

precisely

Precisely MapInfo Pro

User Guide

Version 2021



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1 - Welcome to MapInfo Pro

Thank You for purchasing MapInfo Pro, the most advanced desktop mapping application available! This *Help System* is designed to answer all of your questions about using MapInfo Pro.

This section explains how to get technical support for your product.

In this section

What's New in MapInfo Pro.....	6
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What's New in MapInfo Pro

Thank you for upgrading to trying out the most advanced computer mapping product in the Precisely software family! As the field of computer mapping continues to expand, Precisely leads the way with new products that are designed to fulfil your computer mapping needs from the most basic to the most specialized. This is a list of the most important features and enhancements scheduled to be released with MapInfo Pro 2021.

New Features in MapInfo Pro

Time Series

You can now create a Time Series on a map in MapInfo Pro. A MapInfo Pro Time Series enables you to visualize data and trends from a table or a map over a period of time. You can add a Time Series to a map in MapInfo Pro provided that map has a layer with the date, time, or the datetime attribute.

For details, please see [Adding a Time Series to your Map](#).

Select By Attribute

You can now use the **Select By Attribute** window to create a selection using the conditions and attributes from the table directly without using any SQL queries.

For details, see [Making Queries using the Select By Attribute Command](#).

Smart Text Adornment

You can now add a smart text adornment to a map. A **Smart Text Adornment** is a map adornment that displays a configurable text label over a map.

For details, see [Adding a Smart Text to your Map](#).

Embed Theme Legend

If you have a Theme Legend present, you can add it as an embedded Legend into a map window.

For details, please see [Adding Embedded Theme Legend to a Map](#).

Enhancements and Updates

SQL Cross Join Support

The SQL Select statement now support cross joins. You can now create joins between more than two dynamic query tables. Earlier, this was restricted to only joins between two dynamic query tables.

For details, see [Making Queries using the SQL window](#).

New OGR Table Type

MapInfo Pro now supports a new type of .TAB file that uses the GDAL OGR Vector File library to read and write many file types.

For details, see [Displaying Your OGR Data](#) on page 305.

Updated Export Table command

The **Export Table** dialog has been updated and enhanced to include export to GDAL OGR formats.

For more details, please see [Exporting a Table to a new Format](#)

Table List Updates

New items added to the context menu for the Tables Window.

For details, please see [About the Tables Window](#).

Layer Display Expression Filter

You can now set the layer filter expression using the **Expression** builder dialog in the layer properties of a map.

For details about the SQL window, please see [Changing How a Layer Displays on the Map](#).

WFS Paging Support

Use the new **SQL** window to build and execute SQL queries and statements. The SQL window is essentially a script editor wherein you can write and execute one or more SQL statements along with pre and post script processing snippets. The scripts are run using the *immediate* mode interpreted MapBasic and are not compiled.

For details about the SQL window, please see [Using SQL Window](#).

WFS Auto-Update Support

You can now enable auto update of data and features from a WFS server into a table whenever you zoom-in, zoom-out or Pan a map.

For details, please see [Refreshing WFS Data](#).

Quick Access Toolbar Support for MapInfo Pro Add-Ins

MapInfo Pro Add-Ins can now add menus to the Quick Access Toolbar.

For details, see [Support For MapInfo Pro Add-Ins](#).

Updated Web Content Renderer (Webview2)

The Login window for MapInfo Pro Services has been updated to use a new web content (HTML/Javascript) renderer, WebView2 runtime from Microsoft for the login page and login process. Previously MapInfo Pro had relied on a web renderer that was based off of Internet Explorer 11 and this library has seen a significant lack of updates and support. The change moves the process to utilize the WebView2 runtime from Microsoft that uses a shared renderer from the latest version of Microsoft's Edge Browser which is now based on the open source Chromium project. This is the same rendering engine that is used in Google's Chrome browsers. This renderer supports the latest updates to Javascript, HTML, CSS and other newer web technologies.

Save Copy as in Background

You can now **Save Copy of Table As** as a back ground operation. For details, please see [Saving a Table or a Copy of a Table](#).

You can also select multiple tables from the **Save Copy As** dialog and execute the Save Copy As MapBasic Command. For more details, see [Save a Copy of Multiple Tables](#)

New Coordinate Systems, Projections and Datums

New Croatia Projections added.

New Datum 1029 for Luxemburg (LURES) added.

For datum details, see [Seven or Eight Parameter Datums](#).

Smart Text Aliases

Layout Smart Text Aliases are now visible on the layout ribbon. Click on the **Text** icon on the Layout Ribbon to display a list of all Layout Smart Text Aliases under the **Smart Text** group.

For details, see [Aliases](#) on page 1158.

Save and Rename in SQL Recent List

The **SQL** List Drop-down (accessed by clicking on **SQL**, On the **MAP** tab > **Selection** group) also contains a list of the most recent SQL scripts created using the SQL window.

For more details, please see [Making Queries using the SQL window](#).

Selectable WMS Layer

The WMS layer is now selectable by default. You can toggle it from the WMS layer in the Explorer window.

For details about the selectable WMS layer, please see [Using the Info Tool for WMS Layers](#).

Set Map Projection from Layer

You can now set your map coordinate system to the coordinate system of a table/layer from the Layer window. You can also quickly change the map projection using the status bar for a map window.

For details, please see [Layers Window](#).

New Version of FME - 2021.1

Quick Translator tool and Open Universal Data feature were updated to use latest FME version 2021.1.

For more details, see [Feature Manipulation Engine \(FME\) Format Support](#)

Support for GeoPackage 1.2

MapInfo Pro now supports GeoPackage specification version 1.2. we have also added support for non-mappable GeoPackage tables as per the 1.2 GeoPackage specifications. For details, see [Displaying your GeoPackage Data](#)

MapCad Update

Use the new **SQL** window to build and execute SQL queries and statements. The SQL window is essentially a script editor wherein you can write and execute one or more SQL statements along with pre and post script processing snippets. The scripts are run using the *immediate* mode interpreted MapBasic and are not compiled.

For details about the SQL window, please see [Using SQL Window](#).

Getting Support

Ensuring Your Success

Unquestionably, MapInfo Pro can set your organization apart from your competitors; however, it also requires knowledge of the program's basic functionality.

Here is a four-step process you can use to ensure your own success:

1. Read the documentation.

- MapInfo Pro installs with a set of PDF documents that will help you with all the basic information that you will need to get started with the software. These PDF documents are located in the Documentation subfolder of your installation directory.
- MapInfo Pro also has a context-sensitive *Help System* integrated that contains a comprehensive set of topics that will help you understand all the features and functionality in the software. You can access the help system by pressing F1, or by clicking the help button in MapInfo Pro.

See [MapInfo Pro Documentation](#) for more details.

2. Get trained

Get the most out of your MapInfo Pro software by getting trained in the product and version of the software you are using. Precisely and its partners provide comprehensive training courses throughout the world that is customized to meet your particular business needs. You will learn everything from basic to advanced operations and develop important skills along the way.

See [Getting MapInfo Pro Training](#) for more details.

3. Use support along the way.

When you are stopped at a critical point, Technical Support is here to help.

See [Tech Support](#) for details on contacting your local support center.

MapInfo Pro Documentation

MapInfo Pro documentation, in the form of PDF files, installs with MapInfo Pro in to the Documentation sub folder (for example, C:\Program Files\MapInfo\Professional\Documentation).

You must have the Adobe Acrobat reader installed to view PDF files. To download a free copy of the Adobe Acrobat Reader, go to <https://get.adobe.com/reader>.

Documentation is also available on our website at www.mapinfo.com/miprodocs.

MapInfoProInstallGuide.pdf

MapInfo Pro Install Guide: This document describes the system requirements for installing MapInfo Pro, and describes how to install MapInfo Pro to your desktop. It also provides more advanced topics that an IT Specialist or System Administrator would follow for installing MapInfo Pro within an organization.

ActivatingYourProduct.pdf

MapInfo Pro Licensing and Activation: The first time you start MapInfo Pro you are asked to activate your product using the serial number and access code you supplied during the installation. This document describes the activation process for the type of license your organization purchased.

LicenseServerUtility.pdf

License Server User Guide: If you have purchased MapInfo Pro using a concurrent licensing scheme, you would require a License Server to be installed and maintained to handle requests for product licenses from other computers on the network. This document is designed to help you install, set up, and administer the Precisely License Server.

EasyLoaderUserGuide.pdf

MapInfo EasyLoader User Guide: MapInfo EasyLoader is a utility to upload MapInfo TAB files to a remote database. You can either start MapInfo EasyLoader from within MapInfo Pro or separately if you downloaded your MapInfo EasyLoader from the web. This document provides you all the information that you need to know for using the utility.

MapBasicUserGuide.pdf

MapBasic User Guide: MapBasic Development Environment is a programming language that lets you customize and automate MapInfo Pro. This document provides the concepts behind MapBasic programming, and has all the information that you would need to know for using the MapBasic utility from within MapInfo Pro or separately if you have downloaded your MapInfo MapBasic from the web.

MapBasicReference.pdf

MapBasic Reference: MapBasic Development Environment is a programming language that lets you customize and automate MapInfo Pro. This document describes every statement and function in the MapBasic Development Environment programming language.

Getting MapInfo Pro Training

The best way to ensure success with MapInfo Pro software is to make certain that users are trained in the product and version of the software you are using. Precisely and its partners provide comprehensive training courses throughout the world that is customized to meet your particular business needs.

Since Precisely recognizes that it is not always possible for the designated contact to be trained immediately, Precisely offers a 30-day grace period on this requirement. At the end of the 30-day grace period, Technical Support reserves the right to withhold support from untrained designated contacts.

Note: Trained contacts can place an unlimited number of support calls during the time period of a valid technical support contract.

Precisely also manages a YouTube channel where you can find short video tutorials for using MapInfo Pro: www.youtube.com/mapinfo.

Technical Support

Precisely offers a free support period on all new software purchases and upgrades, so you can be productive from the start. Once the free period ends, Precisely offers a broad selection of extended support services for individual, business, and corporate users.

Technical Support is here to help you, and your call is important. This section lists the information you need to provide when you call your local support center. It also explains some of the technical support procedures so that you will know what to expect about the handling and resolution of your particular issue.

Please remember to include your serial number, partner number or contract number when contacting Technical Support.

Before You Call

Please have the following information ready when contacting us for assistance:

1. **Serial Number.** You must have a registered serial number to receive Technical Support. To locate your serial number, click on **PRO** tab, and click **Licensing** to display the **Manage Your Licenses** page.
2. **Your name and organization.** The person calling must be the contact person listed on the support agreement.
3. **Version of the product you are calling about.** To locate your MapInfo Pro version, click on **PRO** tab, and click **About**.

4. The operating system name and version.
5. A brief explanation of the problem. Some details that can be helpful in this context are:
 - Error messages
 - Context in which the problem occurs
 - Consistency - is the problem reoccurring or occurring erratically?

Contacting Technical Support

Precisely provides full technical support for the currently shipping version plus the two previous versions of MapInfo Pro.

Precisely also provides extended support options at each of our technical support centers in the Americas, Europe/Middle East/Africa, and Asia-Pacific regions. To contact the office nearest you, go to our website at <http://support.precisely.com>.

To use Technical Support, you must register your product. This can be done very easily during installation or anytime during normal business hours by contacting Customer Service directly.

Technical Support Online Case Management System

The Technical Support Online Case Management system is another way to log and manage cases with our Technical Support center. You must register yourself the first time you access this site if you do not already have a user ID.

<http://support.precisely.com>

Locating the MapInfo Pro Log File (minidump file)

When MapInfo Pro closes unexpectedly, it generates a binary log file that is referred to as a minidump file. Your Technical Support associate uses this file to investigate and fix the issue that caused the unexpected closure. Depending on what occurred, you may not need to provide sample data or access to your data.

MapInfo Pro saves the minidump file in the Windows **%temp%** folder under a subfolder called **MIPRO**. The **%temp%** folder is set by default to:

```
C:\Users\<username>\AppData\Local\Temp
```

To browse directly to this folder location:

1. On the **Start** menu, click **Run** to open the **Run** dialog box.
2. In the **Open** text box, type **%temp%/MIPRO**.

The minidump file has a date and time stamp in its name in the format **yyyy_mm_dd_hh_mn_ss.dmp**. Where:

- **yyyy** - year

- mm - month
- dd - day
- hh - hour
- mn - minute
- ss: seconds

When reporting an issue to a Technical Support associate, send this file with your report. Depending on what the issue is, this file will speed up the response time to your issue.

Setting an Environment Variable for the MapInfo Pro Log File

You may be asked to set an environment variable to generate a minidump file that has more information in it. This helps your Customer Support representative determine why MapInfo Pro closes unexpectedly and how to fix the issue.

To include more details in the minidump file by setting the **MI_FULLDUMP** environment variable:

1. On the **Start** menu, click **Control Panel**, and type *Advanced System Settings* in the search box. Click **Advanced System Settings** in the results to open the **System Properties** dialog box.
2. Select the **Advanced** tab and then click **Environment Variables** to open the **Environment Variable** dialog box.
3. In the **User variables** group, click **New** to open the **New User Variable** dialog box.
4. Set the following:
 - In the **Variable name** field, type `MI_FULLDUMP`.
 - In the **Variable value** field, type the value `1`.
5. Click **OK** to close the dialog boxes and save the new variable.

If MapInfo Pro is running, then stop and restart it now to apply the new system variable. The minidump file could be large; a typical size would be between 500 MB and 1 GB. You may need to compress the file (using a compression tool, such as WinZIP) before sending it to your Technical Support associate, or you may need to make it available for download.

Locating the License Log File (PBLicense.log file)

You can address licensing issues, such as the loss of licenses, by specifying that error messages from the License Server are written to a log file. You would use this capability when reporting licensing issues to your Customer Support Representative, who will assist you with setting the license logging level. Your Customer Support Representative will read the messages in this log file to assist with troubleshooting license issues.

To turn on error logging and specify the amount of information saved to a log file, you would set a License Server environment variable called `MI_LOGLEVEL` to a value of 1 to 3. Setting a value of zero (0) disables error logging. By default, the License Server logging level is set to one (1), which logs error messages for some specific situations and if there is a deletion of invalid licenses.

Logging Level	Action
0	Disables logging.
1	Logs short error messages and error codes, and logs if there is a deletion of invalid licenses. This is the default setting.
2	Logs detailed error messages and error codes, logs if there is a deletion of invalid licenses, and logs additional diagnostic messages.
3	Logs everything that level 2 logs with additional information. This level is only useful for client applications like MapInfo Pro that use borrowable or distributable licenses.

The License Server writes log entries to a file called **PBLicense.log** in the Windows **%temp%** folder on the machine where the License Server is running. MapInfo Pro creates the same log file to the same location. The **%temp%** folder is set by default to:

```
C:\Users\<username>\AppData\Local\Temp
```

When reporting a licensing issue to your Precisely Technical Support representative, you will send this log file along with the details of your issue.

If the log file reaches the maximum size limit (of approximately 1MB), then it is renamed to **PBLicenseLog.bak**, and the new log entries are written in the new **PBLicense.log** file.

To set the logging level:

1. On the **Start** menu, click **Control Panel**, and type `Advanced System Settings` in the search box. Click **Advanced System Settings** in the results to open the **System Properties** dialog box.
2. Select the **Advanced** tab and then click **Environment Variables** to open the **Environment Variable** dialog box.
3. In the **User variables** group, click **New** to open the **New User Variable** dialog box.
4. Set the following:
 - In the **Variable name** field, type `MI_LOGLEVEL`.
 - In the **Variable value** field, type the logging level (a value of 0 to 3). Setting a value of zero (0) disables error logging. Setting no value causes the License Server to use a default logging value of one (1).
5. Click **OK** to close the dialog boxes and save the new variable.

If the License Server is running, then stop it and restart it to apply the new system variable and start logging messages. If MapInfo Pro is running, then you must also restart it.

Exporting License Information

The License Server Utility exports all active license information on your server into a text or CSV (comma separated value) format. If you have licenses for multiple versions of MapInfo Pro, you need to select the MapInfo Pro version before exporting the license information.

To export the license information:

1. Start the License Server Utility.
2. Choose the MapInfo Pro version in the **Product Name** list.
3. From the **License** menu, choose **Properties** to open the **License Properties** dialog box.
4. On the **License Properties** dialog box, click **Export** to open the **Save As** dialog box.
5. On the **Save As** dialog box, specify the file save location in the **Save in** box.
6. Specify a file name in the **File name** box.
7. Choose .txt or .csv from the **Save as type** list.
8. Click **Save**.

The license information saves to the selected format.

Customer Service - Your Non-Technical Support

To resolve questions about the accounting of your product, contact the Customer Service department. Keep in mind that this is not a technical support resource. To contact the office nearest you, go to:

<http://support.precisely.com>

Other Available Resources

Here are some other resources available to you when you need assistance in using or learning to use MapInfo Pro.

MapInfo-L Discussion Group

MapInfo-L (MapInfo List) is an independent discussion group, which Precisely monitors to respond to questions posted to this site. To subscribe to this discussion group, go to:

<http://groups.google.com/group/mapinfo-l?hl=en>

and click **Join this group**.

Note: Any messages sent to the list can be read by anyone on the list.

MapInfo Tools Website

MapInfo Tools is a web site organized by Barbara Carroll as a repository and free file exchange for software tools.

www.mapinfotools.com

Tell Us What You Think!

Want to give MapInfo Pro Engineers feedback? We have an option to provide direct product feedback to Precisely. If you have a need for a new feature, or you need our product to do something it does not currently do, use this feature to write to us. Whether you want to complain or complement, let us know so we can meet your MapInfo Pro needs better.

To send us feedback:

- On the **PRO** tab, click **About**, and **Suggestions** to post your thoughts on our ideas forum.

Our team of Product Managers and Engineers will collect your feedback and consider your request in a future release of MapInfo Pro. You will be able to track the activity on your suggestions through different statuses and maintain a list of your ideas or suggestions. Your suggestions will be grouped with other similar ideas to help us build a list of new features and work-flows for the application. You may be invited to give your feedback on the scoping and implementation of these suggestions and participate in surveys that help us narrow down the priority of the features we are working on.

Our goal is to ensure that MapInfo Pro stays on the forefront of your needs and product requirements. Help us do that important work for you!

Customer Experience Improvement Program

Precisely is pleased to offer our customers and users the opportunity to participate in the improvement and development of Precisely products. We believe that our customers are the best source of information on how we can consistently improve the usability of the products we offer. We have created a Customer Experience Improvement Program (the “EIP”) in order to collect information about how our users and customers use our products, problems they may encounter while using the products, and features and functions most often used by our customers. This allows us to provide thoughtful, continuous improvement to ensure that we offer our customers the best user experience available.

1. **Participation.** Your participation in the EIP is voluntary. You may elect to not participate in EIP upon installation of the product, and at any time thereafter. If you choose at any time to end your participation in the EIP, you can go to the options, settings, or help menu for your product and change your settings to end your participation. If you received our products under a beta or evaluation license, your participation in the EIP is automatic. If you choose not to participate in the EIP, you may cease use of your beta or evaluation product to end your participation.
2. **Collected Data.** We will collect general information about: (i) our products (such as version number, serial number (if applicable), the type of license purchased, and whether or not your product was purchased with a maintenance agreement; (ii) the computer on which our products are installed (such as machine name, manufacturer, model, clock speed, processors, amount of memory, operating system, hard drive model/capacity, screen resolution); (iii) product experiences (such as start-up/shutdown/crash details, time spent in various parts of the products, which menu options/commands are used and their frequency); and (iv) the general location/geography of the computer. The EIP will not collect information specific to you as the user, such as your name, address, or telephone number.
3. **Collecting Data.** The EIP will only collect the general information about the computer on which our products are installed, and the products themselves. This may include tools, MBX, plugins, and add-ins (“Add-Ins”). The EIP will only collect data from Add-Ins that are created or provided by us. The data is collected through web-enabled functionality within the products. The EIP will not collect data related to other software, applications, files or information that may reside on the computer, including Add-Ins created by you or third parties that you may elect to install on your computer.
4. **Use of Data.** We will only use the data collected through the EIP for internal purposes like the improvement of our products or services. We may share this data with our partners and providers, but this data will not be able to be used to identify you. Participation in the EIP will not result in additional marketing emails, surveys, or other communications.
5. **Access to Data.** Since there will not be information to connect you as an individual to the data collected through the EIP, unfortunately we are not able to provide any participant with the ability to review or remove data once collected by the EIP.
6. **Location of Data.** This data may be collected, stored, and accessed by us within the United States or any geography in which we or any of our affiliates or partners operate.
7. **Further Information.** If you have any questions regarding your participation in the EIP, please contact us at: <http://support.precisely.com>., or at: Precisely, 2 Blue Hill Plaza, #1563, Pearl River, NY 10965.

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Contact and support information is located at: <http://support.precisely.com>.

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2 - Getting Started

This section explains how to start working with MapInfo Pro.

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Introduction to MapInfo Pro

MapInfo Pro is a comprehensive computer mapping tool that enables you to perform complex geographic analysis such as redistricting, accessing your remote data, dragging and dropping map objects into your applications, creating thematic maps that emphasize patterns in your data, and much more.

With MapInfo Pro, the power of computer mapping is at your complete disposal. You can display your data as points, as thematically shaded regions, as pie or bar charts, as districts, etc. You can perform geographic operations such as redistricting, combining and splitting objects, and buffering. You can also make queries against your data and access your remote data directly from MapInfo Pro.

For example, MapInfo Pro can show which branch store is the closest to your biggest customers. It can calculate the distances between customers and stores; it can show you the customers who spent the most last year; it can color-code the store symbols by sales volume. What makes it all come together is a visual display of your data on the map.

Mapping at a Glance

Huge quantities of information are available today, far more than ever before. Data abounds in spreadsheets, sales records, and marketing files. Paper and disk store masses of information on customers, stores, personnel, equipment, and resources. Thematic maps show distribution of customers for a marketing campaign.

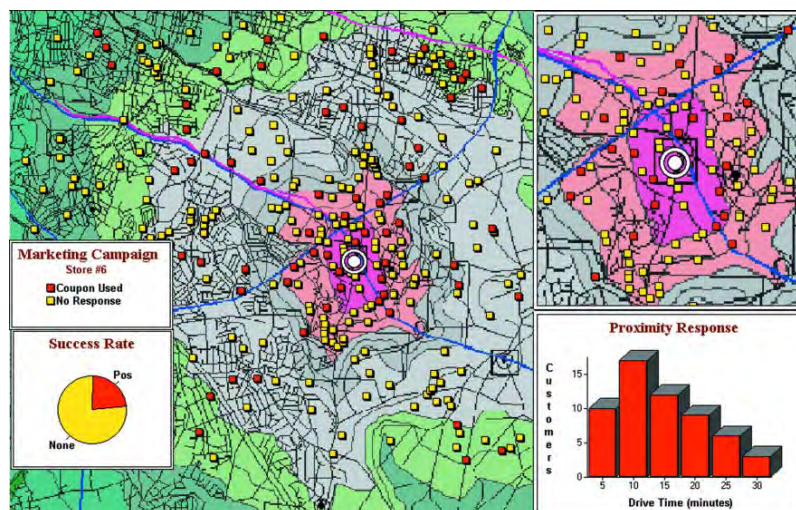


Figure 1: Thematic Map Example

Nearly all data has a geographic component. An estimated 85 percent of all databases contain some sort of geographic information such as street addresses, cities, states, postal codes, or even telephone numbers with area codes and exchange numbers.

Computer mapping can help you sort through all of this information, and using the geographic components in your data, display your results on a map. This lets you see patterns and relationships in the mass of information quickly and easily without having to pore over your database.

Using Your Own Data

To begin with, you can use the data you already have, in the form it is already in—spreadsheets such as Excel, databases such as Access, popular CAD packages, and other GIS applications, to name just a few. If your data is on a remote database, you can access it directly from MapInfo Pro. If you have data that is not already online, you can create database files right inside the product, or use data supplied by Precisely, such as census data.

Similarly, you can use any of thousands of maps available from Precisely, everything from street and highway maps to world maps. You can also create your own maps, either in MapInfo Pro or with a drawing package. You can diagram anything - floor plans, flow charts, even brain anatomy - can be treated as a map and entered into the product.

After you have organized your data visually, you will save the results to files, or send them to any of the dozens of printers and plotters MapInfo Pro recognizes.

If you have your data on hand and you can read a map, you are just about ready to begin. Soon, we will show you an example of how easy it is to put MapInfo Pro's power to work for you.

But first, install MapInfo Pro following the instructions in the *MapInfo Pro Install Guide*. If you are new to the product, or new to computer mapping, we suggest you refer to this guide for an overview of basic mapping terms and concepts. Use the web-enabled tutorial to learn about its features, and become accustomed to the more common tasks and functions.

For more product and service information, you can connect directly from MapInfo Pro to our forum (on the **PRO** tab, click **Products**, and **visit the website**), or visit us at <http://www.precisely.com/product/precisely-mapinfo/mapinfo-pro>.

Reviewing MapInfo Pro Features

MapInfo Pro gives you the processing power of databases (including powerful SQL queries) and the visual power of maps. It is an essential business tool for data analysis, sales, and presentations.

Here is a look at some of the features MapInfo Pro offers:

- Direct opening of files created with dBASE or FoxBASE, delimited ASCII, comma delimited CSV files, ESRI shapefiles, Lotus 1-2-3, Microsoft Excel, and Microsoft Access; importing of graphics files in a variety of formats; a function for creating database files from within the product.
- Multiple views of your data in **Map** or **Browser** windows. Hot Views allow you to open multiple views of the same data and update them when you change any one view.
- Live ODBC access to remote database data, such to SQL Server.
- Seamless map layers that allow you to handle several map layers as if they were one layer.
- Legend Designer window, enabling you to create and customize legends for any map layer.
- Thematic maps to create analyses of your data with high visual impact, including grid surface themes, 3DMaps, and Prism maps.
- Use raster underlay capabilities to enhance your work session.
- Querying capabilities ranging from simple data selections from a single file to complex SQL queries from one or more files.
- Workspaces that save all your settings and views so you can start where you left off.
- HotLinks that let you launch files or URLs directly from a **Map** window.
- A comprehensive array of drawing and editing tools for customizing your maps.
- Thousands of ready-made maps and functions for creating your own maps.
- A layout window for preparing output.
- Printing and export capabilities for high-quality output
- The ability to change the projection of your map for display or digitizing.
- Object processing functions that help to correct errors in data, set node snap tolerances for different objects, as well as thin nodes and polygons.

When it is time to run MapInfo Pro, you will feel right at home with its windowing environment. After you have organized your data visually, you will save the results to files, or send them to your printer or plotter.

For tips to help you succeed in using MapInfo Pro, see *Ensuring Your Success* in the *MapInfo Pro: Getting Support Guide*.

Getting Started

This section describes that a map is the visual representation of data files where each data file displays as a layer on the map.

MapInfo Pro helps you analyze your data on a map for activities such as appraisal, conservation, forecasting, planning, surveying, demarcating, tracking, or managing. You can tailor maps to your specific uses for analysis.

A map is a visual representation of data that has location. MapInfo Pro displays data on the Earth, such as country boundaries, but can also display data that is relative to itself, such as a building floor plan. Seeing data visually on a map gives you the locations of where things are, the relative importance of things through the use of symbols or colors, and the relationships between locations.

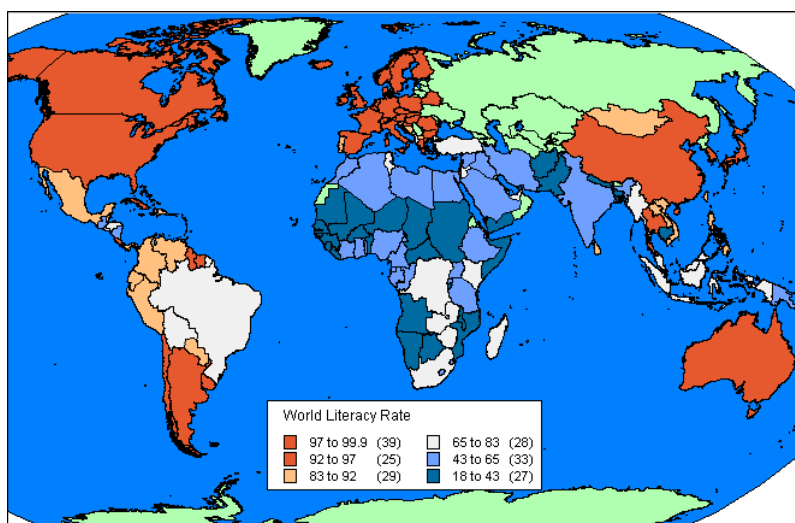


Figure 2: World map showing relative literacy rates where each color represents a range of average values.

Data must be in the form of tables. MapInfo Pro displays data tables as layers on a map. Each table is a single layer and a map may have many layers (tables) on display. For more information about how MapInfo Pro represents data on a map, see [What is a Layer?](#).

A data table organizes information by rows and columns, so that you can easily visualize and manage information in a database, such as SQL Server, or in data management software, such as Microsoft Excel. MapInfo Pro access data tables in a database directly or lets you import data tables to work with them directly in MapInfo Pro's native .TAB format.

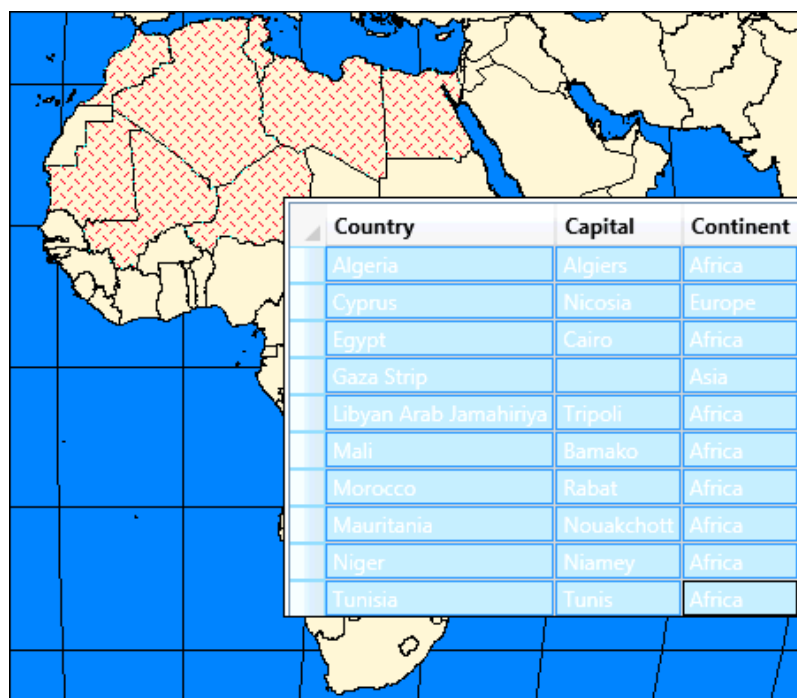


Figure 3: Map displaying three layers: capitol cities, country boundaries, and ocean layers. A Query Browser window displays a table with the results of a simple selection.

Data is represented on a map as an object, such as a point to mark a location, a polygon to mark the boundaries of a region, or a line to mark a route.



Figure 4: A simple map showing store locations as points, circles as sales territories, and lines as roads and railways.

For more information about:

- Data, see [Data - Where MapInfo Pro Begins](#).
- Map objects, see [Map Objects as Part of Layers](#).

In MapInfo Pro you begin by opening your table of data and displaying it in a Map window. Each table you open displays as a separate layer. Before you launch MapInfo Pro, you will need to know where your data tables are located or you will need to set up access to your remote data source.

For details, see *Working with Data in a DBMS* in the *Help System*.

To help you visualize your data and give it context, open a few of the sample data tables that come with MapInfo Pro, such as country and county boundaries, roadways, or city locations. If you have not already done so, install the sample data from the MapInfo Pro DVD. For instructions on how to do this, refer to the *MapInfo Pro Install Guide*.

You are then ready to launch MapInfo Pro as described under [Starting and Leaving MapInfo Pro](#).

There is a lot of information under [A Tour of the MapInfo Pro User Interface](#) that describes how to work with MapInfo Pro. Review this section and the other sections in this *MapInfo Pro: Getting Started* Guide to learn how to work with this product.

For more information about working with data, see the following topics in the *Help System*:

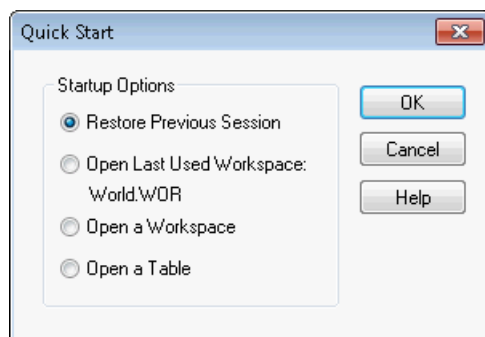
- *Understanding Your Data*
- *Putting Your Data on the Map*
- *Working with Data in a DBMS*

Starting and Leaving MapInfo Pro

In this section we cover the very basics of starting MapInfo Pro, using the `STARTUP.WOR`, and exiting the program. Since opening a table is basic to getting started in using MapInfo Pro, we cover that topic here, as well.

Starting MapInfo Pro

The **Quick Start** dialog box opens every time you start MapInfo Pro, so that you can return to the previous mapping session or start a new mapping session with different data.



To start MapInfo Pro:

1. Launch MapInfo Pro by doing one of the following:

- Double-click the MapInfo Pro icon on your desktop.
 - On the **Start** menu, click **MapInfo**, and **MapInfo Pro 2021**.
2. In the **Quick Start** dialog box, choose how you want to start your mapping session.
 - If you are returning to MapInfo Pro, you can return to the previous mapping session by choosing **Restore Previous Session** or **Open Last Used Workspace**.
 - If this is your first look at MapInfo Pro, choose **Open** on the **HOME**, **TABLE**, **MAP**, or **LAYOUT** tabs. The **Open** list displays a variety of resources that you can open in MapInfo Pro.
 3. Click on the desired resource. The appropriate dialog box for the resource opens.

Note: The **Quick Start** dialog box displays every time you start MapInfo Pro, but you can change this behavior in the Startup preferences. On the **PRO** tab, click **Options**, and **Startup** to open the **Startup Preferences** dialog box. Clear the **Display the Quick Start Dialog** check box.

For details, see *Setting the Startup Preferences* in the MapInfo Pro *Help System*.

Exiting MapInfo Pro

To leave MapInfo Pro, on the **PRO** tab, click **Exit**. There is no confirmation message.

Note: If you made changes to a table and did not save them a prompt appears asking you if you want to save the changes. Unless you choose **Save**, the changes are lost.

Leaving MapInfo Pro using the MAPINFOPRO.WOR Workspace:

The Startup preferences allow you to automatically save your work setup to a workspace when you exit, and display that setup when you enter MapInfo Pro again.

To set the preference option that allows you to save your setup to the MAPINFOPRO.WOR workspace:

1. On the **PRO** tab, click **Options**, and click **Startup** to open the **Startup Preferences** dialog box.
2. Select the **Save MAPINFOPRO.WOR when Exiting MapInfo** check box.

Note: To also load the workspace at startup, clear the **Display Quick Start Dialog** check box and select the **Load MAPINFOPRO.WOR when Starting MapInfo** check box.

3. Click **OK** to save these settings.

MapInfo Viewer

MapInfo Pro users who register with a Precisely online account are able to run MapInfo Pro in a connected **Viewer Only** (subscription) mode.

In order to run the Viewer version of MapInfo Pro, you must first create an online account. You can do this from the MapInfo Pro **Backstage Services** Tab, when you first run MapInfo Pro Viewer.

Note: You can switch which user is logged in on the **Backstage Services** Tab.

See **Capabilities and Limitations** on page 31 for more information on the MapInfo Viewer features.

Capabilities and Limitations

When running MapInfo Pro in **Viewer** (subscription) mode, you are connected to your Precisely account upon start-up. Each MapInfo Pro account is assigned to a **Viewer** subscription plan which identifies the set of features available to you in MapInfo Pro. Currently there is only one plan - **Viewer**. In future, we may offer other free or paid plans with different levels of functionality. In addition, which features are available in each plan can change over time as features are added or removed from the plan.

MapInfo Pro Viewer supports all languages supported by MapInfo Pro.

Features and Limitations

- MapInfo Viewer (subscription) mode allows you to open and view any MapInfo Pro workspace (.wor) file. In addition you can open MapInfo .tab files and other supported formats (such as geopackage, csv, excel, sql server, postgis, etc.) in order to view and understand your data.
- Editing of data is not supported (restricted). Saving of any changes to the workspace is also not allowed.
- Limited analysis is allowed such as queries, selections, browsing data, turning map layers on/off. Printing (and exporting to pdf) of Maps and Layouts are allowed.
- Limited editing of Layout text and image frame are allowed before printing.
- Only a limited set of Tools are allowed to run. Running a MapInfo Pro Add-in or program (.mbx) is prohibited.
- Bing basemaps and search functionality is only allowed if your organization has a Bing Key, which can be entered on the **Backstage Licensing** Tab.
- It is expected that some users in your organization will have a fully licensed version of MapInfo Pro and can create workspaces to share and be viewed by other users running only the MapInfo Pro Viewer.
- Technical Support for MapInfo Viewer is limited to installation issues. To contact support for your location, refer to the support section on our website.

Note: If running MapInfo Pro in Viewer (subscription) mode, you cannot opt-out of the **Customer Experience Program** and this feature will be turned on by default. If user is running a normal licensed copy of MapInfo Pro then the Customer Experience Program is optional and may be turned on or off from the backstage (Pro Tab, Options, Application Preferences).

Styling

The Viewer uses a subdued gray theme, while MapInfo Pro has been updated to use a little more colorful blue theme.

If for any reason the old styling for Pro is desired you can change the "OverrideDefaultStyle" key to "true" in the `styles\MapInfoProStyle.xml` file under the MapInfo Pro installation folder.

Note: Inside this file is also a detailed description of the style changes we have made for Pro and the Viewer.

How To Run

The MapInfo Pro installer adds a shortcut (Icon) to the Windows Start Menu to start MapInfo Pro in Viewer (subscription) mode. This icon is located next to the regular MapInfo Pro Start Menu shortcut.

The same MapInfoPro.exe is used for both the normal licensed version of MapInfo Pro, the trial version and the Viewer (subscription) version. There are three ways to choose which mode to run MapInfo Pro in.

- Command line
 - to start Pro in Viewer mode: `MapInfoPro.exe /Subscription=On`
 - to start Pro in Viewer mode with a specific plan: `MapInfoPro.exe /Subscription=planid`
 - to start Pro in full licensed mode: `MapInfoPro.exe /Subscription=Off`
- MapInfoPro.exe.config
 - Add key under appSettings section
 - `<add key="Subscription" value="Off"/>` to start Pro in full licensed mode
 - `<add key="Subscription" value="On"/>` to start Pro in Viewer mode
 - `<add key="Subscription" value="MIPRO_Viewer"/>` to start Pro in Viewer mode with a specific plan named 'planid'

How do I switch from Viewer to the fully licensed version of Pro

Start MapInfo Pro from the shortcut on the start menu. When prompted enter your license key to activate MapInfo Pro.

Look and Feel

With the introduction of the MapInfo Viewer, we needed to visually distinguish between the two ways of running MapInfo Pro. For this, we have introduced new styling to MapInfo Pro and the MapInfo Viewer.

The Viewer uses a subdued gray theme, while MapInfo Pro has been updated to use a little more colorful blue theme.

If for any reason the old styling for MapInfo Pro is desired you can change the "OverrideDefaultStyle" key to "true" in the `styles\MapInfoProStyle.xml` file under the MapInfo Pro installation folder. (Same for MapInfo Pro Runtime)

Note: Inside this file is also a detailed description of the style changes we have made for MapInfo Pro and the Viewer.

The Viewer version of MapInfo Pro also has a slightly different icon in the Windows Task bar and MapInfo Pro main window. The Welcome window and About backstage pages both show which subscription plan is in use - typically 'Viewer'.

In addition to the limitation described above you will notice some visual differences. Parts of the MapInfo Pro user interface that are not needed are hidden to simplify the Viewer experience. The SPATIAL Tab is hidden for example, along with some groups from the Map and Table Tabs. Other commands on the ribbon are hidden or disabled. If a command is disabled due to not being available in the current plan, its tool-tip will indicate that.

When run in subscription mode Pro uses different docking and ribbon state file-names to allow for separate window and ribbon customizations based on the plan name. For example:

- `MapInfoPro.RibbonState_Viewer.<language_code>.xml`
- `MapInfoPro.DockingState_Viewer.xml`

File Associations

When MapInfo Pro is started by double-clicking on a registered file type such as workspace (*.wor) or table (*.tab) it checks the value of a registry key to determine whether to run in Viewer (subscription) mode or normal mode.

The registry key is located at

```
HKEY_CURRENT_USER\Software\MapInfo\MapInfo\Professional\1700\CloudVersion,
and
```

```
HKEY_LOCAL_MACHINE\Software\MapInfo\MapInfo\Professional\1700\CloudVersion
```

If the **HKEY_CURRENT_USER** key exists, it uses that value, else it looks for the **HKEY_LOCAL_MACHINE** value.

If the value of the `CloudVersion` registry key is = 1, MapInfo Pro is started in subscription mode.

If the value of the `CloudVersion` registry key is = 0 or the key is not present, MapInfo Pro is started in normal licensed mode.

To switch the default value of this registry key, there are two files installed in the same location as where MapInfo Pro is installed.

- `DefaultToFullPro.reg` - Default to normal licensed mode.
- `DefaultToSubscription.reg` - Default to Viewer (subscription) mode.

Double-click on either file to set the registry key value.

Using the Tools in the Tools Manager

MapInfo Pro contains tools that simplify mapping tasks, convert MapInfo Pro files to different file formats and vice versa, automate tasks for working with DBMS tables, and more. The Tools Manager helps you run and manage these many utilities easily.

Use the Tool Manger to run, add, edit, or remove tools from MapInfo Pro. You can also configure a tool to run automatically upon startup. If you performed a Custom installation, you may have elected to not install the tools. In this case, when you open the **Tools Manager**, the list box will be empty (on the **HOME** tab, in the **Tools** group, click **Tool Extensions**).

For a list of available tools and for information about using the tools in MapInfo Pro, see *Working with MapInfo Pro Tools* in the MapInfo Pro *MapInfo Pro: Productivity Aids* Guide.

MapBasic Available Free of Charge on the Web

The MapBasic development environment is a free download. To get your copy, follow the **Location Intelligence Product Downloads** link on the Precisely web site, at <http://support.precisely.com>. There is also information there about building custom applications and integrating MapInfo Pro into your application using the MapBasic development environment.

To obtain your free copy of MapBasic and access other resources to enhance your use of MapInfo Pro, you need to register on the Precisely site before accessing this download page.

Backup User Modified Settings File

The first time you start MapInfo Pro after an upgrade, any files that have been modified will be backed up into a folder named `backup_yyymmdd_hhmm` (current date and time) at the following location.:

```
%LOCALAPPDATA%\MapInfo\MapInfo\Professional\version
```

While MapInfo Pro installation is in progress, you will see a pop-up window with the following message:

```
Copying files and tools for first time use by this user.
```

If any files were backed up, a **Task** is created, and it is visible in the **Tasks** Window. The task has a command button to open the backup folder in windows explorer. The **View Log** command shows the name of the backup folder. A notification bubble on the MapInfo Pro status bar indicates that the task has completed (unless that preference is disabled). You can safely close the tasks window as

this is purely informational. Advanced users can decide to restore their backed up files for use by MapInfo Pro.

A Tour of the MapInfo Pro User Interface

Introduction

This section provides an overview of the MapInfo Pro user interface. The application interface consists of a **command ribbon**, **Quick Access Toolbar** and **Status Bar**. The **command ribbon** is located across the top of the desktop where tabs provide access to all MapInfo Pro features and functionality. The **Quick Access Toolbar** allows you to place frequently used commands in one location, either above or below the ribbon. The **Status Bar** provides information during a MapInfo Pro session, some of which can be changed on the fly. Like many aspects of MapInfo Pro, these user interface components can be configured to match your needs and working style.

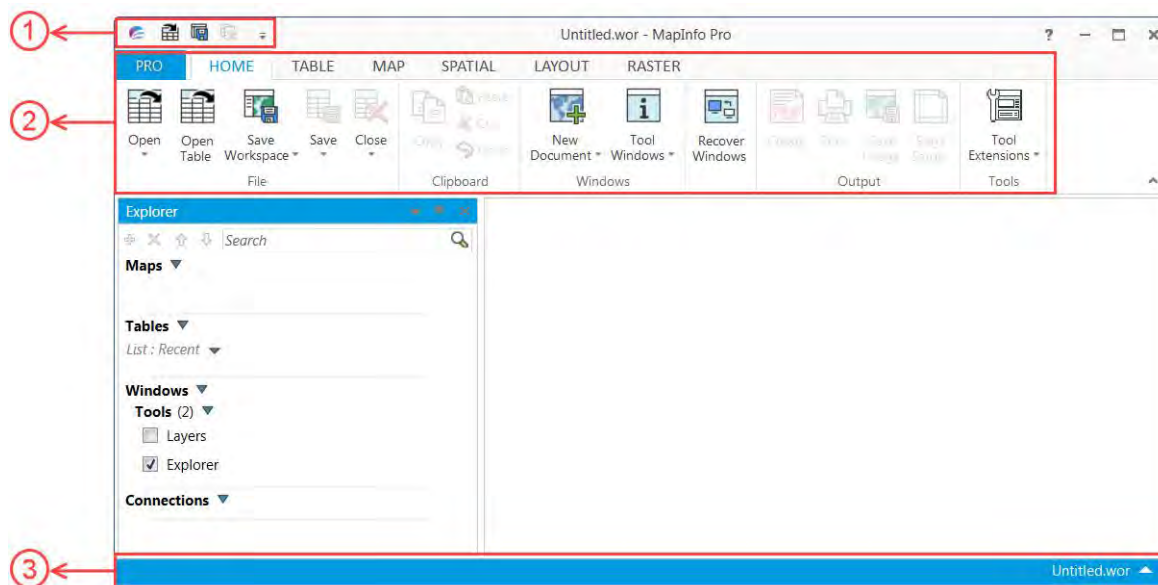


Image call-outs:

- 1 - Command Ribbon
- 2 - Quick Access Toolbar
- 3 - Status Bar

The best way to learn the new user interface is to start using it.

If your copy of MapInfo Pro includes introductory data, you may want to install it now, as described in the *MapInfo Pro Install Guide*. You can then view the sample data in MapInfo Pro as a map while getting familiar with the features of this product.

For more information, see [Opening MapInfo Pro Introductory Data](#)

The Welcome Window

The Welcome Window is an informative and functional page that appears when you start MapInfo Pro. It provides you a quick access to recently used tables and workspaces and the possibility to open new ones. You can also access the base Bing maps (Aerial, Roads and Hybrid) from the Welcome Window.

The Welcome Window also has links to the Precisely Li360 Community site. Li360 is a Location Intelligence and GIS Community that contains useful information and video demonstrations on how to effectively use MapInfo Pro.

You can also access resources like Technical Support and Documentation along with useful suggestions on how to use MapInfo Pro optimally right from the Welcome Window.

You can also access workspaces from the **Welcome Window**. Click **Sample Workspaces...** under **Workspaces** on the **Welcome Window**.

All functionalities in the Quick Start dialog are now available in the [Welcome Window](#). So, the Quick Start dialog has been removed from MapInfo Pro.

As a result of this change, the Startup Preferences dialog has been updated. The checkbox controlling display of the Quick Start dialog has been replaced with a checkbox to control the display of the Welcome Window.

Also, if you turn ON the Welcome Window, the MapInfoPro.wor workspace would not be automatically loaded and the checkbox to turn it ON in Startup preferences is also disabled.

About the MapInfo Pro Ribbon

The MapInfo Pro desktop is a collection of tabs, groups and commands that are accessible from a ribbon layout across the top of the desktop. Each tab contains a number of related groups of features, while within the groups are the commands and command lists for performing MapInfo Pro's operations. The following is a brief overview of the tabs and their contents. See the individual topics for details.

- **HOME** – This tab includes **File** and **Window** groups of commands, as well as **Clipboard**, **Output** and **Tools**. The **Open** command list includes commands to open every type of supported resource from tables and workspaces to Base Maps and database connections.
- **TABLE** – This tab has groups of commands related to working with tables, such as **Selection** and **Edit**.

- **MAP** – This tab has commands for creating map content, manipulating, navigating, labeling, and analyzing map data.
- **SPATIAL** – This tab has the groups and commands for selecting, editing and creating data, including geocoding.
- **LAYOUT** – This tab has commands for creating layouts for output.
- **RASTER** – This tab has commands for working with MapInfo Advanced. You need a Premium license to enable all of the commands.
- **LEGEND** – This tab has commands for working with map legends and the **Legend Designer** window. It displays after creating a map legend.
- **THEME** – This tab has the most commonly used commands and command lists for working with theme settings and styles.
- **STYLE** – This tab has commands for changing the display styles for layers. It displays after highlighting a layer in the **Layers** or **Explorer** window.
- **LABELS** – This tab has commands for working with layer labels. It displays after highlighting a layer in the **Layers** or **Explorer** window.
- **GRIDLINES** – This tab has commands and command lists for managing the gridlines in a **Map** window. It displays after selecting a Gridline layer for a map in the **Explorer** window.

One additional tab to the left of the others is the **PRO** tab where you access licensing and help tasks and product information. One key group on this tab is the **Options** group where you choose settings for a wide variety of features. It is organized into **System**, **Window**, and **Devices** subgroups.

For convenience, some of the commands are repeated on more than one tab, such as the **Open** command on the **HOME** and **TABLE** tabs, and selection commands on the **MAP** and **SPATIAL** tabs.

The tabs are also available when a window is floating. For example, a floating **Browser** window displays the **TABLE** tab. A floating **Map** window displays the **TABLE**, **MAP** and **SPATIAL** tabs.

Several additional tabs appear on the ribbon when certain conditions are met. These include the **STYLE** and **LABELS** tabs when you highlight layers in either the **Layers** or **Explorer** windows. For details, see the [STYLE Tab](#) and the [LABELS Tab](#).

The **LEGEND** tab is available when a **Legend Designer** window is active. See *About the Legend Designer Window* in the *Help System*.

The **LEGACY** tab is visible on the MapInfo Pro ribbon after running a MapBasic tool that includes ribbon commands. For information on how to run or add MapBasic tools to your MapInfo Pro, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids Guide*.

Customizing the Ribbon

The MapInfo Pro ribbon can be customized to suit your needs and work style. For example, create custom tabs and custom groups to hold frequently used commands. Re-arrange tabs and groups to put commands where you want them. Minimize the ribbon to enlarge your work area.

Commands must be added to a new tab or a new group in an existing tab. They cannot be added to an existing group.

To customize the ribbon:

1. Right-click on the ribbon and choose **Customize Quick Access Toolbar** to open the **Customize Ribbon** dialog box.

This dialog is also available from the **Customize Quick Access Toolbar** menu, in the upper left corner of the desktop, by choosing **More Commands**.

2. Highlight **Customize Ribbon** in the left pane to access the customizable settings.

The following instructions describe how to create new custom tabs or groups, add commands, and organize them on the ribbon.

To add a new tab to the ribbon:

1. On the **Customize Ribbon** dialog box, click the **New Tab** button. A New TabX (Custom) displays in the pane. Rename the tab.
2. Click **OK** to save your changes.

To add a new group to an existing tab:

1. On the **Customize Ribbon** dialog box, in the panel under the Customize the Ribbon heading, highlight a tab and click **New Group**. The tab will now include a NewBarX (Custom). Click the **Rename** button to rename the custom group.
2. Click **OK** to save your changes.

To customize the command group:

1. On the **Customize Ribbon** dialog box, from the **Choose commands from:** drop down list, choose a command group or choose **All Commands** (default). The commands list updates based on your selection.
2. Highlight the tab or group to prepare it for a new command.

Commands are added to custom groups under an existing tab or to a custom tab. They cannot be added to an existing group.

3. In the left pane, highlight a command and click the **Add** button.
4. To remove a command from a custom tab or group, click the **Remove** button.
5. To organize the commands within a tab or group, use as the **Up** and **Down** arrows. You can also reorder any of the tabs, including the standard ones.
6. Click **OK** to save your changes.

To reset the ribbon:

1. On the **Customize Ribbon** dialog box, click the **Reset** button down arrow and select **Reset only selected Ribbon Tab** or **Reset all customizations**.
2. Click **OK** to save your changes.

To minimize the ribbon:

1. From the **Quick Access Toolbar**, choose **Minimize Ribbon** or click the caret on the lower right corner of the ribbon.

To return it to view, clear the checkmark next to **Minimize Ribbon** on the **Quick Access Toolbar**.

Note: Instead of minimizing the ribbon, consider putting frequently used commands on the **Quick Access Toolbar** and moving the toolbar under the ribbon. Choose **Show Quick Access Toolbar Below the Ribbon** from the **Customize Quick Access Toolbar** menu. See [Customizing the Quick Access Toolbar](#)

HOME Tab

The **HOME** tab contains commands and command lists for accessing files, windows and tools. The **HOME** tab is available on the ribbon, unless it is minimized.















File Group















These commands open resources, such as workspaces, tables, programs, base maps, web services and connections. This group includes commands for closing resources and saving workspaces.

Icon	Command	Keyboard Shortcut	Description
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	Open	Ctrl+ O	
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Icon	Command	Keyboard Shortcut	Description
			The following commands are available from the Open command list.
	Open Workspace	(Ctrl+Shift+ O)	Open a workspace
	Add Workspace	(Ctrl+Shift+ A)	Adds a workspace to a current workspace
	Table	(Ctrl+ O)	Opens one or more tables in MapInfo .TAB format, as well as Microsoft Access and Excel, ESRI Shapefiles, raster and grid images, SQLite, and GeoPackage and others.
	Import		Opens the Import File dialog box for accessing data in MapInfo Interchange Format, AutoCAD and GML.
	Universal Data		Opens external data directly without the need for translation.
	Database Table		Opens a connection to a DBMS server.
	Program	(Ctrl+ U)	Run a MapBasic program or tool.
	Aerial		Adds an Aerial layer to the current Map window. Requires a License Key.
	Roads		Adds a Roads layer to the current Map window. Requires a License Key.
	Hybrid		Adds a Hybrid layer to the current Map window. Requires a License Key.
	GeoMap Bronze		Adds a basemap layer to the current map. If the map window is not in front, creates a new map with a basemap layer. Requires login to your Precisely account.
	GeoMap Steel		Adds a basemap layer to the current map. If the map window is not in front, creates a new map with a basemap layer. Requires login to your Precisely account.
	GeoMap Iron		Adds a basemap layer to the current map. If the map window is not in front, creates a new map with a basemap layer. Requires login to your Precisely account.
	Mapping (WMS)		Access layers from a Web Mapping

Icon	Command	Keyboard Shortcut	Description
			<p>Server (WMS).</p> <p> Feature (WFS): Access layers from a Web Feature Service (WFS).</p> <p> Mapping (WMTS): Access layers from a Web Mapping Tile Server (WMTS).</p> <p> Catalog (CSW): Allows you to locate descriptive information about spatial and non-spatial data.</p> <p>Open Connections: Lists any open connections.</p> <p>Recent Files: Displays a list of the most recently opened resources, up to 10 items.</p>
	Open Table	(Ctrl+ O)	Opens one or more tables in MapInfo .TAB format, as well as Microsoft Access and Excel, ESRI Shapefiles, raster and grid images, SQLite, and GeoPackage and others.
	Save Workspace	Ctrl+Shift+ S	<p> Save Workspace: Saves the current session as a workspace.</p> <p> Save Workspace As: Saves the session to a new workspace.</p>
	Save		<p> Save Table (Ctrl+ S): Save changes made to a table. Available once there are changes made to a table.</p> <p> Save Copy As: Saves a table with a new name, projection or format.</p>
	Close		<p> Close DBMS: Closes a DBMS connection. Enabled when a DBMS connection is open.</p> <p> Close Table: Closes one or more tables.</p> <p> Close All: Closes all the tables and the current workspace.</p>












Clipboard Group
















These commands copy and paste selections to the clipboard.


Icon	Command	Keyboard Shortcut	Description
	Copy	Ctrl+ C	Copies the selection and puts in on the clipboard.
	Paste	Ctrl+ V	Pastes the content of the clipboard. Enabled once you cut or copy a selection.
	Cut	Ctrl+ X	Cuts the selection and puts in on the clipboard. Enabled once you make a table selection of an SQL selection.
	Undo	Ctrl+ Z	Undo/redo last operation. Enabled after you make an edit.

Windows Group

This group has drop-down list of new document windows and related tool window commands.





Icon	Command	Keyboard Shortcut	Description
	New Document		<p>The drop-down list is divided in two sections: New Document Windows and Window Commands. The following commands are available under the list.</p> <p>New Document Windows section:</p> <p> Map (F3): Displays a table as a map.</p> <p> Browser (F4): Display and manipulate data in tabular format.</p> <p> Legend (Shift+ F3): Creates legend frames for the map window.</p> <p> Layout (F5): Arrange/annotate windows for printing.</p> <p> 3D Map (F11): Displays a map in three dimensions. Enabled when you or one or more tables or activate a map window containing a grid surface layer.</p> <p> Prism Map (F10): Creates a prism map using the current Map window.</p> <p> Redistrict (Shift+ F4): Display and manipulate a table in a redistricter.</p> <p>Window Commands section:</p> <p> Clone Window (Ctrl+Shift+ C): Makes a copy of the current document window.</p> <p> Redraw Window (Ctrl+ D): Redraws the active window.</p> <p> Hide Status Bar: Shows and hides the Status Bar at the bottom of the desktop.</p>

Icon	Command	Keyboard Shortcut	Description
	Tool Windows		<p>The drop-down list is divided in two sections: Tool Windows and Explorer Sub-Windows. The following commands are available under the list.</p> <p>Tool Windows section:</p> <p> Info (Ctrl+Shift+ I): Opens the Info window used by the Info Tool.</p> <p> Explorer (Ctrl+Shift+ E): Opens the Explorer Window. This window contains all the open resources - maps, layers, tables, windows and connections.</p> <p> MapBasic (Ctrl+Shift+ B): Echoes MapBasic commands. You can also type in commands.</p> <p> Ruler: Opens the Ruler window.</p> <p> Message: Opens the Message window.</p> <p> Tasks (Ctrl+Shift+ K): Shows tasks.</p> <p> Statistics (Ctrl+Shift+ Z): Shows the Statistics window.</p> <p> Move To: Allows you to type an address or place to recenter the map.</p> <p> Themes (Ctrl+Shift+ G): Shows theme legends for the current map.</p> <p> Tool Extensions (Ctrl+Shift+ U): Allows you to configure the MapBasic tools to run automatically when MapInfo Pro starts.</p> <p>Explorer Sub-Windows section:</p> <p> Windows (Ctrl+Shift+ W): Displays a list of open windows that you can sort, search, show or hide.</p> <p> Layers (Ctrl+Shift+ L): Opens the Layers list in a Layer or Explorer window. Allows you to add and remove layers and set layer properties.</p> <p> Connections Shows a list of open connections.</p> <p> Tables (Ctrl+Shift+ T): Displays a list of open tables.</p>

Icon	Command	Keyboard Shortcut	Description
	Recover Windows		Ensures that floating windows are positioned on screen.

Output Group

These commands set and printing window contents.

Icon	Command	Keyboard Shortcut	Description
	Create		Creates a PDF of the active document windows
	Print	Ctrl+ P	Prints window contents
	Save Image		Saves the active window as a bitmap or metafile
	Page Setup		Sets the page size, orientation and margins.

Tools Group

The **Tool Extensions** command expands to display a three-tab drop-down where you see which MapBasic programs are running, registered, or recent. The Options drop-down lets you run a program, register and get additional tools, and unload tools.












Tab	Description
Running	A list of running programs.
Registered	A list of installed tools and Autoload check boxes for MapInfo Pro to load them automatically on startup. Click on a tool name to see a description. Buttons display to manage the tool including load, unload, edit registered tool information, and unregister a tool.
Recent	A list of recently used tools.

TABLE Tab

The **TABLE** tab contains commands and command lists for working with tables. The **TABLE** tab is available on the ribbon, unless it is minimized. It is also available at the top of floating **Map**, **Browser** and **Layout** windows. The **Table** tab for a **Browser** window displays two additional groups of commands (**Browser Tools** and **Sort and Filter**).









Contents Group

These commands modify the contents of a **Browser** window.


Icon	Command	Keyboard Shortcut	Description
	New Browser	F4	Creates a new Browser window where data from a table is displayed in tabular format.
	Open	Ctrl+Shift+O	Opens a variety of resources for including in your layout, see File Group .
	Save	Ctrl+S	The commands on the Save Table command list are:  Save Table : Saves changes made to a table.  Save Query Saves a query  Save Copy As : Creates a new table from an existing table.
	Revert		Discards edits and uses the last saved table version.
	Close		Closes one or more tables.
	New Table	Ctrl+N	Creates a new table. Opens the New Table dialog box.
	Export		Exports the table to another format.
	Universal Translator		Tool to import and export MapInfo data to and from other popular mapping formats.




Selection Group

These commands provide advanced object selection options.

Icon	Command	Keyboard Shortcut	Description
	Select		Selects one or more map/layout objects or browser rows. To create a selection query, click on the Launcher button in the lower right corner of the Selection group to open the Select dialog box.
	SQL Select		Creates a selection by querying using SQL.
	Invert		Inverts currently selected map/layout objects or browser rows. Available when objects or rows are selected.
	Clear	Ctrl+W	Deselects map/layout objects or browser rows.
	Find	Ctrl+F	 Find (Ctrl+Shift+F): Select an item or row and find the item in all windows.  Find Address : Find an address using a geocoding server. Places a marker on the map.  Mark (Ctrl+F): Find objects by some criteria and place a marker on the map.







Edit Group

Icon	Command	Keyboard Shortcut	Description
	Update Column		Use to assign values to a column, add a new (temporary) column using data from another table, move values between columns and enter graphics information into columns for descriptive data.

Icon	Command	Keyboard Shortcut	Description
	Append Rows		To attach the rows of one table to another table. The tables should have the same set of columns, in the same order.
	Add New Row	Ctrl+E	Adds a new blank row to the bottom of the active Browser window.
	Clear Map Objects		Deletes the selected map objects from the table but leaves the attributes column intact.












Browser Tools Group


The Browser Tools group is enabled when a **Browser** window is active. It provides access to these commands.

Icon	Command	Description
	Info	Displays tabular information about map objects.
	HotLink	Enabled when the Browser references a table containing hotlink data (URL).
	HotLink Options	Opens the Hotlink Options dialog box where you can add, remove and manage the Hotlink properties.
	Pick Fields	Choose which fields display in the active Browser window. You can also use Pick Fields to temporarily rename a column, creates a new column that will display in the Browser window, or edit the expression that defines an existing column.
	Font	Opens the Text Style Dialog Box where you select how to display the text in the Browser window.
	Gridlines	Show/Hide the Browser grid lines.






Sort and Filter Group



















The Sort and Filter group is enabled when a **Browser** window is active. It provides access to these commands.






Icon	Command	Description
	Filter	<p> Filter: Opens the Filter dialog box where you can set filter conditions for the column. A filter may consist of up to two conditions where each condition is built from a simple set of operations (such as equals, greater than, and so on) and some set of values. After applying a filter to a column, an icon displays in the column header to let you know that the column has a filter. You can apply as many column filters as the number of columns in the table up to a limit of 100. Each new column filter is appended to the previous filters to produce fewer records in the current view.</p> <p> Clear Filter: Clears the filter conditions from the column and refreshes the Browser window. This only clears the filter on the right-clicked column; filters and sort on other columns are preserved. The Clear Filter command is enabled after you apply a filter condition to a column.</p> <p>The Filter and Clear Filter commands are also available by right-clicking on a column in the Browser window.</p>
	Sort	<p> Sort Multi-Column: Opens the Sort dialog box where you would make selections to perform a multi-column sort in the Browser window.</p> <p> Sort Ascending: Sorts the column containing text alphabetically starting from A to Z. This is also available by right-clicking on the column.</p> <p> Sort Descending: Sorts the column containing text alphabetically starting from Z to A. This is also available by right-clicking on the column.</p> <p> Clear Sort: Removes the sort that was applied to the data in the Browser window. This removes the sort from memory, so you cannot reapply the sort after making this selection.</p>
	Clear All	Removes all sort and filters that were applied to the data in the Browser window. This removes the sort and filters from memory, so you cannot reapply them again after making this selection.
	Sort On/Off	Turns off a sort, so that you can view data as it appears in the table. After turning a sort off, you can turn it back on to view the sort result.
	Re-Sort	Reapplies the last sort/filter to the data in a Browser window. This is useful after making changes to the data or after turning the sort/filter on.

Icon	Command	Description
	Add to Map	Opens the Create Query dialog box which allows you to add a query with the current sort and filter conditions as a layer on the map.

Maintenance Group

Icon	Command	Description
	Table	 Modify Structure: Change the structure for editable tables, including add, remove, rename or reorder fields, add and remove indexes).  Advanced Pack: Compress tables to conserve disk space and eliminate deleted records.  Delete Table: Permanently removes the table and its component files from the computer.  Rename Table: Renames the table and its component files.

Icon	Command	Description
	Database	<p>Commands for maintaining remote database tables. There are also Oracle-specific commands in this group (not shown).</p> <p> Make DBMS Table Mappable: To make a table that is linked a remote database mappable.</p> <p> Change DBMS Table Symbol: To change the symbol attributes for the objects in a mappable DBMS table.</p> <p> Unlink DBMS Table: To unlink a table which was downloaded from a remote database and linked to a MapInfo Pro table.</p> <p> Refresh DBMS Table: To refresh a MapInfo Pro linked table with the most recent data residing on the remote database for that linked table.</p> <p> Create Oracle Workspace: Create a new Oracle workspace.</p> <p> Delete Oracle Workspace: Delete an Oracle workspace.</p> <p> Merge Oracle Table: Merge a workspace into its parent workspace, resolving conflicts.</p> <p> Refresh Oracle Table: Refresh a workspace from its parent workspace, resolving conflicts.</p> <p> Enable Oracle Versioning: Turn versioning on for an existing Oracle table.</p> <p> Disable Oracle Versioning: Turn versioning off for an existing Oracle table.</p>
	Library	<p> Add to Library: Create a metadata record for the table in MapInfo Manager Library.</p> <p> View/Edit Metadata: View and edit a metadata record for the table.</p>
	Raster	<p> Adjust Image Styles: Adjust raster image color, contrast and brightness.</p> <p> Modify Image Registration: Add or edit control points used to register a raster image.</p> <p> Select Control Point: Add control points to a raster image.</p>




Icon	Command	Description
	Web Services	<p> WFS Table Properties: Opens the WFS Table Properties dialog box to edit the settings for a WFS table.</p> <p> WFS Table Refresh (Alt+F5): To refresh the WFS layer based on the WFS server settings and the filter options set for WFS Refresh in the Web Services preferences.</p> <p> WMS Table Properties: Opens the WMS Table Properties dialog box to edit the settings for a WMS table.</p> <p> WMTS Table Properties: Opens the WMTS Table Properties dialog box to edit the settings for a WMTS table, changing display styles, and image format settings.</p>








MAP Tab

Use the **MAP** commands when working with maps. It is always available, unless it is minimized. The **MAP** tab is also available at the top of floating **Map** and **Layout** windows.

Content Group








These commands modify the contents of the active map.








Icon	Command	Keyboard Shortcut	Description
	Map	F3	Displays a table as a map.
	Open	Ctrl+Shift+O	Opens a variety of resources for including in your layout, see File Group .
	Add Theme	F9	Creates a theme that graphically displays information about the map's underlying data.

Icon	Command	Keyboard Shortcut	Description
	Add to Map		 Legend (Shift+F3): Adds a legend to the layout.  Gridlines : Creates a new grid layer on the active Map window, see Adding Grid Lines to a Map and Changing Grid Line Properties .  Scalebar : Adds a scale bar to the map.
	Cosmetic		 Clear Cosmetic Layer : Clears all objects from the cosmetic layer. Enables when there are cosmetic objects on the active map.  Save Cosmetic Objects : Save objects in the cosmetic layer to a table. Enables when there are cosmetic objects on the active map.

Selection Group

These commands provide methods for selecting objects.

Icon	Command	Keyboard Shortcut	Description
	Select		 Select : Selects one or more map/layout objects or browser rows.  Radius Selection : Selects map objects within a circle.  Marquee Selection : Selects map objects within a rectangle.  Polygon Selection : Selects map objects within a polygon.  Boundary Selection : Selects map objects within an area defined by a boundary in another layer (for example, cities within a county).  Select by Style : Select objects by style. (MapCAD)





Icon	Command	Keyboard Shortcut	Description
	SQL Select		Creates a selection by querying using SQL.
	Invert		Inverts currently selected map/layout objects or browser rows. Available when objects or rows are selected.
	Clear	Ctrl+W	Deselects map/layout objects or browser rows
	Find		 Find (Ctrl+Shift+F): Select an item or row and find the item in all windows.  Find Address : Find an address using a geocoding server. Places a marker on the map.  Mark (Ctrl+F): Find objects by some criteria and place a marker on the map.






MapCAD is a tool that plugs in to MapInfo Pro on startup. Some commands on the **SPATIAL** ribbon are from MapCAD. To read more about how to use MapCAD commands, see the *MapCAD Help*: On the **PRO** tab, select **Add Ins**, and then under the section titled MapCAD, click **Help**.

Create Group





These commands create objects on the map.

Insert

Icon	Command	Description
	Point	Inserts a marker or pin on to the map.
	Text	Inserts text on the map.
	Line	Creates a straight line on the map.
	Polyline	Creates a polyline on the map.


Icon	Command	Description
	Arc	Creates an arc on the map.
	Polygon	Creates a region (polygon) shape on the map.
	Ellipse	Creates an ellipse (circle) on the map.
	Rectangle	Creates a rectangle shape on the map.
	Rounded Rectangle	Creates a rectangle shape that has rounded corners on the map.











Style

Icon	Command	Keyboard Shortcut	Description
	Point Style	Alt+F8	Modifies symbol size, color and type.
	Line Style	Shift+F8	Modifies line color, pattern and width.
	Region Style	Ctrl+F8	Modifies the color, pattern and outline of closed objects.
	Text Style	F8	Modifies text color, font and size.

Navigate Group




These commands change the map display.




Icon	Command	Keyboard Shortcut	Description
	Pan		Recenter the map by grabbing and moving in a direction.

Icon	Command	Keyboard Shortcut	Description
	Zoom In		Zooms in on map at cursor location.
	Zoom Out		Zooms out on map at cursor location.
	Previous View	Alt+Left	Return to a map's last view.
	Move To		Allows you to type an address or place to recenter the map.
	Zoom To		<div>  Entire Selection Layer: Views the entire extents of the layer that has the current selection. </div> <div>  Extents of Selected Objects: Zooms to the extents of the selected objects on the map. </div> <div>  Entire Layer: Zooms to display an individual or all map layers. </div> <div>  Entire Map: Zooms to display the extents of the map. </div> <div>  Nearest Tile Server Level: Changes the zoom to the nearest tile server level. </div>

Label Group

These commands manage the map labels.








Icon	Command	Description
	Label Tool	Adds a custom label to the map at the cursor location.
	Text Objects	<div>  Text from Table: Create text objects from a table. (MapCAD) </div> <div>  Update Column with Text Object: Write the content of text objects that are placed within polygons/regions or on top of lines/polylines into a column of the table. (MapCAD) </div>












Icon	Command	Description
	Selectable	Controls whether labels can be selected or not.
	Clear Custom	Discards all custom labels and revert to defaults
	Priority	Change the priority of labels from different layers. Two or more layers which can be labelled must be open to activate it.

MapCAD is a tool that plugs in to MapInfo Pro on startup. Some commands on the **SPATIAL** ribbon are from MapCAD. To read more about how to use MapCAD commands, see the *MapCAD Help*: On the **PRO** tab, select **Add Ins**, and then under the section titled MapCAD, click **Help**.

Options Group

These commands provide additional choices for displaying the map.

Icon	Command	Keyboard Shortcut	Description
	Map Tools		 Ruler : Opens the Ruler window.  Info : Displays tabular information about map objects.  Statistics (Ctrl+Shift+Z): Displays or hides the Statistics window.  Hotlink : Launch a file or URL associated with a Browser field or labels/objects in a map.  Explorer (Ctrl+Shift+E): Opens the workspace Explorer window. All open resources are displayed: maps, layers, windows, browsers, layouts, legends, tools, connections.  Redraw (Ctrl+Shift+D): A toggle to suspend/enable map drawing.





Icon	Command	Keyboard Shortcut	Description
	Redistricter		 New Redistricter Window: (Shift+F4) Allows you to display and manipulate a table in a district browser.  Set Target: Sets the selected object's district as the target district.  Assign District: Permanently assigns selected objects to the target district.  Add District: Adds a new district to the Districts Browser.  Delete District: Deletes the current target district from the Districts Browser.  Options: Sets the district order and grid pattern display.
	Map Options		Changes the settings for the map.
	Hotlink Options		Specifies the Hotlink options.
	Drag Map		Drag the map to another Map or Layout window.
	Lock Scale		Locks the scale, so that only zoom and center changes are allowed. When on, resizing the Map Window does not change the scale of the content. When off, resizing the Map Window resizes the map content, so that everything remains in view.

SPATIAL Tab

The **SPATIAL** tab contains commands and command lists for working with tables. It is always available, unless it is minimized. The **SPATIAL** tab is also available at the top of floating **Map** and **Layout** windows.










Clipboard Group






These commands copy and paste selections to the clipboard.

Icon	Command	Keyboard Shortcut	Description
	Copy	Ctrl+ C	Copies the selection and puts in on the clipboard.
	Paste	Ctrl+ V	Pastes the content of the clipboard. Enabled once you cut or copy a selection.
	Cut	Ctrl+ X	Cuts the selection and puts in on the clipboard. Enabled once you make a table selection of an SQL selection.
	Undo	Ctrl+ Z	Undo/redo last operation. Enabled after you make an edit.

Selection Group









These commands provide methods for selecting objects.











Icon	Command	Keyboard Shortcut	Description
	Select		 Select: Selects one or more map/layout objects or browser rows.  Radius Selection: Selects map objects within a circle.  Marquee Selection: Selects map objects within a rectangle.  Polygon Selection: Selects map objects within a polygon.  Boundary Selection: Selects map objects within an area defined by a boundary in another layer (for example, cities within a county).  Select by Style: Select objects by style. (MapCAD)
	SQL Select		Creates a selection by querying using SQL.
	Invert		Inverts currently selected map/layout objects or browser rows. Available when objects or rows are selected.
















Icon	Command	Keyboard Shortcut	Description
	Clear	Ctrl+W	Deselects map/layout objects or browser rows
	Find		 Find (Ctrl+Shift+F): Select an item or row and find the item in all windows.  Find Address : Find an address using a geocoding server. Places a marker on the map.  Mark (Ctrl+F): Find objects by some criteria and place a marker on the map.
















Edit Group












These commands edit objects on the map.

Icon	Command	Keyboard Shortcut	Description
	Set Target	Ctrl+T	Sets a map object as the target for editing.
	Clear Target	Ctrl+Delete	Clears the target selection.
	Erase		 Erase Target : Removes a portion of a map object using the currently selected object as the eraser.  Erase Outside Target : The portion of the target that is not overlapped by the erasing object is removed.
	Combine		 Combine Selected Objects : Combines separate map objects into a single object.  Combine Using Column : Combines objects by using common column data.

Icon	Command	Keyboard Shortcut	Description
	Split		<p>Breaks target map object using selected cutter object.</p> <p> Split Target: Separates target object using a cutter object.</p> <p> Split Target Using Polyline: Separates target object using one single section polyline cutter object.</p> <p> Polyline Split at Node: Separates single section polyline object at a node.</p> <p> Split Region Using Polyline: Split a region or polygon object using a line or polyline. (MapCAD)</p>
	Disaggregate		<p>Separates objects and their data into their component parts (polygons, polylines, and multi-points).</p>
	Buffer		<p> Buffer Objects: Creates a buffer polygon around a selected object or objects.</p> <p> Buffer Table: Buffers objects in table.</p> <p> Convex Hull: Creates a polygon representing a convex hull around a selected points.</p>

Icon	Command	Keyboard Shortcut	Description
	Modify		 Line Intersection: Trim two lines or polylines at their intersection point. (MapCAD)
			 Fillet/Chamfer: Creates an polyline (fillet) or a line (chamfer) between two line segments corresponding their intersection point. (MapCAD)
			 Reverse Line Direction: Reverse the line direction. (MapCAD)
			 Undershoot/Overshoot: Modifies start and end nodes from linear objects close to a reference object. Only the start or end nodes are moved. (MapCAD)
			 Spline: Creates splines for existing polyline or region objects. (MapCAD)
			 Scale: Scales an object relative to its anchor point. (MapCAD)
			 Snap to Line: Aligns objects to clean overshoots and undershoots. (MapCAD)
	Nodes	S key	 Snap to Nodes: In Snap mode (S key) the cursor snaps to a node of a map object when it comes within a certain distance.
			 Segmenting: Adds nodes to a line segment with fixed distance using a defined number of segments. (MapCAD)
			 Reshape (Ctrl+R): Edit regions, polylines, lines, and points by moving, adding, and deleting nodes that define line segments.
			 Move Duplicate Nodes: Move identical nodes in different layers at the same time. All Layers that contain objects whose nodes you want to move have to be selectable. (MapCAD)
			 Add Node (Ctrl+Shift+N): Add a node to a region, polyline or line.
			 Overlay Nodes onto Target: Adds nodes to the target objects at all points where the target objects intersect the selected objects.




Icon	Command	Keyboard Shortcut	Description
	Fix/Clean		<p> Check Regions: Check regions for self-intersections, overlaps and gaps.</p> <p> Clean Objects: Automatically detects and corrects self-intersections, overlaps and gaps.</p> <p> Snap/Thin: Snaps nodes from different objects that are close and thin the number of nodes while retaining the general shape.</p> <p> Smooth Lines: Smooths selected polyline into a curve.</p> <p> Unsmooth Lines: Returns selected polyline to its original state.</p>
	Transform		<p> Offset Object: Moves the selected object by specifying a distance and direction.</p> <p> Rotate Object: Rotates object by a specified angle.</p> <p> Rotate Object (MapCAD): Rotate objects using angle or degree and clockwise orientation of left or right. (MapCAD)</p> <p> Move Along: Selected objects can be moved using a free angle and distance. (MapCAD)</p> <p> Mirror Horizontally: Uses the centroid of the whole selection as the center point for mirroring objects. (MapCAD)</p> <p> Mirror Vertically: Uses the centroid of the whole selection as the center point for mirroring objects. (MapCAD)</p> <p> Align Horizontally: Aligns objects horizontally: objects are centered and evenly distributed one on top of another. (MapCAD)</p> <p> Align Vertically: Aligns objects vertically: objects are centered and evenly distributed beside each other. (MapCAD)</p>















Icon	Command	Keyboard Shortcut	Description
	Convert to Polygons		 Convert to Polygons: Changes each selected object into a polygon object.  Convert Polyline to Line: Changes a single polyline to a line. (MapCAD)
	Calculate		 Calculate Angle: Returns the value of the angle between two straight line segments. (MapCAD)  Calculate Direction: Returns the angle between the horizontal axis and a line segment. (MapCAD)
	Clip Region		 Set Clip Region: Defines a region to be clipped.  Clip Region On/Off: Turn map clipping on or off.
	Digitizer Setup		Setup for digitizer hardware.
	Clear Map Objects		Deletes selected map objects from the table, but keeps the attribute columns in tact.



Create Group

These commands create objects on the map.






Insert

Icon	Command	Keyboard Shortcut	Description
	Point		Inserts a marker or pin on to the map.
	Text		Inserts text on the map.
	Cell		Inserts a new cell on the map. (MapCAD)




Icon	Command	Keyboard Shortcut	Description
	Orthogonal Points		Creates a point that is at right angles to a reference line. (MapCAD)
	Line		Creates a straight line on the map.
	Polyline		Creates a polyline on the map.
	Arc		Creates an arc on the map.
	Right Angle		Creates a line along an approximate direction that is at 90 degrees to an object. (MapCAD)
	Perpendicular Line		Creates a line that is perpendicular to a segment of an object. (MapCAD)
	Arc from 3 Points		Creates an arc from three points. (MapCAD)
	Line Polar Append		Creates a line using distance and angle. (MapCAD)
	Traverse Line		Creates a polyline from the distance and angle of each node. (MapCAD)
	Polygon		Creates a region (polygon) shape on the map.
	Orthogonal Polygon		Creates a polygon with a right angle between the first and last line segment. (MapCAD)
	Ellipse		Creates an ellipse (circle) on the map.
	Circle from 3 Points		Creates a circle on the map from three points. (MapCAD)
	Rectangle		Creates a rectangle shape on the map.





Icon	Command	Keyboard Shortcut	Description
	Rounded Rectangle		Creates a rectangle shape that has rounded corners on the map.
	Rotated Rectangle		Creates a rotated rectangle using specific width and height. (MapCAD)

Style




Icon	Command	Keyboard Shortcut	Description
	Point Style	Alt+F8	Modifies symbol size, color and type.
	Line Style	Shift+F8	Modifies line color, pattern and width.
	Region Style	Ctrl+F8	Modifies the color, pattern and outline of closed objects.
	Text Style	F8	Modifies text color, font and size.
	Cell Style		Specify the current cell and manage the cell library. (MapCAD)

Regions


Icon	Command	Keyboard Shortcut	Description
	Convert to Regions		Changes each selected objects into a region object.
	Convert to Rectangle		Change the selected object to a rectangle. (MapCAD)
	Enclose (Polylines to Regions)		Creates regions from polygonal areas enclosed by polylines.




Icon	Command	Keyboard Shortcut	Description
	Drive Regions (Objects)		Creates time or distance buffers around objects.
	Drive Regions (Table)		Creates time or distance buffers for a table.
	Voronoi (Objects)		Partitions the map space into cells from a designated set of points. Each cell is an area in which the contained points are closer to the enclosed site than to any others.
	Voronoi (Table)		Partitions the map space into cells based on a point layer from a table, selection or query. Each cell is an area in which the contained points are closer to the enclosed site than to any others.

Dimension



Icon	Command	Keyboard Shortcut	Description
	Dimension Line		Creates a dimension line in a separate layer. (MapCAD)
	Continuous Dimension Line		Generates measurement lines with cumulated distance and distance to objects. (MapCAD)
	Intersecting Arcs	Calculates the intersection of two arcs using center point and radius. (MapCAD)	

Create

Icon	Command	Keyboard Shortcut	Description
	Create Points		Creates point objects for a database table using X and Y coordinates.

Icon	Command	Keyboard Shortcut	Description
	Line from Table		Create line objects from a table. (MapCAD)
	Polyline from Table		Create polyline objects from a table. For details, see the MapCAD Help. (MapCAD)
	Circle from Table		Create circle objects from a table. For details, see the MapCAD Help. (MapCAD)

Geocode

Icon	Command	Keyboard Shortcut	Description
	Geocode Points		Geocodes records using MapInfo Pro's built-in geocoder.
	Geocode using Server		Geocode records using a geocoding server.


MapCAD is a tool that plugs in to MapInfo Pro on startup. Some commands on the **SPATIAL** ribbon are from MapCAD. To read more about how to use MapCAD commands, see the *MapCAD Help*: On the **PRO** tab, select **Add Ins**, and then under the section titled MapCAD, click **Help**.





LAYOUT Tab

The **LAYOUT** tab contains commands and command lists for working with layouts. It is always available, unless it is minimized. The tab is also available in the **Layout** window when the window is floating.

Page Group






These commands create and set the page properties for a layout.

Icon	Command	Keyboard Shortcut	Description
	New Layout	F5	Adds a new Layout window to the desktop.

Icon	Command	Keyboard Shortcut	Description
	Page Setup		Opens the Page Setup dialog box, where you can set the paper size, orientation (portrait or landscape), and margins for your layout.
	Output		 Print Prints window contents.  Create Creates a PDF of the active document windows.  Save Saves the active window as a bitmap or metafile.












Clipboard Group

These commands copy and paste selections to the clipboard.

Icon	Command	Keyboard Shortcut	Description
	Copy	Ctrl+ C	Copies the selection and puts in on the clipboard.
	Paste	Ctrl+ V	Pastes the content of the clipboard. Enabled once you cut or copy a selection.
	Cut	Ctrl+ X	Cuts the selection and puts in on the clipboard. Enabled once you make a table selection of an SQL selection.
	Undo	Ctrl+ Z	Undo/redo last operation. Enabled after you make an edit.
	Redo	Ctrl+ Y	Reapply a layout edit that was undone.

Insert Group

These commands add the contents to the layout.







Icon	Command	Description
	Map	Select to add a map into a new frame or into the selected frame on the layout. Either, copy an existing Map window into the Layout , or create a new map.
	Legend	Select to add a legend to the layout. This option is active when there is a map on the layout.
	Browser	Select to add a Browser into a new frame or into the selected frame on the layout. Either, copy an existing Browser window into the Layout , or create a new browser.
	Text	Select and then click in the Layout window where you want to add text to your layout.
	Image	Select to add an image to the layout.
	Scalebar	Select to add a scalebar to the layout.
	Insert	Lists a variety of object commands to include in your layout: Symbol, ScaleBar, Line, Polyline, Ellipse, Rectangle, Rounded (rectangle), and Polygon. The last selected object is active.
	Frames	<p>The Frames list contains the following commands:</p> <ul style="list-style-type: none">  New Frame  Remove Content  Remove (frame)

Style Group

These commands control the text, region, line, symbol, and frame display styles.




Icon	Command	Description
	Font Family	Change the font family. Available when a text box is activated on the layout.
	Font Size	Change the font size. Available when a text box is activated on the layout.









Icon	Command	Description
	Increase Font Size	Change the font size incrementally larger when a text box is activated on the layout.
	Decrease Font Size	Change the font size incrementally smaller when a text box is activated on the layout.
	Bold	Applies a stronger appearance to label text.
	Italic	Slopes label text to the right.
	Underline	Adds an underline to label text.
	All Capitals	Displays label text in all capitals (TEXT).
	Expanded	Adds space between the characters of label text (t e x t).
	Font Color	Select a color to apply to label text.
	Halo	Adds a luminous outline around label text.
	Highlight	Sets a color to use behind labels to make them more legible on the map.
	Background Color	Selects the background color to use with Halo and Highlight effects.
	Left Align Text	Left-justify selected text.
	Center Text	Center selected text.
	Right Align Text	Right-justify selected text.
	Line Spacing	Increase or decrease the spacing between lines of selected text.




Icon	Command	Description
	Rotate Frame	Rotate the selected frame by entering or selecting an angle value.
	Modify Frame Style	Change how a layout frame displays.
	Style	<p>The Style command list contains the following commands. The last selected style is active.</p> <p> Region: Modify the style of a region object. Activate or open a Layout window and select a region object to modify.</p> <p> Line: Modify the style of a line object. Activate or open a Layout window and select a line object to modify.</p> <p> Frame: Modify the frame style.</p> <p> Symbol Modify the style of a symbol. Activate or open a Layout window and select a symbol to modify.</p>

Edit Group

These commands help you design the layout.

Icon	Command	Description
	Reorder	<p>The Reorder command list contains two commands:</p> <p> Bring to Front moves the frame to the front, so that it is on top of all of the other frames.</p> <p> Send to Back moves the frame to the back, so that it is behind all of the other frames.</p>

Icon	Command	Description
	Alignment	<p>The Alignment command list contains the following commands:</p> <ul style="list-style-type: none"> • Guides: <p>Add Vertical Guideline adds a guideline to the Layout canvas for aligning frames along their left or right sides.</p> <p>Add Horizontal Guideline adds a guideline to the Layout canvas to align the tops or bottoms of frames.</p> <p>Disable/Enable Guidelines shows or hides Layout window guidelines.</p> <p>Remove All Guidelines removes the guidelines from the Layout window.</p> <p>Smart Guides aligns the edge of the item you are moving to the edge of other items on the current layout. This is turned on by default for a new Layout window. When using this option, disable Snap To Grid.</p> • Grid: <p>Show Grid Shows or hides the layout grid.</p> <p>Snap To Grid Enable so that when you move a frame near a guideline or a grid line it aligns and attaches (snaps) to the line.</p> <p>Grid Size Resizes the grid by a percentage value. Select this to choose a value.</p> • Align Objects: <p> Align Left Snap left edge of selected objects to the nearest guideline. Enables after selecting an object in a layout with a vertical guideline.</p> <p> Align Center Arrange selected objects along their mid points vertically (up and down).</p> <p> Align Right Snap right edge of selected objects to the nearest guideline. Enables after selecting an object in a layout with a vertical guideline.</p> <p> Align Top Snap top edge of selected objects to the nearest guideline. Enables after selecting an object in a layout with a horizontal guideline.</p> <p> Align Middle Arrange selected objects along their mid points horizontally (left and right).</p> <p> Align Bottom Snap bottom edge of selected objects to the nearest guideline. Enables after selecting an object in a layout with a horizontal guideline.</p>
	Select	Selects objects on the layout canvas.

Icon	Command	Description
Tools		Selects objects on the layout canvas.
	Pan	Select and then click on and drag across the layout to re-center the map to a new location (this changes what you see in the map view). To get out of zoom mode, click the Select tool.
	Zoom In	Select and then click on the layout to zoom in by two times (2x) the current zoom level (this shows more details in a smaller area). Click and drag across the layout to create a marquee rectangle that becomes the new view and zoom level. To get out of zoom mode, click the Select tool.
	Zoom Out	Select and then click on the layout to zoom out by two times (2x) the current zoom level (this shows a larger area). Click and drag across the layout to create a marquee rectangle that more of the map displays around. To get out of zoom mode, click the Select tool.

RASTER Tab







Use the **RASTER** commands when working with raster files, which contain grid-based spatial information. The tab is also available in the **Raster** window when the window is floating. For a description of these commands, which are part of the MapInfo Pro Advanced raster extension, click the **Help** button on the **RASTER** tab.

After opening a raster file, such as a MRR, ERS, ASC, GRD, or GRC file, use the **RASTER** commands to apply processing, analysis, and creation operations to the raster data.

By default, all MapInfo Pro users have access to a subset of commands on the **RASTER** tab. To enable all of the commands on the **RASTER** tab, you must have a Advanced license. For a free trial of all of the raster features, on the **Pro** tab, click **Licensing** and then click **Begin 30 Day Trial** in the Advanced Version section. To purchase an Advanced license, contact your MapInfo Pro sales representative.




File Group

This group of commands manage raster files in MapInfo Pro.

Icon	Command	Description
	Open	<p>Clicking Open displays the dialog from your last selection.</p> <p> Open Table displays the Open dialog where you can select a data file to work with in MapInfo Pro. From the Preferred View list, select to open the file in a Browser window, the current Map window as a layer on the map, a new Map window, or to make it available on the Explorer panel.</p> <p> Open Workspace displays the Open Workspace dialog where you can select a workspace file to use in MapInfo Pro.</p>
	Copy Raster	Copy a raster file, and its associated files, to a directory location.
	Delete Raster	Delete a raster file, and its associated files.
	Rename	Change a raster file name.



Properties Group

These commands provide information about a raster.

Icon	Command	Description
	Raster Info	Opens the Raster Info window, which displays information about the raster dataset.
	Statistics	Opens the Statistics window, which displays information about the raster dataset. By default, the Input File field is populated with the current raster file on display. Click Calculate Statistics in this window to generate information about the raster.
	Cell Value	<p>Queries and returns cell values from selected locations in a raster.</p> <p>Full shows information about a selected location in the Cell Value window.</p> <p>Status Bar shows information about a selected location on the MapInfo Pro status bar, located at the bottom of the MapInfo Pro window.</p>






Interpolate Group





These commands let you select interpolation methods for creating continuous raster surfaces from point data. You must have an Advanced license to enable these commands.

Icon	Command	Description
	Create Raster	Creates a raster data set from vector data.
	Create Raster Multifile	Creates a raster data set from multiple vector data files. Select from various interpolation methods to create continuous raster surfaces from the point data.

Display Group

The following commands are active when you have a raster overlay on the map. These commands are also available on the **STYLE** tab.

Icon	Command	Description
	Field	Displays all the fields that are present in the active raster. To render different fields, select the field name from the drop-down list. There must be two or more fields to activate this command.
	Display Mode	Select to render the file in either Pseudo , RGB , or Classified mode. You can render continuous and imagery file in either Pseudo or RGB display mode.
	Band to Display	Displays all the bands for the selected field in the current raster, such as red, green, and blue. When in Pseudo display mode, select a specific band from the drop-down list to render it on the current map. When in RGB display mode, map different bands in the current raster to the RGB channel to then render it on the current map. This is useful for Landsat data.
	Color	Opens a dialog to select the color to apply to the raster. The raster must be open in Pseudo mode to activate this command.
	Color Stretch	Opens the Color Stretch dialog, which has options to enhance the display of a raster grid by changing the grid's appearance through data stretches.





Icon	Command	Description
	Advanced Color	Opens a Color dialog to enhance all aspects of the appearance of the raster by changing its coloring, data stretches, and bandpass cutoffs.
	Hill Shade	Opens a dialog of effects to mimic the sun's illumination, intensity, and shadows across variations in elevation within the map landscape (the raster surface). The raster must be open in Pseudo mode to activate this command.
	Raster Quality	Improve the appearance of continuous raster surfaces using an interpolation technique when viewed at high resolution: None (this is the default), Nearest Neighbor , Bilinear , Cubic Spline (Local) , or Cubic Spline (Global) .
	Favorite Template	Manage and apply custom templates. Selecting Manage Templates opens the Custom Templates window where you can create and edit your raster templates. You must have an Advanced license to enable this command.




Operations Group

Raster Operations Command










These commands process and analyze a raster overlay. A message dialog displays when a command requires an Advanced license to use it.




Processing

Icon	Command	Description
	Convert	Changes a raster to an MRR and other defined raster formats.
	Clip	Cuts a raster to a rectangle object, a selected region object, or a table of region objects.
	Combine	Arranges different input rasters into a single MRR file as individual fields or as multiple bands in a single field.
	Resample	Creates a new version of the raster dataset with a different height or width.

Icon	Command	Description
	Merge	Combine multiple adjacent or overlapping rasters into a single output raster.
	Reproject	Changes the projection of a raster dataset from one projection system to another.
	Rasterize	Converts a vector file to a classified or numeric raster file.

Analysis

Icon	Command	Description
	Point Inspection	Extracts all cell values from one or more input rasters at point locations and adds these as attributes of the points.
	Calculator	Performs mathematical and logical operations on each cell in one or more input rasters.
	Classify	Reassigns a value, range of values, or a list of values in a raster to new output values.
	Surface	Calculates slope, aspect, and curvature from a continuous raster.
	Region Statistics	Extracts aggregated statistics from a raster within region objects and add these as attributes.
	Contour	Creates vector contour lines, polygons from a continuous, or polygons from a classified raster.
	Cross Section	Extracts the cell values of a raster along a line or polyline.
	Filter	Applies an enhancement or smoothing filter to a raster using a filter kernel.
	Line Statistics	Extracts cell values as attributes from a raster along polyline or line objects.



Icon	Command	Description
	Viewshed	Identifies locations on a raster that are visually connected to a single or multiple observer location.
	Line of Sight	Checks the visibility from a source point to a destination point.
	Volume	Computes the volume of a raster against the constant plane or between two rasters.

Utilities

Icon	Command	Description
	Export	Exports a raster to an ASCII format file.
	Import ASCII	Imports an ASCII format raster to a continuous binary raster.

Draw Profile Command

These commands provide information along a line between two points on the raster overlay. You must have an Advanced license to enable these commands.

Icon	Command	Description
	Interactive Cross Section	Process the cell values of a raster by drawing a line or polyline on the map.
	Interactive Line of Sight	Check the visibility from a source point to a destination point.

LEGEND Tab






The **LEGEND** tab contains commands and command lists for working with map legends and the **Legend Designer** window. It is available after creating a map legend by selecting **Add Legend** on the **MAP** tab.

For information about the Legend Designer window, see *About the Legend Designer Window* in the *Help System*.

The **LEGEND** tab contains commands and command lists for working with map legends and the **Legend Designer** window. It is available after creating a map legend by selecting **Add Legend** on the **MAP** tab.












Content Group

These commands modify the contents of the active legend.

Icon	Command	Keyboard Shortcut	Description
	Refresh		<p>The Refresh list contains the following commands:</p> <p> Quick Refresh refreshes the legend styles and positions in the active Legend Designer window.</p> <p> Refresh opens the Refresh Legend dialog to select what to refresh in the active Legend Designer window.</p>
	Modify Theme		Modifies a thematic layer. This command activates when selecting thematic frame in a Legend window.
	Modify Legend		Modifies legend properties, such as font size, row visibility, and row order. This command activates when selecting a frame in a Legend window.
	Add Legend	Shift+F3	Creates legend frames for the active Map window.

Alignment Group

These commands help you to design the layout of the legend.

Icon	Command	Description
	Guide	<p>The Guide list contains the following commands:</p> <p> Add Vertical Guideline adds a guideline to the Layout canvas for aligning frames along their left or right sides.</p> <p> Add Horizontal Guideline adds a guideline to the Layout canvas to align the tops or bottoms of frames.</p> <p> Disable/Enable Guidelines shows or hides Layout window guidelines.</p> <p> Remove All Guidelines removes the guidelines from the Layout window.</p>
	Snap to Left	Snap left edge of selected frame to the nearest guideline. Enables after selecting a frame in a legend with a vertical guideline.
	Snap to Top	Snap top edge of selected frame to the nearest guideline. Enables after selecting a frame in a legend with a horizontal guideline.
	Snap to Bottom	Snap bottom edge of selected frame to the nearest guideline. Enables after selecting a frame in a legend with a horizontal guideline.
	Snap to Right	Snap right edge of selected frame to the nearest guideline. Enables after selecting a frame in a legend with a vertical guideline.
	Grid Lines	Shows or hides the legend grid lines.
	Snap To Grid	Enable so that when you move a frame near a guideline or a grid line it aligns and attaches (snaps) to the line.
	Grid Size	Resizes the grid by a percentage value. Select this to choose a value.

THEME Tab

The **THEME** tab contains the most commonly used commands and command lists for working with theme settings and styles. It is a consolidation of the **Modify Thematic Map** dialog boxes for all theme types except the **Grid** theme. The **THEME** tab makes commonly used theme editing tasks much easier and in most cases eliminates the need to use the theme modification dialogs.

When you select a theme type in the **Layers** or **Explorer** window, the **THEME** tab displays settings and styles for that particular theme. Any updates or changes to the settings and styles on the **THEME** tab automatically updates the map's meta-data and the theme view, except when you modify the





actual data in the table being themed. In that case you have to **Recalculate** the theme to reflect the updates on the map.

See also:

- *Creating Thematic and Other Themed Maps* in the *Help System*

File Group

These commands create a thematic template, save and remove default themes, and recalculate the current theme in case of data modifications. The **File Group** is common to all theme types and all commands and command lists provides the same functionality across all theme types.







Icon	Command	Description
	Save as Template	Displays the Save Theme to a Template dialog box. Type a unique name or highlight an existing name and overwrite it. If you overwrite an existing name you will be asked to confirm this action.
	Save Theme	Saves the current theme to the map's meta-data to make it the default theme view for that map. The saved theme is automatically applied to the map the next time you open it.
	Remove Theme	Disassociates a saved theme from the map and removes it from the map's meta-data. The theme view reverts to default when you remove the associated theme.
	Recalculate Theme	If you have added, deleted or modified any data in the table being themed, click Recalculate Theme to recalculate the map and theme bins without deleting and recreating the theme. The Theme and Legend Designer now reflects the current state of the data on the table.


See also:

THEME Tab

Ranged Style Group

These commands help you in customizing the ranged theme settings and styles. This group is visible only when you select the **Ranges** theme type in the **Layers** or **Explorer** window.

Icon	Command	Description
	Field	Updates the field or expression that contains the data values. The drop-down list displays all the applicable fields in the table selected when creating the theme.
	Method	<p>The Method list contains the following commands:</p> <p> Equal Count Each range contains approximately the same number of records. If the number of records is not evenly divisible by the number of ranges, MapInfo Pro places the remaining records into the most appropriate ranges.</p> <p> Equal Ranges The difference between the top and bottom values in each range is the same.</p> <p> Standard Deviation The middle range breaks at the mean of your data values, and the ranges above and below the middle range are one standard deviation above or below the mean.</p> <p> Natural Break The range breaks are determined according to an algorithm such that the difference between the data values and the average of the data values is minimized on a per range basis. This reduces error and enables you to obtain a truer representation of your data.</p> <p> Quantile Determines the distribution of a variable across a segment of your data (for example, population). Displays the Customize Ranges dialog box. When you choose Quantile, a Quantile Using drop-down list appears at the bottom of the dialog box. Choose the field or an expression you want to perform the quantiling operation on from the drop-down list.</p> <p> Custom Indicates that the ranges are user-defined. Displays the Customize Ranges dialog box. When you choose Custom, a Custom Ranges box appears at the bottom of the dialog box. Highlight the range you want to change from the list in the middle of the dialog box, and edit the minimum and maximum values in the Custom Ranges box.</p>
	Ranges	Choose the number of ranges you want from the drop-down list. The minimum number of ranges is 2, and the maximum number of ranges is 16. The default is 4 ranges.
	Round By	Choose a rounding factor for the range breaks from the drop-down list. Each rounding factor is a multiple of 10.








Icon	Command	Description
	Color Palettes	<p>Shades different ranges of data with a set of color band.</p> <p>Color Palettes contain a list of predefined bands of colors that can be applied on any existing range thematic map. When you associate a color band from Color Palettes to a ranged map, it turns off auto-spreading of style attributes and sets the colors from the selected colors band to the ranges.</p> <p>Color Palettes provides two types of color schemes for ranged thematic maps.</p> <ul style="list-style-type: none"> • Sequential – Contains light to dark shades of a color in the color band. Lightness and saturation of the color changes incrementally, using Single-Hue or Multi-Hue. Light colors are suited for low data values and darker colors for higher data values. • Diverging - Contains two different colors at both the ends of the set. Lightness and saturation of these two colors change as they move from the edge towards the center and they meet in the middle at an unsaturated color. <p>Note: The Sequential color scheme is available for any number of ranges, while Diverging color scheme is available till number of ranges goes up to eleven.</p>

See also:

THEME Tab

Bar Chart Style Group

These commands help you in customizing the Bar Chart theme settings and styles. This group is visible only when you select the **Bar Charts** theme type in the **Layers** or **Explorer** window.

Icon	Command	Description
	Chart Type	<p>Choose the type of bar chart you want to create from the four choices in the group.</p> <p> Stacked The bars for each variable are stacked on top of each other, creating a single bar chart.</p> <p> Stacked - Graduated The height of the bars are determined by the ratio of the sum of the values for each record to the value in the at value box in the Customize Bar Styles dialog box. For details, see <i>Customize Bar Styles Dialog Box</i> in the <i>Help System</i>.</p> <p> Multiple Creates a multi-bar chart, one bar for each field. All the bars in each chart are scaled according to the ratio of the height in the Max Height box to the value in the at value box.</p> <p> Multiple - Independent Creates a multi-bar chart where the bars are scaled independently of one another. The same bar in each chart is scaled according to the ratio of the height in the Height box to the maximum value of its corresponding variable, ignoring the at value setting.</p>
	Graduation	<p>The Graduation list is available only when the Chart Type is Stacked - Graduated or Multiple. It contains the following commands.</p> <p> Square Root Choose Square Root to scale by square root.</p> <p> Constant Choose Constant to scale linearly.</p> <p> Log Choose Log to scale logarithmically (base 10). All bars are scaled down to a zero-sized bar for a zero value. The default setting is to scale by a constant, which is best for representing data in one dimension. Since you are only concerned with one dimension in bar charts, the height of the bars, we recommend that you stay with the default scaling method.</p> <p>Note: If your data range is extremely large, or the numbers are related in an exponential way, graduate the size by log.</p>






Icon	Command	Description
	Height	<p>Indicates the maximum height of a bar. The default height is 0.25 inches, and the valid range is 0.1 to 10 inches. Set the paper units in System Preferences.</p> <ul style="list-style-type: none"> • If the chart type is Stacked, then all the bars are the same height, as specified in the Height box, and the value in the at value box is ignored. • If you choose Stacked - Graduated, the value in the Height box is the height, in paper units, of a stacked bar when the value in the at value text box is the sum of the bar's data values. • If the bar chart contains Multiple bars with identical scales for each bar, all bars are scaled according to the ratio of Height to the at value. • If the chart type is Multiple - Independent, at value is ignored and each bar is scaled according to the ratio of Height to its field's or expression's maximum value.
	Width	<p>Indicates the width, in paper units, of the bar chart. The valid range is 0.1 to 4 inches. You can set the paper units on the PRO tab, by clicking Options, and System Preferences.</p>
	Orientation	<p>Choose one of the buttons in the Orientation box to set the bar charts' placement and direction with respect to the object's centroid in the base layer. Each button shows a different orientation. The base layer is the map view of the table on which you have chosen to base your thematic map. For example, if you are making a thematic map with bar charts from the States table, the States layer is the base layer. The default is to place the bar chart above the object's centroid in the base layer.</p> <ul style="list-style-type: none"> ▣ Top Left (West) ▣ Top Center (North) ▣ Top Right (East) ▣ Center Left (West) ▣ Center (North) ▣ Center Right (East) ▣ Bottom Left (West) ▣ Bottom Center (South) ▣ Bottom Right (East)










See also:

THEME Tab

Pie Chart Style Group

These commands help you in customization of Bar Chart theme settings and styles. This group is visible only when you select the **Pie Charts** theme type in the **Layers** or **Explorer** window.






Icon	Command	Description
	Chart Type	<p>Choose the type of pie chart you want to create from the group.</p> <p> Whole Pies Choose Whole Pies to display full pies.</p> <p> Half Pies Choose Half Pies to display half pies.</p>
	Graduation	<p>Choose Graduated to make the size of the pies proportional to the sum of their components.</p> <p> Square Root Choose Square Root to scale by square root.</p> <p> Constant Choose Constant to scale linearly.</p> <p> Log Choose Log to scale logarithmically (base 10). This option is available when Graduated in the Chart Type group box is selected. All graduated pies are scaled down to a zero-sized pie for a zero sum. The default setting is to scale by square root. We recommend that you scale by square root for pie charts because the pies' area varies as a square of the radius.</p>
	Pie Size	<p>Drag to set the maximum diameter of a pie. Double click at thumb to set value at specified size.</p>
	Start Angle	<p>Specify at what angle you want the first pie wedge to start.</p>

Icon	Command	Description
	Orientation	<p>Choose one of the buttons in the Orientation box to set the pies' placement and direction with respect to the object's centroid in the base layer. Each button shows a different orientation. The base layer is the map view of the table on which you have chosen to base your thematic map. For example, if you are making a thematic map with pie charts from the States table, the States layer is the base layer. The default is to center the pie chart over the object's centroid in the base layer.</p> <ul style="list-style-type: none">  Top Left (West)  Top Center (North)  Top Right (East)  Center Left (West)  Center (North)  Center Right (East)  Bottom Left (West)  Bottom Center (South)  Bottom Right (East)

See also:**THEME Tab****Symbol/Graduated Style Group**

These commands help you in customization of Symbol/Graduated theme settings and styles. This group is visible only when you select the **Graduated** theme type in the **Layers** or **Explorer** window.

Icon	Command	Description
	Field	Updates the field or expression that contains the data values. The drop-down list displays all the applicable fields in the table selected when creating the theme.

Icon	Command	Description
	Graduation	<p>Choose Graduated to make the size of the pies proportional to the sum of their components.</p> <p> Square Root Choose Square Root to scale by square root.</p> <p> Constant Choose Constant to scale linearly.</p> <p> Log Choose Log to scale logarithmically (base 10). The default setting is to scale by square root. We recommend that you scale by square root in a graduated symbols map. When you scale by square root, MapInfo Pro assigns symbol sizes in such a way that, the area of a symbol is proportionate to the symbol's value. Therefore, if one records value is three times larger than another record's value, the larger record has a symbol that occupies three times as much area on the map. Cartographers have determined that this method of varying symbol sizes produces maps that result in more accurate visual representations of the data values, making far better comparisons.</p>
	Positive Symbol	Enables you to choose a symbol for positive data values. Displays the Symbol Style dialog box for positive values.
	Negative Symbol	Enables you to choose a symbol for negative data values. Displays the Symbol Style dialog box for positive values.
	Show Negative Values	Check this box to display the symbol for negative values on your map. Changing the values of the negative values symbol has no effect on the attributes of the positive values symbol. To change the negative values symbol's attributes, click inside the Symbol style box in the Negative Values group. The Symbol Style dialog box displays. You can change the type of symbol, its color and size. The default is a 36 point blue circle.
	Symbol Font Size	Choose the point size for the symbol from the drop-down list. The default size is 36 points.
	Increase Symbol Size	Increases the symbol size.
	Decrease Symbol Size	Decreases the symbol size.



Icon	Command	Description
	At Value	Enter the data value on which you want to base the symbol's proportion. The size of the symbol at this value is the size you specified in the Symbol Style dialog box. The symbols for the remaining data values are sized using this value. The default setting is the maximum value of your data, with two significant digits. The symbols are scaled down to a one point symbol for zero values.

See also:

THEME Tab

Dot Density Style Group

These commands help you in customization of Dot Density theme settings and styles. This group is visible only when you select the **Dot Density** theme type in the **Layers** or **Explorer** window.

Icon	Command	Description
	Field	Updates the field or expression that contains the data values. The drop-down list displays all the applicable fields in the table selected when creating the theme.
	Dot Shapes	Choose either the Circle or the Square to display the dot shape of your choice. <input type="radio"/> Circle: Choose Circle to display circle shaped dots. <input type="radio"/> Square: Choose Square to display square shaped dots.
	Size	Choose either square dots (1-25 pixels) or circle dots (2-25 pixels).
	Value Per Dot	MapInfo Pro makes an estimate of how many units each dot should represent and places this estimate in the text box. Enter a different number if you wish. The greater the number of units each dot represents, the fewer the number of dots that appears on the map.
	Increase Size	Increases the dot size.
	Decrease Size	Decreases the dot size.


Icon	Command	Description
	Dot Color	Changes the dot color of a Dot Density Thematic map.

See also:

[THEME Tab](#)

Individual Value Style Group

These commands help you in customization of Individual Value theme settings. This group is visible only when you select the **Individual** theme type in the **Layers** or **Explorer** window.


Icon	Command	Description
	Field	Updates the field or expression that contains the data values. The drop-down list displays all the applicable fields in the table selected when creating the theme.
	Color Palettes	Changes the color scheme of Individual Value Thematic map. Color Palettes contain a list of predefined bands of colors that can be applied on any existing individual value thematic map. When you select a color band from Color Palettes , it sets the color of the line, point or region of individual value object to the color selected from the color palette.

See also:

[THEME Tab](#)

Modify Group

Allows you to modify theme style settings. This group is visible only when you select one out of the following theme types in the **Layers** or **Explorer** window; **Ranges**, **Bar chart**, **Pie Chart** or **Individual**. The **Styles** command behaves differently based on the theme type selected. Refer the table below for details.

Icon	Command	Description
	Styles	<p>Displays the Customize Range Style dialog box when a Ranged theme type is selected in the Layers or Explorer window. This allows customization of attributes such as color and size. For details, see <i>Customize Range Styles Dialog Box</i> in the <i>Help System</i>.</p> <p>Displays the Customize Pie Style dialog box when a Pie Chart theme type is selected in the Layers or Explorer window. This allows customization of chart type, method and orientation. For details, see <i>Customize Pie Styles Dialog Box</i> in the <i>Help System</i>.</p> <p>Displays the Customize Bar Style dialog box when a Bar Chart theme type is selected in the Layers or Explorer window. Allows customization of chart type, method and orientation. For details, see <i>Customize Bar Styles Dialog Box</i> in the <i>Help System</i>.</p> <p>Displays the Customize Individual Style dialog box when an Individual Style theme type is selected in the Layers or Explorer window. Allows customization of color and other attributes. For details, see <i>Customize Individual Styles Dialog Box</i> in the <i>Help System</i>.</p>

See also:





THEME Tab




STYLE Tab

The **STYLE** tab contains commands and command lists for working with layers. It is available when at least one layer in the **Layers** or **Explorer** window is highlighted.

Style Group

These commands change how regions, lines, symbols, and text display on the map.

Icon	Command	Description
	Apply Styles	Toggles the style override on and off.
	Use Stacked Styles	Toggles stacked styles on and off. See Stacking Display Styles to Create a Custom Look
	Region Style	Modifies the color, pattern and outline of closed objects.
	Line Style	Modifies line color, pattern and width.




Icon	Command	Description
	Symbol Style	Modifies symbol size, color and type.
	Text Style	Modifies text color, font and size.
	Symbol Rotation	Adjusts the rotation for symbols in the selected layer(s).

Translucency Group

These commands control how opaque a layer or its labels are on the map. Make a layer transparent to make the information behind it more visible when overlaying a region, such as a flood plain, market catchment area, or hotspot. Make labels transparent, so that they do not obscure information behind them.









Command	Description
Layer	Adjusts the percentage of translucency for the layer.
Label	Adjusts the percentage of translucency for the labels in the layer.


Display Group

Icon	Command	Description
	Show Nodes	Displays the nodes in the selected layer.
	Show Centroids	Displays the centroid of each object in the selected layer.
	Show Line Direction	Displays the direction in which line objects are drawn.

Display (Raster Overlay) Group

These commands are active when you have a raster overlay on the map. For a description of how to work with the MapInfo Pro Advanced raster features, click the **Help** button on the **RASTER** tab.

Icon	Command	Description
	Field	Displays all the fields that are present in the active raster. To render different fields, select the field name from the drop-down list. There must be two or more fields to activate this command.
	Display Mode	Select to render the file in either Pseudo , RGB , or Classified mode. You can render continuous and imagery file in either Pseudo or RGB display mode.
	Band to Display	Displays all the bands for the selected field in the current raster, such as red, green, and blue. When in Pseudo display mode, select a specific band from the drop-down list to render it on the current map. When in RGB display mode, map different bands in the current raster to the RGB channel to then render it on the current map. This is useful for Landsat data.
	Color	Opens a dialog to select the color to apply to the raster. The raster must be open in Pseudo mode to activate this command.
	Color Stretch	Opens the Color Stretch dialog, which has options to enhance the display of a raster grid by changing the grid's appearance through data stretches.
	Advanced Color	Opens a Color dialog to enhance all aspects of the appearance of the raster by changing its coloring, data stretches, and bandpass cutoffs.
	Hill Shade	Opens a dialog of effects to mimic the sun's illumination, intensity, and shadows across variations in elevation within the map landscape (the raster surface). The raster must be open in Pseudo mode to activate this command.
	Raster Quality	Improve the appearance of continuous raster surfaces using an interpolation technique when viewed at high resolution: None (this is the default), Nearest Neighbor , Bilinear , Cubic Spline (Local) , or Cubic Spline (Global) .

Icon	Command	Description
	Favorite Template	<p>Manage and apply custom templates. Selecting Manage Templates opens the Custom Templates window where you can create and edit your raster templates.</p> <p>You must have an Advanced license to enable this command.</p>

LABELS Tab

The **LABELS** tab is available on the ribbon when you highlight one or more layers in the **Layers** or **Explorer** windows. This tab is another way to access label options that are also available from the **Layer Properties** dialog box. It contains the following groups of commands.

Label Content Group



These commands label content with columns or expressions.











Command	Description
Label using	Select a column in the table to use labels from.
Abbreviate with	Select this check box and a column in the table that contains abbreviated labels. This uses abbreviations when there are a large number of labels.

Label Placement Group

These commands provides common preset rules for how labels are placed on the map. The preset rules are groups of options that you would normally have to set individually in the **Layer Properties** dialog box. The available rules change depending on the type of layer selected. For example, for a layer of regions, some of the rules include **Auto Size**, **Auto Position** and **Centroid**. For a line layer the options are **Curved**, **Curved with Fallback**, **Rotated**, and **Horizontal**.












The other commands in the Label Placement group – position, offset, overlaps and duplicates – are the same as those in the **Layer Properties** dialog box.



Icon	Command	Description
	Label Rules	<p>Lists common preset label rules.</p> <p> Default Point Labeling</p>

Icon	Command	Description
	Label Position	<p>Use these default position (Anchor Point) buttons and the label offset to set label placement.</p> <div>  Top Left  Top Center  Top Right  Center Left  Center  Center Right  Bottom Left  Bottom Center  Bottom Right </div> <p>The anchor point is the label's position relative to the map object. The default anchor point varies with the type of map object: Regions default to Center, Lines to Above Center, and Points to Right.</p>
	Offset	Sets the number of points (a measurement of text size) that a label is placed from its anchor point.
	Label Overlap	<p>Sets how to display labels when they overlap.</p> <p>Discard Labels – Remove labels that overlap each other on the map.</p> <p>Allow Overlaps – Allow labels to draw on top of each other. Labels may not display when they overlap labels that have a higher priority on the map.</p> <p>Try Other Positions – Avoid overlapping labels (to display more labels) by repositioning them around the object the label is describing.</p>
	Allow Duplicates	Allows duplicate labels for different objects to display, for example, (Portland, OR) and (Portland, ME). Use this option with street maps to label street segments individually.
	Label Partial Objects	Label polylines and objects whose centroids are not visible in the Map window. This only applies to autolabels. Customizing a label does not change its location.

Label Style Group

These commands set label display style, such as font family, size, special effects, and whether or not to show label lines. These are the same options available from the **Layer Properties** dialog box. An important difference, however, is you can see an immediate effect of your style choices when **Enable Preview** command is turned on and you hover over, for example, a font name or size on a drop-down list. You can preview **Label Rules**, see [Enable Preview Command](#).


Icon	Command	Description
	Font Family	Change the font family. Available when a text box is activated on the layout.
	Font Size	Change the font size. Available when a text box is activated on the layout.
	Increase Font Size	Change the font size incrementally larger when a text box is activated on the layout.
	Decrease Font Size	Change the font size incrementally smaller when a text box is activated on the layout.
	Bold	Applies a stronger appearance to label text.
	Italic	Slopes label text to the right.
	Underline	Adds an underline to label text.
	All Capitals	Displays label text in all capitals (TEXT).
	Expanded	Adds space between the characters of label text (t e x t).
	Shadow	Adds a shadow effect behind label text.
	Font Color	Select a color to apply to label text.
	Halo	Adds a luminous outline around label text.
	Highlight	Sets a color to use behind labels to make them more legible on the map.

Icon	Command	Description
	Label Background Color	Selects the background color to use with Halo and Highlight effects.
	Label Lines	<p>Lists the following commands. The last selected style is active. Label lines display after you move the label from where it was originally created.</p> <p>None: Do not display a line with the label.</p> <p>Simple: Create a call-out by using a simple line that connects the label to the anchor point.</p> <p>Arrow: Create a call-out by using an arrow and line that connects the label to anchor point.</p> <p>Line Style Modify the style of the call-out lines.</p>

Enable Preview Command

This command shows a preview of the label while you are making label style choices. If your map contains a large number of labels, the preview display can be slow. So consider turning off the **Enable Preview** feature when you don't need it.

Preview is available for font family, font size, label foreground color, label background color (when halo or highlight is set) and **Label Rules**. The **Enable Preview** only enables or disables previewing for layers. It is not available for use with the **Layout** window.



Icon	Command	Description
	Enable Preview	Enables a preview of the label while you are making style choices.

GRIDLINES Tab

The **GRIDLINES** tab contains commands and command lists for managing the grids in a **Map** window. The **GRIDLINES** tab is available on the ribbon after selecting a **Gridline** layer for a map in the **Explorer** window.




Gridline Group






These commands add a grid to a map and modify the properties of it.

Icon	Command	Description
	Add Gridline	Creates a new grid layer on the active Map window. You can add more than one grid layer to a map.
	Gridline Properties	Modifies properties for an existing grid layer on the active Map window, such as the horizontal and vertical spacing of grid lines.

Style Group



These commands control how the labels on grid lines display.

Icon	Command	Description
	Apply Styles	Toggles the style override on and off.
	Use Stacked Styles	Toggles stacked styles on and off. See Stacking Display Styles to Create a Custom Look
	Font Family	Changes the font family.
	Font Size	Changes the font size.
A⁺	Increase Font Size	Changes the font size incrementally larger.
A⁻	Decrease Font Size	Changes the font size incrementally smaller.
B	Bold	Bolds label text.
<i>I</i>	Italic	Italicizes label text.
<u>U</u>	Underline	Adds an underline to label text.
T^T	All Capitols	Displays label text in all capitols (TEXT).
a b 	Expanded	Adds space between the characters of label text (t e x t).

Icon	Command	Description
	Shadow	Adds a shadow effect behind label text.
	Halo	Adds a halo effect around label text.
	Highlight	Sets a color to use behind labels to make them more legible on the map.
	Label Background Color	Selects the background color to use with Halo and Highlight effects.
	Enable Preview	Enables a preview of the label while you are making style choices.

Labels Group

These commands control how labels are placed relative to their grid line.

Icon	Command	Description
	Label Offset	Sets a measurement value to place labels from their grid line. This uses the measurement type beside the Map Edge Offset command.
	Map Edge Offset	Sets a measurement value to place labels from the edge of the map. The measurement can be in inches (in), centimeters (cm), millimeters (mm), picas, or points.
	Label Placement	<p>Vertical Lines select to place labels to the left of, centered on, or to the right of grid lines.</p> <p>Horizontal Lines select to place labels above, centered on, or below grid lines.</p> <p>Label Positions select an anchor point for placing labels, such as using all sides of labels, the top and left of labels, or the bottom and right of labels.</p>
	Label Direction	<p>Label Direction select the direction in which to place labels: either horizontal or following grid lines.</p> <p>Label Format select to display labels using compass direction (N,E,S,W) or degrees (-90 to +90).</p>

Translucency Group

These commands control how opaque a grid layer or its labels are on the map. You can make grid lines transparent to control how much importance the grid has to the map design and to make information behind the grid lines more visible. You can make the labels for grid lines transparent, so that they do not obscure information behind them.

Command	Description
Layer	Adjusts the percentage of translucency for the layer.
Label	Adjusts the percentage of translucency for the labels in the layer.

PRO Tab

The **PRO** tab contains links to a wide variety of system, application and product resources, including setting preferences on the **Options** page and handling licenses on the **Licensing** page. The **PRO** tab is always available.

Click the arrow at the top of the Pro tab to return to the MapInfo Pro desktop and the other tabs. Click Exit to stop the current MapInfo Pro session and exit the product.

About

The **About** group contains links to updates, copyrights, license terms, news and suggestions.

Licensing

The **Licensing** group is where you manage your license(s) for MapInfo Pro, including transferring, borrowing and returning a license, activating an advanced license, and entering a Bing License key.

Help

The **Help** group contains links to help topics and documentation, tutorial video library, Tech Support and system information.

Products

The **Products** group contains links to the MapInfo page on the Precisely website, MapInfo data products, and the MapInfo Online Store.

Geocoding

The **Geocoding** group contains links to manage your Precisely Global Geocoder account.

Add Ins

The **Add Ins** group contains a list of applications that have been added to this MapInfo Pro installation, such as MapInfo Pro Raster.

Options

The **Options** group provides access to preferences for system and application-level components of MapInfo Pro. For a description of each option, see *Summary of Preferences* in the *Help System*.

Ribbon Keytip Navigation for Accessibility

The MapInfo Pro ribbon provides keytip support for users to navigate the tabs and commands without the use of a mouse. Keytips are a Windows ribbon convention for keyboard navigation. Keytips appear as small black indicators over the tabs and commands when you click the Alt key. You can progressively drill down levels within the ribbon by navigating the keystrokes as they appear on the user interface. To turn off keytips, press ESC.

For example, to access the Zoom-To Entire Layer on the MAP tab, press: `Alt+M+ZT+L`.

Quick Search Tool

You can use **Quick Search** to quickly search and execute commands on the MapInfo Pro ribbon. These commands might be grouped or nested under different tabs, sub-menus or backstage items but the **Quick Search** tool displays a list of all relevant commands as you type your query in the search box. Once you see the desired command in the drop-down list, select or click on the command to launch. The selected command location on the ribbon interface is also highlighted on launch from **Quick Search** to aid you in locating the command.

Quick Search is a MapInfo Pro tool that is loaded by default when you install MapInfo Pro. Once loaded, it is located at the top-right corner of the MapInfo Pro ribbon and is accessible by choosing the `Ctrl+Q` keys. You can show or hide the **Quick Search** box by loading or unloading the **Quick Search** tool from the **Tool Extensions** drop-down list under the **Tools** group on the **HOME** tab.

If you are connected to the internet, Software Data and Marketplace content is also searchable from the Quick Search tool.

Note: Toggle this option by right-clicking on the **Quick Search** tool in the **Tools** window and selecting **Search MapInfo Marketplace**.

Custom Keywords

You can define custom keywords to launch specific commands using the **Quick Search** tool. The keyword list is in a comma separated value (CSV) file stored in the Application Data directory of the **Quick Search** tool at

%appdata%\MapInfo\MapInfo\Professional\2021\Tools\QuickSearch\keyword_en.csv

The keyword list works on the Key-Value pair concept. A typical keyword list looks like

```
info,point query
add theme,thematic,Create Thematic Map, Bivariate, Chloropleth
hybrid,bing hybrid,base map
aerial,bing aerial,base map
roads,bing roads,base map
```

Here the first entry in every CSV line is the key (command searched) and all subsequent entries are values (search query). For example, from the first line of the keyword list; if you type point query in the Quick Search box, a list of all `info` commands would be displayed.

Highlighting Command on Launch

An important feature of the Quick Search tool is that along with searching a command for you it aids you in locating that command in the ribbon interface. As soon as you launch a command from Quick Search, it is highlighted on the ribbon interface. You can enable/disable this highlighting feature or set the duration and color of the highlight when a particular command is launched by updating the following three entries in the

%appdata%\MapInfo\MapInfo\Professional\2021\Tools\QuickSearch\QuickSearch.dll.config file.

```
<add key="Enable_Command_Highlight" value="True" /> // Default value is
True, set to False to disable highlighting
<add key="Command_Highlight_TimeSpan_Seconds" value="4" /> //Sets the
duration of the highlight
<add key="Command_Highlight_Brush" value="Blue" /> //Sets the color of
the highlight
```

Note: For command highlighting to work correctly, it is recommended that you disable **Ribbon Tab Switching**. Under the **PRO** tab, click **Options** and then click **Application** in the **System** section to open **Application Preferences**. Set **Ribbon Tab Switching** to **None**.

About the Quick Access Toolbar

The **Quick Access Toolbar** is a customizable toolbar that contains a set of commands that are independent of the tab on the Ribbon that is currently displayed. You can add buttons that represent

commands to the Quick Access Toolbar. The toolbar is located in the upper-left corner of the MapInfo Pro desktop by default. It can also be moved closer to the work area below the ribbon.

Customizing the Quick Access Toolbar

The **Quick Access Toolbar** can be configured to hold commands to suit your needs and work style. You may wish to include frequently used commands here rather than access them from one of the tabs on the ribbon. By default **Open Table**, **Save Workspace**, and **Close All** are included on the **Quick Access Toolbar**.

Use the **Quick Access Toolbar** menu to locate the toolbar above or below the MapInfo Pro ribbon and control whether the ribbon is viewable or hidden.

To customize the **Quick Access Toolbar**:

1. Right-click on the ribbon and choose **Customize Quick Access Toolbar** to open the **Customize Ribbon** dialog box.

This dialog is also available from the **Customize Quick Access Toolbar** menu, in the upper left corner of the desktop, by choosing **More Commands**.

2. Highlight **Quick Access Toolbar** in the left pane to access the customizable settings.
3. From the **Choose commands from:** drop down list, choose the command group or choose **Application Commands** (default). The commands list updates based on your selection.

Commands are grouped by common themes, such as Layer and Edit commands, as well as for each tab. Layer and Legend commands are also listed.

4. Double-click on a command name or highlight it and click **Add** to move it to the **Quick Access Toolbar** pane.

The following instructions describe how to add more commands and organize them on the toolbar.

To remove a command:

1. On the **Customize Ribbon** dialog box, click the **Remove** button.
2. Click **OK** to save your changes.

To organize the commands:

1. On the **Customize Ribbon** dialog box, use the **Up** and **Down** arrows.
2. Click **OK** to save your changes.

To reset the toolbar to the default settings:

1. On the **Customize Ribbon** dialog box, click **Reset**.
2. Click **OK** to save your changes.

To change the location of the **Quick Access Toolbar**:

- Right-click on the ribbon and choose **Show Quick Access Toolbar Below the Ribbon**.

To hide the ribbon:

- Right-click on the ribbon and choose **Minimize Ribbon**. See [Customizing the Ribbon](#).

Support for MapInfo Pro Add-Ins

MapInfo Pro Add-Ins can now add menus to the Quick Access Toolbar. You can use the `MapInfo.Types.IRibbon.SaveRibbonState` method while unloading an Add-In and the `MapInfo.Types.IRibbon.LoadRibbonState` method while loading an Add-In from `MapInfo.Types.IRibbon` to enable the Quick Access Toolbar.

See below for the definitions of the two methods:

```
/// <summary>
/// Load add-in's ribbon state.
/// </summary>
/// <param name="identifier">a unique name</param>
/// <param name="path">Add-in path</param>
/// <remarks>An Add-in can call this to load any items a user has added
/// to the Quick Access Toolbar.
/// Only ribbon items with the IsQAT property set to true can be added
/// to the QAT. Gallery controls cannot be added to the QAT.
/// A state file is loaded from the location specified by the path with
/// the name made up of the identifier followed by ".QatState.json".
/// See <see cref="MapInfo.Types.IRibbon.SaveRibbonState"/>
/// </remarks>

void LoadRibbonState(string identifier, string path);

/// <summary>
/// Save add-in's ribbon state.
/// </summary>
/// <param name="identifier">A unique name</param>
/// <param name="path">Add-in path</param>
/// <remarks>
/// <para>An Add-in can call this to save any items a user has added to
/// the Quick Access Toolbar.
/// Only ribbon items with the IsQAT property set to true can be added
/// to the QAT. Gallery controls cannot be added to the QAT.
/// A state file is created in the location specified by the path with
/// the name made up of the identifier followed by ".QatState.json".
/// See <see cref="MapInfo.Types.IRibbon.LoadRibbonState"/>
/// </para>
/// <para>
/// Add-in should call this method before removing any control from the
/// ribbon.
/// </para>
/// </remarks>

void SaveRibbonState(string identifier, string path);
```

Floating and Docking Windows

Document windows, such as **Map**, **Layout**, and **Browser** windows, may be set to float outside of MapInfo Pro or dock within MapInfo Pro.

To set how a window displays, right-click on the document window name located on the document tab. Select one of the following from the pop-up menu:

- **Floating** - Separate the window from MapInfo Pro, so that you can move it anywhere on your screen or onto a second monitor. Floating **Map** and **Browser** windows include a ribbon of commands for working with the contents of the window.
- **Dockable** - Attach the window to the side of the MapInfo Pro screen, so that it is out-of-the way when collapsed, but still easy to access.
- **Tabbed** - Cascade windows one on top of another. For details, see [Tiling and Cascading Windows](#).

If you chose to dock a window, then the right-click context menu on the document window name shows the following additional option:

- **Auto Hide** - Automatically hide a docked window when it is not active. Docked windows are located along the sides of the MapInfo Pro screen, where they are out-of-the way, but still easy to access. This option is only available on docked windows.

The document windows that are currently open are listed in the **Explorer** window. You may need to scroll down the **Explorer** window to see the **Windows** panel and the list of open documents. If you have selected to hide a window, then it is in the **Explorer** window list where you can select it to redisplay it.

Tiling and Cascading Windows

Document windows, such as **Map**, **Layout**, and **Browser** windows, may cascade one on top of another or tile one beside the other when they are in the tabbed state (when they are not docked or floating). When document windows cascade, they overlap and the document on top is visible. When document windows tile, they are next to one another and each window is visible on the screen.

To cascade or tile document windows, right-click on a document window name located on the document tab. Select one of the following from the pop-up menu:

- **New Horizontal Tab Group** - Displays when document windows cascade. Select to tile windows side-by-side across the screen. Only the selected window is active.
- **New Vertical Tab Group** - Displays when document windows cascade. Select to tile windows side-by-side down the screen. Only the selected window is active.
- **Move To Next Tab Group** - Displays when document windows are tiled. Select to overlap windows, so that only the top window is visible. The top-most window is always the active window.

- **Hide** - Removes the window from view, but keeps it open in MapInfo Pro. To view the window, select it from the **Windows** list (select the check box beside its name) in the **Explorer** window.

To view a hidden document window, locate the table (document) name in the **Explorer** window, right-click on it, and select **Activate**. You can also double-click on the table (document) name to open it.

The document windows that are currently open are listed in the **Explorer** window. You may need to scroll down the **Explorer** window to see the **Windows** panel and the list of open documents.

Closing or Cloning Document Windows

Document windows, such as **Map**, **Layout**, and **Browser** windows, can be closed or hidden.

To remove one or more document windows from view, right-click on the document window name located on the document tab. Select one of the following from the pop-up menu:

- **Close All But This** - Closes all document windows except for this one.
- **Close All** - Closes all document windows in MapInfo Pro.
- **Close** - Closes the current document window.

When you close a document window, the table is no longer available from the **Explorer** window. You can reopen the table from the **Open** command, which lists all of the recently opened tables.

To clone a document window, right-click on the document window name located on the document tab and select the following:

- **Clone** - Duplicates the document window. The new window has the same name with a numeric extension (shown on the window tab or title bar), such as MyMap:1.

Reviewing Windows Features

HTML Support

As a mapping graphics application, we support exporting map images to formats commonly used on the World Wide Web.

Shortcut Menus

Shortcut menus are pop-up menus activated by the right mouse button. They are available in **Map**, **Browser**, **Layout**, and **MapBasic** windows. Use them to quickly perform common tasks.

Long Filename/UNC Support

MapInfo Pro supports Universal Naming Conventions. This gives you greater flexibility, as you can access data without drive mappings from one session to another. MapInfo Pro also supports long filenames. A filename can have up to 260 characters in the qualified path, and any one component within the path can have up to 255 characters. In addition, you are not restricted to the 8.3 DOS convention in naming files. Spaces are allowed, as are additional periods.

Installer/Uninstaller

MapInfo Pro has a fully-automated installation program that graphically leads the user through the installation process. Furthermore, MapInfo Pro provides several different uninstall options.

Drag and Drop

MapInfo Pro has drag and drop support for **Map** windows. Using the **Drag Map** command, you can drag and drop a **Map** window into a container application, such as a spreadsheet or word processing program. For details, refer to [Using Drag and Drop](#).

Using the Windows-Compatible Features

Using the Save Window to File Dialog Box for HTML Support


When saving a window to a file, you can specify a file name for the image, directory, file format, and drive.

To save a window to a file:

1. On the **HOME** tab, in the **Output** group, click **Save** to open the **Save Window to File** dialog box.
2. From the **Save as type** list, choose the file format for the exported image. The default format is Bitmap (.BMP).

Using Drag and Drop

You can place a map into a Microsoft application. A MapInfo Pro object or selection of objects can be dragged to and dropped upon Microsoft drop targets (such as Microsoft Word and Excel). You can perform drag and drop within a document or window, across documents and windows within MapInfo Pro, or across applications.

Use the **Drag Map**  command to place a MapInfo Pro map into an OLE container application. A map dragged from 64-bit MapInfo Pro is a metafile and does not provide map functionality.

Note: You need to specify what gets copied to the clipboard. See [Setting Your Copy to Clipboard Preferences](#). By default, you cannot copy a map until you set this preference.

To drag a map into a Microsoft application:

1. On the **MAP** tab, in the **Options** group, click **Drag Map**.

As the cursor moves over the map, it displays as a drag icon.

2. Click and hold down the mouse button anywhere in the **Map** window.
3. Drag the map to the new location.
4. Release the mouse button; the map is dropped in the new location.

If the application into which you are dragging a map cannot accept the map object, the **No Drop cursor** displays.

Toggling the Crosshair Cursor

Some MapInfo Pro commands display a crosshair cursor. You can switch the crosshair style by pressing the **X** key. Each press toggles between a style, there are three styles to choose from.



MapInfo Pro applies the crosshair cursor style globally-there is no per-window setting. It stores the style between sessions, so you see the most recent crosshair cursor style at startup.

Note: Two dialogs display a crosshair cursor when the mouse cursor is over the sample raster image within the dialog: the **Image Registration** dialog box and the **Adjust Image Styles** dialog box. While working within the **Adjust Image Styles** dialog box, you cannot toggle between different cursor styles (by pressing the **X** key).

Setting Your Cursor Style

When working in a Citrix XenApp environment, there may be a delay rendering the 32-bit per pixel cursor in MapInfo Pro causing a performance issue. Switching to the 1-bit per pixel cursor corrects this issue.

To switch to the 1-bit per pixel cursor:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.
2. Clear the **Enable True Color Cursors** check box to use the 1-bit per pixel cursor, which displays in black and white.

Selecting the check box enables the 32-bit per pixel cursor.

Touch Screen Devices

MapInfo Pro supports multi-touch gestures which allows two-finger pinching and panning gestures on a touch screen device to perform zoom in, zoom out and pan on the map. The multi-touch also works on a 3D map, Prism map, and the map in the **Layout** window.

When you pinch the touch screen display or drag your fingers on it, the system detects the gestures and creates the zoom or pan effect on the map.

Turn Multi-Touch On or Off

Multi-touch support is enabled by default, to turn it off:

1. On the **PRO** tab, select **Options**.
2. Click **System Settings** to open the **System Settings Preferences** dialog box.
3. Clear the **Enable Multi-touch** check box.

Pan

1. Open a map on your touch screen device.
2. Place two fingers on your touch screen display and drag both fingers together in any direction.

Zoom In

1. Open a map on your touch screen device.
2. Place two fingers on your touch screen display and spread them apart without lifting them from the screen.

Zoom Out

1. Open a map on your touch screen device.
2. Place two fingers on your touch screen display and pinch them in together without lifting the fingers from the screen.

Multi-touch on a 3D or Prism Map

You can move the 3D or Prism map around to determine the most effective angle for displaying your information on a touch screen device.

Pan a 3D or Prism Map

1. Open a 3D or Prism map on your touch screen device.
2. Place two fingers on your touch screen display and drag both fingers together in any direction.

Zoom In on a 3D or Prism Map

1. Open a 3D or Prism map on your touch screen device.
2. Place two fingers on your touch screen display and spread them apart without lifting them from the screen.

Zoom Out on a 3D or Prism Map

1. Open a 3D or Prism map on your touch screen device.
2. Place two fingers on your touch screen display and pinch them in together without lifting the fingers from the screen.

Using the Status Bar

The Status Bar along the lower edge of the desktop provides helpful information during your mapping session and allows you to make some changes directly in the Status Bar.

Note: Not all entries display in the Status Bar at all times. Entries display when a feature is active.

- **Status Bar Help:** To find out what a command does, hover the cursor over the command in the Status Bar. A brief description (tooltip) displays.
- **Zoom, Map Scale, Cartographic Scale, Cursor Location:** View any one of these settings in the Status Bar. You can change which one displays directly from the Status Bar. Click the setting on display in the Status Bar and then click the one you want to display from the list. The Status Bar automatically updates. These display settings are also controlled in the **Map Options** dialog box (on the **MAP** tab, in the **Options** group, click **Map Options**).
- **Editing:** To keep track of which layer is currently editable, review the list of layers that display in the Status Bar. You can change the editable layer directly in the Status Bar by clicking **Editing** and selecting a layer from the list of layers in the active **Map** window. The Status Bar updates showing the new editable layer.
- **Selecting:** The Status Bar indicates which layer the current selection is from. If there is nothing selected, the Status Bar reads: *Selecting: NONE*.
- **records:** When viewing a table in a **Browser** window, the record count displays in the Status Bar.
- **SNAP:** When working in a **Map** window, you can turn on snap-to-node by pressing the **S** key. When this feature is in use, *SNAP* displays in the Status Bar.
- **AUTOTRACE:** When working in a **Map** window, you can turn on the auto-trace indicator by pressing the **T** key. When this feature is in use, *AUTOTRACE* displays in the Status Bar.
- **AUTONODE:** When working in a **Map** window, you can turn on the auto-node indicator by pressing the **N** key. When this feature is in use, *AUTONODE* displays in the Status Bar.

Using the Help System

MapInfo Pro's comprehensive *Help System* provides the information you need to learn and use the product more effectively. You can reach the information in several ways:

- Use the *Help System* screen to choose topics.
- Use the Search feature to search on a specific word. Type the word you want to search for in the first field, select the matching word in the second, and then the topic in the third box. MapInfo Pro displays the topic in the drop-down pane beneath the search box.
- Context-Sensitive Feature: Press the **F1** key to receive more information on any command or dialog box. The Help window for that item displays.

Instructions For Using Help

The MapInfo Pro *Help System* lets you quickly reference commands and options (such as what is the purpose of this command, how do I make this command active) and provides step-by-step instructions for the related tasks.

To find a topic in the *Help System*:

1. Click the **Contents** icon to browse through topics by category.
2. Click the **Search** icon to search for words or phrases that may be contained in a Help topic.

To copy text from the **Help** window select the text to copy, right-click, and then select **Copy** from the pop-up menu.

Related tasks

[Searching for Help on a Keyword](#) on page 113

[Saving a Favorite Topic](#)

Searching for Help on a Keyword

The **Search** dialog box lets you select or type a keyword that you want to search for in the *Help System*. All help topics associated with that keyword are listed. You can then choose the desired topic for display. For example, to find out how to add a control point, you could select or type add, control, or point. Topics that have the word add, control, or point associated with them would then be listed in the **Search** dialog box.

To search on a keyword:

1. On the top right of the MapInfo Pro window, click the **MapInfo Pro Help Topics (?)** button to open the *Help System*.
2. On the **Search** tab, type the topic or word you want to search for in the search box.
3. Click **Search**.
4. Click on the topic in the search results that you want to view.

Clicking on the **Back** button in the menu bar will return you to the previous **Help** screen.

For more about using help, see [Instructions For Using Help](#) and [Saving a Favorite Topic](#).

Related tasks

[Instructions For Using Help](#) on page 113

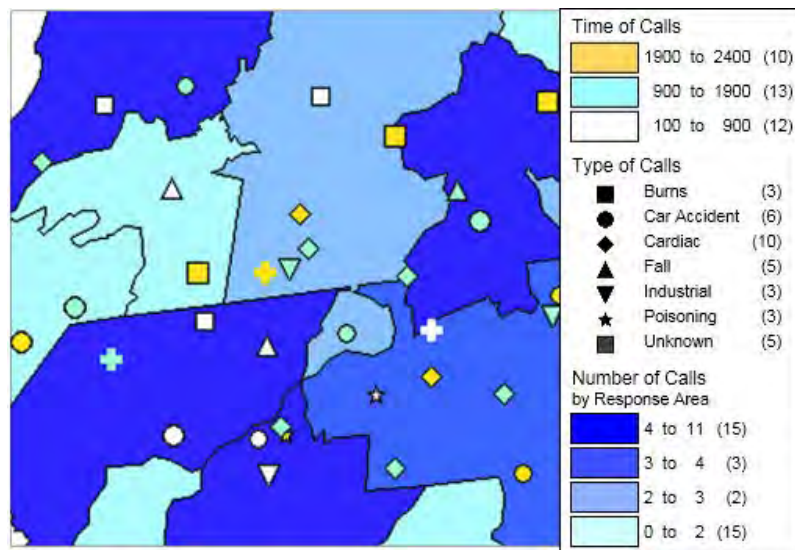
Data - Where MapInfo Pro Begins

To use MapInfo Pro, you need to match the files that contain your information (*data*) and maps that come from MapInfo Pro or that you create yourself. MapInfo Pro organizes all its information, whether textual or graphic, in the form of tables; each table is a group of MapInfo Pro files that constitute either a map file or a database file.

MapInfo Pro begins when you open tables, whether they are maps or data from a database.

What is a Database and Other Basic Terminology

A *database* is a collection of information organized so that it can be readily accessed using a computer. Databases in MapInfo Pro are often referred to as tables. MapInfo Pro creates a visual display of the data in tables in the form of a map.



Emergency medical calls thematically shaded by type of call and time of call, with response zones shaded by number of calls.

To understand MapInfo Pro, you need a basic understanding of database organization, in particular, three fundamental concepts: *record*, *field*, *index*, and *query*.

LastName	FirstName	Address	ZIPCode
Fraser	Mark	212 Hudson St	12205
Donaldson	Eva	459 Yates St	12208
Espinosa	Kim	200 Broadway	12180
Smith	Charles	1 Redbird Ln	12065
Chang	Elizabeth	53 Crescent Rd	12077

To understand the database concepts we are about to discuss, consider the table above.

Each row in the list contains information about one person. In database terms, each row is a *record*. Each different box of information (Last Name, First Name, etc.) within a record is called a *field*. Fields correspond to the columns so that the table shown above contains four different fields.

Database fields are ordered (first, second, third, fourth, etc.), and the basic convention is that the first field displays as the first column in the database. The second field is in the column to the right of the first, and so on to the last field, which is displayed in the right most column.

Since the data in a database is not usually in alphabetical order or postal code order or any other pattern which would make it easy for the computer to find the information, the computer needs a way to organize the information. A database uses an *index* to keep track of what information is where and what record it is tied to. Without indices it would be tedious to find anything in a database with hundreds of records, not to mention databases with thousands and tens of thousands of records.

A database index works on the same principle as a book index. A book index is an alphabetical list of topics that appear in the book and the page number or address of the information. Database indices work in a similar way, except that they generally work behind the scenes. You do not ever see them. But the computer constructs them and allows you to use them in your work. An index allows the computer to work with the records according to the order of items in the key field.

MapInfo Pro requires fields to be indexed in order to use the Find command. Indices are also used to improve performance in SQL Select and joins.

A *query* is just another word for a question. You query data to collect a particular type of information from your database. For example, if you wanted to know how many customers live within a certain number of miles of your store, (and you had that kind of information in your database), you could query the database to find out that information. The result of the query is *query data*. You can think of query data as a subset of your data as in the example - a list of all the customers within 5 miles and none of the customers who live further away. MapInfo Pro has commands to help you query your data and display it on a map.

For more about querying your data, see *Selecting and Querying Data* in the *Help System*.

What Data Can I Use in MapInfo Pro?

MapInfo Pro allows you to use data that was created in other file formats. When you bring data into MapInfo Pro for the first time, you need to specify its format. For example, if your data is in delimited ASCII format, choose **Delimited ASCII** from the File Format drop-down list.

Data file choices include:

- Microsoft Access
- Microsoft Excel
- dBASE DBF
- ESRI shapefiles
- Raster Images
- Grid Images
- ASCII Delimited Text
- Lotus 1-2-3
- Remote Databases (Oracle, SQL Server, PostGIS)

- Workspace
- Comma Delimited CSV files
- GeoPackage

For database versions that MapInfo Pro supports, see the *MapInfo Pro Install Guide*.

When you choose a particular file format, the File Name box will only list files that have the appropriate extension. For example, if you choose **dBASE DBF** from the File Format drop-down list, MapInfo Pro will only list files that are in dBASE format.

When you choose a file other than a MapInfo-formatted file type, MapInfo Pro creates a table structure for that data based on the type of file that it is.

Note: During the .TAB file creation process, the original file is in no way altered. The file retains its original properties.

When you open that table in future work sessions, MapInfo Pro will treat these files as if they were in MapInfo Pro's native format. The next time you want to open the table, you should choose the .TAB format for the table. If you accidentally attempt to open the file again with its original file format, MapInfo Pro prompts you with the message:

Table definition already exists. Overwrite it?

This message displays because MapInfo Pro has already created a table for that file. To use the file you have already created, click **Cancel** and open the associated .TAB file.

Also keep in mind that MapInfo Pro supports long filenames and UNC paths. The UNC paths allow you to access your data without having to remember your drive mappings from one session to another.

To display your table in the Map window, your data must contain X and Y coordinates. If it does not already, you can add them using MapInfo Pro. Assigning these coordinates is called geocoding.

Using Data Files in Any Language or Character Set

You can work with characters from any language in your data files, so that multi-language tables display properly in maps, browsers, the Info tool, and other locations. MapInfo Pro can open tables, files, or workspaces with Unicode characters in the file name or path name regardless of the locale of MapInfo Pro or which localized version of MapInfo Pro you are running. A system setting called **Encode Workspaces and Tab Files** enables this feature, which is off by default.

Note: You would disable **Encode Workspaces and Tab Files** to share MapInfo tables with versions of MapInfo Pro that are older than version 15.2, to share data with applications that do not support the UTF-8 character set, or when you use data from only one language. In this case, workspaces and tables are written with the current system character setting (charset).

When enabled, this system setting writes workspaces using the UTF-8 charset. New Tab files or Tab files being re-written, such as save copy as, pack table, update friendly name, or update metadata, use the UTF-8 encoding. The `!charset` in the .tab file remains the same; it represents the data in

the table and not the charset of the .tab file itself. MapInfo Pro writes a UTF-8 Byte Order Mark (BOM) at the beginning of the file, so that other applications recognize the encoding.

When **Encode Workspaces and Tab Files** is enabled (turned on) and you are opening an Excel or Access file for import into MapInfo native TAB format, the resulting tables (TAB files) are in UTF-8 format. When opening an instance of an Excel, ASCII, CSV, or Lotus 1-2-3 data type and **Create Copy in MapInfo Format** is checked on the **Open Table** dialog, the resulting table is in MapInfo Extended format with a default character set (charset) preference set to NativeX (MapInfo Extended). When reading from or writing to a .QRY file, the file opens using the UTF-8 character set.

To enable or disable the **Encode Workspaces and Tab Files** feature:

1. On the **PRO** tab, click **Options**, and click **System Settings** in the **System** group, to open the **System Settings Preferences** dialog box.
2. Select the **Encode Workspaces and Tab Files** check box to enable this feature or clear the check box to disable it.
3. Click **OK**.

To specify a specific character set, such as UTF-8 or UTF-16, to use for your MapInfo tables (*.tab) and MapInfo Interchange files (*.mif, *.mid), see *Setting Your Language Preferences* in the *Help System*.

Note: You can encounter data corruption, due to truncation or conversion, when saving a copy of a database table between Unicode and non-Unicode character sets. When saving non-UTF-8 (non-Unicode) to UTF-8 (Unicode), there is the potential for data truncation. When saving UTF-8 or UTF-16 (Unicode) to a non-Unicode, there is the potential for conversion issues.

When saving data to the MapInfo Extended TAB format (NativeX format), MapInfo Pro interprets the width of character fields in tables with a UTF-16 character set (charset) as the number of characters with two bytes (16-bits) per character. It interprets the width of character fields in tables with any character set other than UTF-16 (such as WindowsLatin1, Cyrillic, and UTF-8) as the number of bytes. For non UTF-8 character sets each character takes up one byte, but could also take from one to four bytes. For UTF-8, since it is used to store characters from any language, it is more likely to require more than one byte. This means that you need to allow for larger field widths to avoid data truncation.

Using the UTF-16 character set is the best way to ensure that all data is preserved, but it results in larger file sizes. The UTF-8 character set can be used to encode all characters faithfully, but truncation could occur. When you save a copy of a table from a non UTF-8 character set to UTF-8, increase the field width to avoid truncation.

See also:

Saving a Table or a Copy of a Table

Support for Raster Images

MapInfo Pro supports raster image display. Raster images are computerized pictures. These graphic images can be used as backgrounds for maps you create in MapInfo Pro and can serve as a reference for your displayed data.

When you bring in a raster image to MapInfo Pro, you may need to register it (specify its map coordinates) so MapInfo Pro can display it properly. Choosing the Raster Image file format from the **Open** dialog box will bring you to the **Image Registration** dialog box where you can specify the appropriate map coordinates. Once you register the image, a process that creates a .TAB file for the image, you can open it as you would open any table in a Map window. Images that you purchase from MapInfo Pro will already be registered.

If a raster image is georeferenced it will be automatically opened. If a raster image has an associated world file, you will be prompted to choose the projection. If you open a raster image that does not have any georeferencing data, you will be prompted to display or register the image.

For a full discussion of raster image display, see *Registering SPOT Images* in the *Help System*.

The MapInfo Pro raster handlers support:

- LeadTools to version 15
- MrSID SDK (3.2), to provide support for MG3 files
- Multi-threading; specifically for ECW and the Government handlers (ADRG, ASRP, CADRG, CIB, NITF)

AirPhotoUSA provides raster images at different elevations for particular areas in the United States. The AirPhotoUSA map handler allows MapInfo Pro users to open and display the imagery contained in AirPhotoUSA Map files as a layer. These files are treated just like any other raster file in MapInfo Pro. The `MAPINFOW.PRJ` file contains AirPhotoUSA information.

You can use the AirPhotoUSA Conterminous U.S. coordinate system without making any changes. However, if you want MapInfo Pro to recognize and give a name to that coordinate system, or to use it for other purposes, you must add it to the `MAPINFOW.PRJ`.

Understanding the Files Associated with MapInfo Pro Tables

When you open your data file, MapInfo Pro creates a table. This table consists of at least two separate files. The first file contains the structure of the data. The second file contains the raw data. All MapInfo Pro tables have the following two files:

- `<SOMEFILE>.tab`: This file describes the structure of your table. It is a small text file describing the format of the file containing your data.

- <SOMEFILE>.DAT or <SOMEFILE>.WKS, .DBF, .XLS, .XLSX: These files contain your tabular data. If you are working with a dBASE/FoxBASE, delimited ASCII, Lotus 1-2-3, Microsoft Excel, or Microsoft Access file, your MapInfo Pro table will consist of a .TAB file and your data or spreadsheet file. For raster tables, the equivalent extension might be BMP, TIF, or GIF.

Your data may also contain graphic objects. Once you assign X and Y coordinates to your data records, your table will also contain graphic objects. If you already have graphic objects in your table, there are two more files associated with the table:

- <SOMEFILE>.MAP: This file describes the graphic objects.
- <SOMEFILE>.ID: This file is a cross reference file that links the data with the objects.

See *Geocoding - Assigning Coordinates to Records* in the *Help System* to learn how to assign X and Y coordinates to your data records so you can display them on a map.

For a Microsoft Access table, there will be a file SOMEFILE.AID associated with the table instead of SOMEFILE.ID. This file is a cross reference file that links the data with the objects for a Microsoft Access table.

Your table may also include an index file. The index file allows you to search for map objects using the Find command. If you want to locate an address, city, or state using the Find command, those fields must be indexed in your table. The index is located in:

- <SOMEFILE>.IND

Opening Your Data in MapInfo Pro

Using Local Data (Located on your Machine)

You can open your Excel (.XLS or .XLSX), dBase (.DBF), Microsoft Access (.MDB or .ACCDB), and ASCII (.TXT) in MapInfo Pro and display that data on a map. There are three steps to accomplishing this:

1. Creating a copy of your data in MapInfo format.
2. Creating points on a map using either coordinates in your data or by matching your data to a search file (see [When Do I Geocode vs. Create Points?](#) for this process).
3. Display your data on the map (see *How Do I Get My Data on the Map?* in the *Help System* to complete this process).

Using Remotely Located Data

If you are accessing your data remotely or use an ODBC supported database product, see *Working with Data in a DBMS* in the *Help System* for additional support.

For information about opening remotely located data, see [Opening Data in Remote Tables](#).

For information about converting, displaying, and printing your data, see *Understanding Your Data* in the *Help System*.

Using Introductory Data

If your copy of MapInfo Pro includes introductory data, you may want to install it now, as described in the *MapInfo Pro Install Guide*. You can then view the sample data in MapInfo Pro as a map while getting familiar with the features of this product.

- For more information, see *Opening MapInfo Pro Introductory Data* in the *Help System*.

MapInfo Pro Data File Support

You can open the following file types in MapInfo Pro on the **HOME** tab by pointing to **Open**:

- **ACCDB** – Microsoft Access 2007 or later files
- **CSV** – Comma Delimited files
- **DBF** – dBASE DBF files
- **MDB** – Microsoft Access files
- **TAB** – MapInfo .TAB files (includes MapInfo Extended – Type NATIVEX)
- **Raster image files** – (*.adf, *.asc, *.bil, *.bip, *.bsq, *.dat, *.dem, *.dt0, *.dt1, *.dt2, *.ecw, *.ers, *.flt, *.grc, *.grd, *.gxf, *.img, *.j2c, *.j2k, *.jp2, *.jpc, *.jpx, *.kap, *.mrr, *.mvr, *.jpx, *.sid, *.tif, *.tiff, *.vrt, *.xml, *.xyz, *.zip)
- **SHP** – ESRI Shapefiles
- **TXT** – Delimited ASCII files
- **WKS** – Lotus 1-2-3 files (*.wk1, *.wks, *.wk3, *.wk4)
- **WOR** – MapInfo workspace files
- **MWS** – MapInfo workspace files
- **XLS** – Microsoft Excel files
- **XLSX** – Microsoft Excel 2007 or later files
- **Grid images** – (*.adf, *.flt, *.txt, *.asc, *.img, *.dem, *.dt0, *.dt1, *.dt2, *.mig, *.grd). This release does not support .XLSM and .XLSB Excel files.
- **GPKG** – GeoPackage files
- **OGR** – Uses the GDAL OGR Vector File library to read and write many file types.

Note: Grid Format Direct Support: The following grid handlers support direct read of DEM-USGS Text (.dem); GTOPO30 (.dem) and DTED levels 1, 2, 3 (.dt0, .dt1, .dt2). These grid handlers are read-only; they cannot be used to create grid files during the Create Grid Thematic interpolation process.

Importing File Formats

You can import the following file formats into MapInfo Pro using the Universal Translator (on the **HOME** tab, point to **Open** and click **Universal Data**. From the **Specify Data Source** dialog, click **Browse the gallery** to open the **FME Reader Gallery** dialog.):

- Autodesk AutoCAD DWG/DXF (.dxf, .dwg) — up to AutoCAD rel 2013
- Bentley MicroStation Design 7 (.dgn)
- Bentley MicroStation Design 8 (.pos, .fc1, .dgn)
- ESRI ArcInfo Export (.e00)
- ESRI ArcSDE
- ESRI Geodatabase (File GeoDB API) (.gdb)
- ESRI Geodatabase (Personal Geodatabase) (.mdb)
- GML (Geography Markup Language) (.gml, .xml, .gz)
- Google Earth KML (.kmz, kml)
- OS MasterMap Database – Supports Cadcorp OS MasterMap Database data.
- OS VectorMap District – Reader supports GML data in OS VectorMap District format.
- OS VectorMap Local – Reader supports GML data in OS VectorMap Local format.
- Spatial Data Transfer Standard, such as TR01CATD.DDF (*CATD.DFF)
- Vector Product Format (VPF) Coverage, such as POAREA.AFT, POLINE.LFT, POPOINT.PFT (.ft)

You can import the following file formats into MapInfo Pro on the **HOME** tab by selecting **Open** and then pointing to **Import**:

- **DXF** – The graphic/data interchange format (DXF) for AutoCAD and other CAD packages
- **GML** – OS MasterMap format
- **GML, XML** – Geographic Markup Language (GML) 2.1
- **IMG** – A file format for MapInfo Pro for DOS image files
- **MBI** – MapInfo Pro Boundary Interchange format (MBI) An ASCII file for MapInfo DOS boundary files.
- **MIF** – MapInfo Pro Interchange Format (MIF) MapInfo Pro's data interchange format (ASCII file format).
- **MMI** – MapInfo DOS MMI

Note: You can download raster handlers for NIMA formats such as ADRG, CADRG, ASRP, CIB, USRP, and NITF formats from the Precisely website or get them from the Installation DVD.

MapInfo Pro imports graphics and textual information from MapInfo Pro Interchange Format, DXF, MBI, and MMI files. MapInfo Pro imports only graphics from IMG.

Supported Raster Image File Formats

The following are the Raster image file formats that MapInfo Pro supports:

- **ADF** – ArcInfo coverage Data File (ADF)
- **ASC** – ASCII text file

- **BIL** – Satellite Pour l'Observation de la Terre (SPOT) satellite images Spot Image Formats 1.5 and 4.0: 8 Bit Gray, Format 1.5, 8 Bit Gray, Format 4.0, 24 Bit Color, Format 1.5, 24 Bit Color, Format 4.0
- **BIP** – Band Interleaved by Pixel
- **BSQ** – Band Sequential
- **BMP** – Windows bitmap (BMP) Monochrome: 8 Bit Color, 24 Bit Color
- **DAT** – Datum, contain data in text or binary format
- **DEM** – Digital Elevation Model
- **DT0, DT1, DT2** – Digital Terrain Elevation Data (DTED) Level 0, 1, and 2
- *filename.** – Compressed ARC Digitized Raster Graphic (CADRG) format
- *filename.** – Controlled Image Base (CIB) format
- **ECW** – Enhanced Compression Wavlet (ECW) format handler by ER Mapper
- **EMF** – Enhanced Metafile Format
- **ERS** – European Remote Sensing
- **FLT** – Image Filter (FLT)
- **GEN** – ARC Digitized Raster Graphic (ADRG) format
- **GEN** – ARC Standard Raster Product to 1.2 (ASRP) 1.2 format
- **GIF** – Graphics Interchange Format (GIF)
- **GIF** – Graphics Interchange Format (GIF89a) non-interlaced only Monochrome: 8 Bit Color
- **GRC** – Grid, or MapInfo Vertical Mapper
- **GRD** – Classified Grid, or MapInfo Vertical Mapper

MapInfo Pro treats GRD files as either a grid or raster image. If the associated .TAB file contains a RasterStyle 6 entry, then MapInfo Pro treats the file as a grid.

- **IMG** – ERDAS IMAGINE File Format
- **JFIF** – JPEG File Interchange Format (JFIF)

8 Bit Gray, 24 Bit Color, No Subsampling, 24 Bit Color, YUV422 Subsampling, 24 Bit Color, YUV411 Subsampling

- **JP2** – Joint Photographic Experts Group (JPEG) 2000 format

MapInfo Pro supports creating JPEG 2000 files using Save Window As and viewing JPEG 2000 files using the LeadTools raster handler.

- **JPG** – Joint Photographic Experts Group (JPG)
- **JPEG** – Joint Photographic Experts Group (JPEG)

8 Bit Gray, 24 Bit Color, No Subsampling, 24 Bit Color, YUV422 Subsampling, 24 Bit Color, YUV411 Subsampling

- **MRR** – Multi-Resolution Raster
- **NTF** – National Imagery Transmission Format (NITF) version 2.x format
- **PCX** – ZSoft Paintbrush
- **PCX** – Format Version 5 (Paintbrush Version 3.0)

Monochrome, 8 Bit Gray, 8 Bit Color, 24 Bit Color

- **PNG** – Portable Network Graphics (PNG) format
- **PSD** – Photoshop 3.0
- **SID** – MrSID format

The MrSID raster handler allows you to open and display raster images compressed in the MrSID format

- **TGA** – Targa

TGA Truevision File Format Specification 2.0. 8 Bit Gray, 8 Bit Color, 24 Bit Color

- **TIF** – Geographic Tagged Image File Format (GeoTIFF)
- **TIF** – Tagged Image File Format (TIFF)

TIFF Revision 5.0, Monochrome (Class B), Uncompressed, Monochrome (Class B), PackBits Compression, 8 Bit Gray (Class G), Uncompressed, 8 Bit Color (Class P), Uncompressed, 24 Bit Color (Class R), Uncompressed

- **TIF** – Tagged Image File Format (TIFF) CMYK
- **TIF** – Tagged Information File Format (TIFF) CCITT Group 4
- **TIF** – Tagged Information File Format (TIFF) LZW
- **TXT** – Text
- **URL** – Uniform Resource Locator
- **VRT** – Virtual Format
- **WMF** – Windows Metafile Format(WMF)

The raster handler will load a rasterized version of the WMF file.

- **ZIP** – a compressed file containing raster format files

File Limitations for MapInfo Pro Supported Formats

Keep the following notes in mind when working with these MapInfo formats:

- MapInfo Pro only supports the DXF file import to release 13: on the **HOME** tab, point to **Open**, and click **Import**. This has been superseded by the Universal Translator and Open Universal Data feature.
- The Open Universal Data feature supports all DWG and DXF formats up to the AutoCAD release 2013. While it is our company's intention to keep pace with the new releases of FME, if you extend the application to import AutoCAD DWG and DXF files using a newer version of FME before we have upgraded our product, errors may occur.
- You can have maximum 500 files open at a time in MapInfo Pro if you remove the `HKEY_LOCAL_MACHINE\SOFTWARE\MapInfo\MapInfo\Common Max Files` registry key.
- You can have up to 125 files open at a time for editing in MapInfo Pro.

Feature Manipulation Engine (FME) Format Support

MapInfo Pro installs with the Feature Manipulation Engine (FME) 2021.1, which lets you open data directly to avoid having to translate it separately and work with copies of the data in .tab format. This FME opens following Universal Data formats:

- Autodesk AutoCAD DWG/DXF – Supports AutoCAD file versions up to and including 2013
- Bentley MicroStation Design (V7) – Supports Intergraph Standard File Format (ISFF) Version 7
- Bentley MicroStation Design (V8) – Supports Intergraph Standard File Format (ISFF) Version 8
- ESRI ArcInfo Export (.e00) – Supports ArcGIS 10.x
- ESRI ArcSDE – Supports ArcSDE 10.x
- ESRI Geodatabase (File Geodatabase API) - Supports 10.0 File Geodatabases or higher
- ESRI Geodatabase (Personal Geodatabase) – Supports ArcGIS 10.x
- ESRI Shapefile (*.SHX, *.SHP)
- Geography Markup Language (GML) - Reader supports GML versions 2.1.2, 3.1.1, and 3.2.1 and Writer supports GML versions 3.1.1 and 3.2.1
- Google KML – Supports KML 2.2
- OS MasterMap Database – Supports Cadcorp OS MasterMap Database data.
- OS VectorMap District – Reader supports GML data in OS VectorMap District format.
- OS VectorMap Local – Reader supports GML data in OS VectorMap Local format.
- Spatial Data Transfer Standard (SDTS) - Supports USGS DLG datasets that adheres to the SDTS Topological Vector Profile (TVP) and USGS Digital Elevation Model (DEM) datasets that adhere to the SDTS Raster Profile
- Vector Product Format (VPF) Coverage - Supports VPF data that is stored in a structure described in the Military Standard, Vector Product Format, MIL-STD-2407

Note: MapInfo Pro installs with a subset of FME that supports a limited number of formats. You can install the complete FME Suite from Safe Software for additional formats, and use it with mapInfo Pro. See [Working with the FME Suite](#) for details. For the list of formats supported by the FME suit, see: http://docs.safe.com/fme/html/FME_Desktop_Documentation/FME_ReadersWriters/Format-List-All.htm.

To open these data formats in MapInfo Pro, on the **HOME** tab, point to **Open** and select **Universal Data**.

To translate TAB files using FME in MapInfo Pro, on the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and select **Universal Translator**.

To see what is new in FME 2019, see <http://www.safe.com/fme/new>.

Storing TAB, MAP, and ID files in same location as SHP files

When opening a SHP file in MapInfo Pro, you can now store the resultant TAB, MAP, and ID files in the same folder as input SHP file. In previous versions, this location used to be the SHP file directory preference (typically user's **Documents** folder) by default. Now this location automatically defaults to the same folder as the input SHP file.

However, there is a new folder icon in the location sidebar you can use to select the SHP file directory preference location instead. If the folder location where SHP files reside is read-only, an error is displayed asking you to select another location.

Opening MapInfo Tables

Just about everything in MapInfo Pro starts with opening a table. You can display the information in your tables in a number of ways in MapInfo Pro, as a table, in a browser, and on a map.

To open a local table (which is a data file on your machine):

1. On the **HOME** tab, on the **File** group, in the **Open** list, click **Table** to open the **Open** dialog box.

Note: If you are at the **Quick Start** dialog box (the first dialog box you see after starting MapInfo Pro), choose the **Open** button. The **Open** dialog box displays.

2. Navigate to the data file you want to open. From the **Files of type** drop-down list, select the type of data you will open.
3. From the **Preferred View** drop-down list, select the view you want of this data.

- **Automatic** - MapInfo Pro chooses the most appropriate view. If the data is mappable (for example, graphic objects are attached to the data), for example, MapInfo Pro opens the table in a Map window. If you have a Map window displayed and the table you want to open is mappable, MapInfo Pro will automatically open the table in the current Map window. If the data is not mappable, MapInfo Pro will attempt to open the table in a Browser window. If the table cannot be mapped or browsed, MapInfo Pro opens the table using the No View option (no data is displayed).
- **Browser** - MapInfo Pro attempts to open the table in a Browser window.
- **Current Mapper** - MapInfo Pro attempts to add your data to the current Map window.
- **New Mapper** - MapInfo Pro attempts to open the table in a new Map window.
- **No View** - MapInfo Pro opens the table making the data available for other uses, but no data is displayed.

Note: When you open a table and select an option in the **Preferred View** drop-down list, MapInfo Pro remembers what you selected and uses the same option the next time you open a table.

4. Select the **Create copy in MapInfo format for read/write** check box to open it in native (.tab) format.

Note: If you do not select the **Create copy** check box, the file opens read-only.

5. To open the file, do one of the following:
 - Double click the file you want to open

- Click the file you want to open to highlight it in the list and click **Open**.

Using either method, MapInfo Pro opens the data file.

When opening multiple tables, use **Shift**-click to select adjacent tables and **Ctrl**-click to select non-adjacent tables.

Note that although a MapInfo Pro table consists of two or more component files (`STATES.TAB`, `STATES.DAT`, `STATES.MAP`, etc.), only the `.TAB` file appears in the **File Name** box of the **Open** dialog box. It is the only component file you must open. For more about these other MapInfo file types, see [Understanding the Files Associated with MapInfo Pro Tables](#).

In MapInfo Pro you can work with a variety of table types. Some data tables are like the example table we just discussed. Further subdividing this class of tables are data tables that contain graphic objects (map objects) and data tables that do not (such as spreadsheets or external database tables). Raster tables are graphic images that you can display in a Map window. These computerized pictures do not have the same table structure of record, field, and index as data tables do, and therefore, will not be discussed in this chapter.

For more on raster images, see *Working with Raster Images* in the MapInfo Pro *Help System*.

You can see what windows are currently open by reviewing the list at the bottom of the **Explorer** window.

You can open additional tables to add more information (layers) to the Map window. If you want the second table to display in the current Map window, leave the Automatic option selected in the Preferred View list. MapInfo Pro displays the table in the current Map window automatically.

If you do not want the table to display with the first map, choose **New Mapper**. MapInfo Pro opens a second table in its own Map window.

To set a default path you want MapInfo Pro to use when opening tables, select new directories in the **Directories Preferences** dialog box. Here, you can also set default paths for workspaces, MapBasic programs, Import files, and DBMS SQL queries.

See *Setting your Directory Preferences* in the *Help System*.

Note: If your data file does not contain graphic objects, you will not be able to display the table in a Map window. You can only bring it up in a Browser. You must first geocode the table to display it as a map.

Geocoding is discussed more fully in *Geocoding - Assigning Coordinates to Records* in the *Help System*.

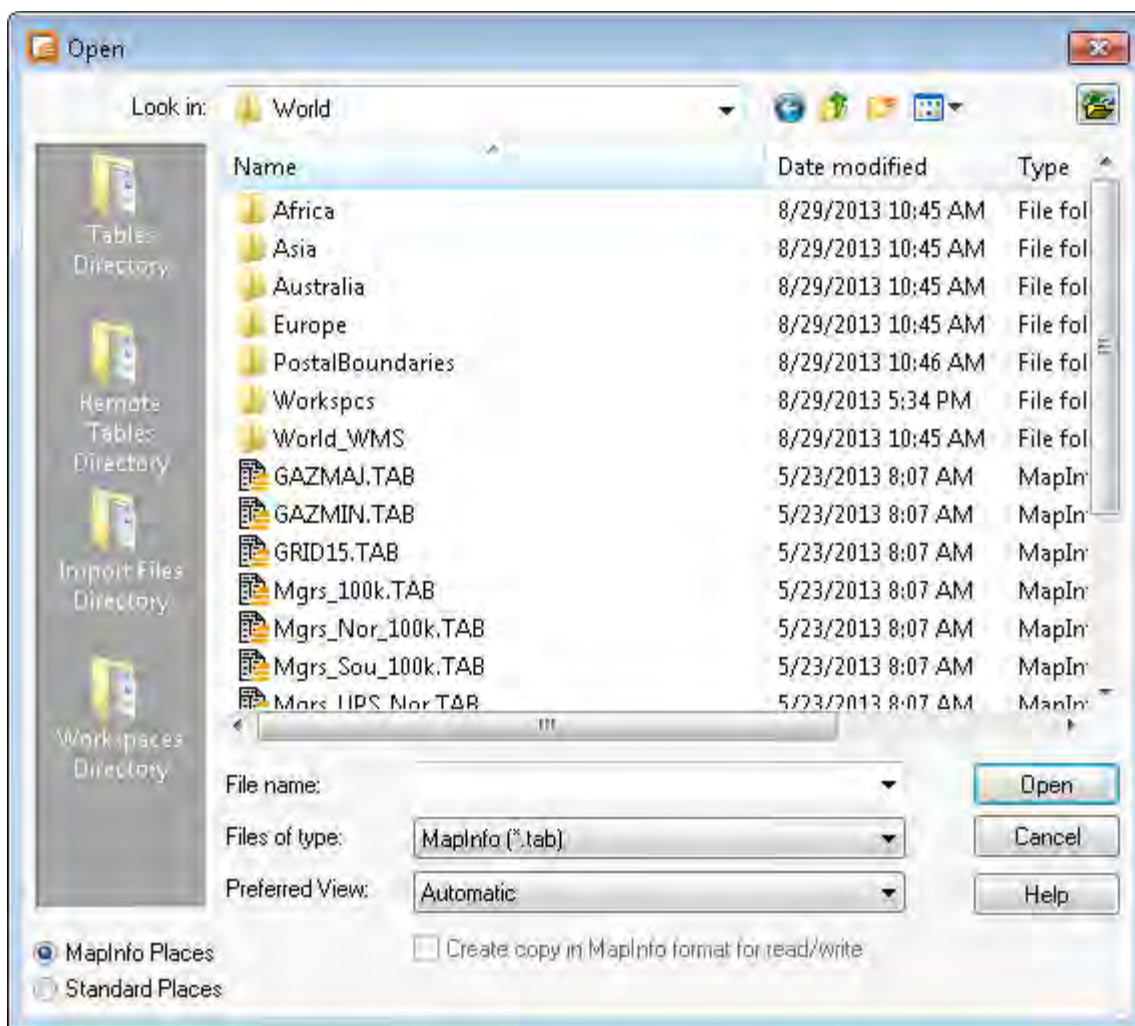
Use the Places Bar to quickly access a specified directory. There are four MapInfo Pro Places options: Table; Workspaces; Import Files; Remote Tables. Designate each directory path in the **Directories Preferences** dialog box.

In MapInfo Pro you can work with a variety of table types. Some data tables are like the example table we just discussed. Further subdividing this class of tables are data tables that contain graphic objects (map objects) and data tables that do not (such as spreadsheets or external database tables).

Raster tables are graphic images that you can display in a Map window. These computerized pictures do not have the same table structure of record, field, and index as data tables do, and therefore, will not be discussed in this chapter. You can see what windows are currently open by reviewing the list at the bottom of the Explorer window.

A Note about the Preferred View Options

Of the five Preferred View options, **Automatic** and **No View** will work on all tables, regardless of what kind of data they contain.



MapInfo Pro attempts to open the table as specified for **Browser**, **Current Mapper**, and **New Mapper**. If it cannot, it will open the table according to the following rules:

- If **Current Mapper** is selected, and there is no **Map** window displayed, MapInfo Pro will attempt to open the table in a new **Map** window.
- If **Current Mapper** or **New Mapper** is selected and the data is not mappable, MapInfo Pro will try to open the table in a **Browser** window.

- If the table cannot be mapped or browsed, MapInfo Pro opens the table using the **No View** option (no data is displayed). You will see it in the **Tables** list in the **Explorer** window.

For more information, see [Renaming a Table](#) and [Deleting a Table](#).

Renaming a Table

A MapInfo Pro table consists of several component files. When you rename a table using the Rename Table command, MapInfo Pro automatically renames that table's component files. When you rename a table through the Windows File manager, you have to be sure that you rename all of the component files.

To rename a table:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Rename Table**. A dialog box with a drop-down list of all open tables displays.
2. Choose the table you want to rename from this list and click the **Rename** button.
3. Type the new name into **File Name**.
4. Choose the directory where you want to put your renamed table.
5. Click **OK**.

Note: When you rename a table, any workspaces containing that table are affected. When you want to continue using those workspaces, you should edit the workspace file so that it uses the new table name. You can edit a workspace file in any text editor or word processor.

Deleting a Table

To delete a table:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Delete Table** to open a dialog box with a drop-down list of all open tables.
2. Choose the table you want to delete from this list and click the **Delete** button.
3. Click **OK**.

Deleting a table allows you to remove the .TAB file and all component files associated with the table.

Deleting a raster table only deletes the *.tab file. Deleting a grid file removes both the *.tab and grid file. Deleting a GeoPackage table deletes the *.tab file and all associated component files. If a GeoPackage has only one table, using this command will delete only the table and associate files, not the GeoPackage file.

Opening Data in Remote Tables

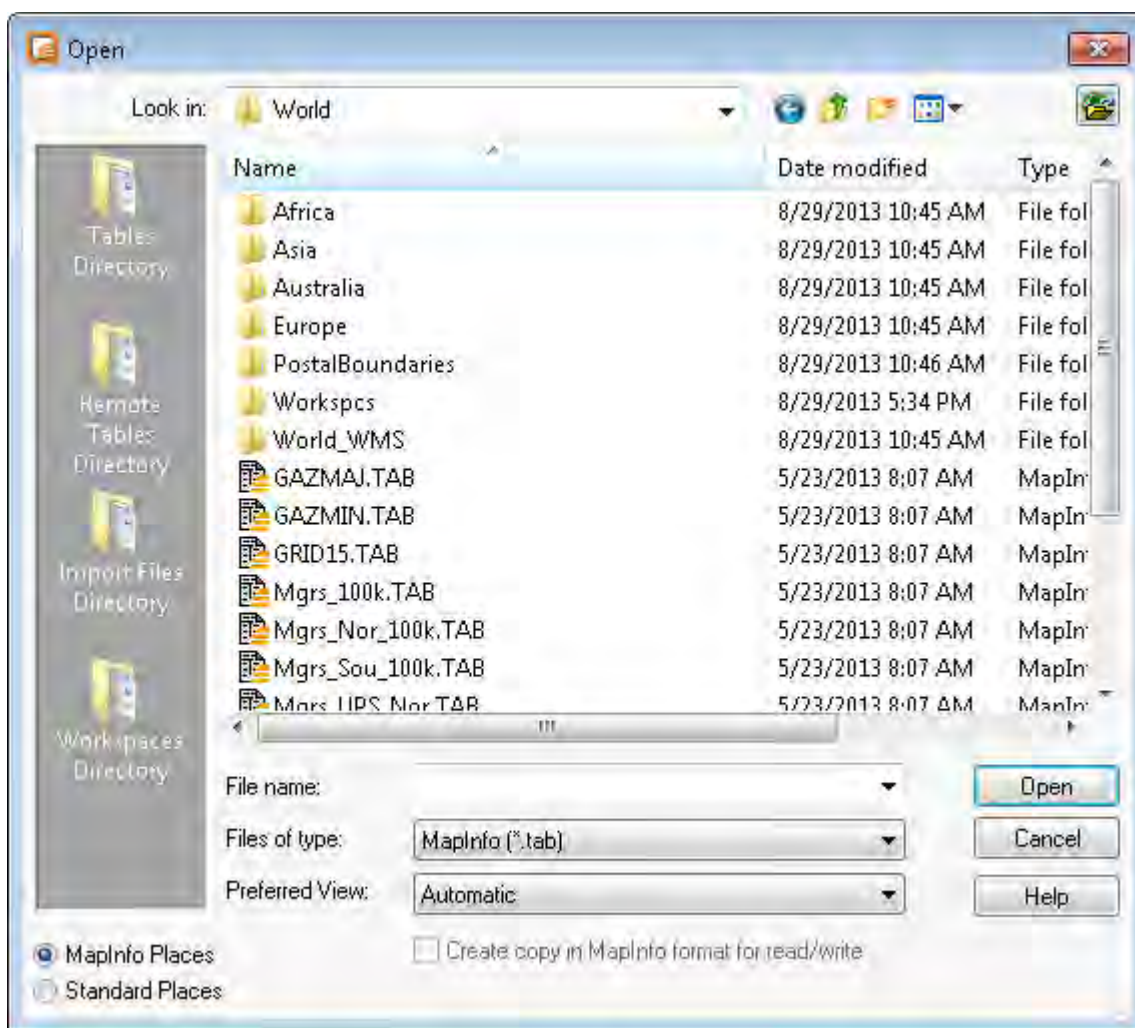
MapInfo Pro also enables you to access remote database data through its ODBC connectivity support and the Oracle Spatial Object support. The MapInfo Pro ODBC connectivity support supplies many ODBC drivers that you can easily install.

Oracle spatial databases store spatial objects with your conventional data in the same database. This enables you to read and write geographies in Oracle Spatial without the need for a middleware product or SDE. You also gain better performance through the Oracle Call Interface (OCI). In addition, Oracle applications can use this same spatial or non-spatial data through other interfaces (ODBC, OCI, JDBC, PL/SQL, HTTP, IIOP) or use other spatial or non-spatial commands (MapInfo Pro, ArcView, Intergraph, Excel, Forte, Formida).

For more about accessing remote data using ODBC connectivity, see *Setting your Database Connection Preferences* in the *Help System*.

Using the MapInfo Places on Open Dialog Box

The **Open** dialog box provides a quick way to look for maps you have created.



The **Places** box. Select the **Workspaces Directory** option in the **Places** box, to display the **Workspace (.wor)** type in the **Files of Type** list. If you select any other entry in the **Places** box, **MapInfo (.tab)** displays in the **Files of type** list.

The **Open** dialog box provides many ways to quickly find the maps that you have created in a variety of locations in your system and network.

Note: The **Places** box on the left side of the **Open** dialog box allows you to select a directory in which you may have your map and other MapInfo Pro tables and workspaces.

When you select the **Workspaces Directory** option in the **Places** box, the Files of type drop-down list changes to **Workspace (.wor)** type. If you select any other entry in the **Places** box, **MapInfo (.tab)** displays in the **Files of type** list.

Opening MapInfo Pro Introductory Data

Precisely supplies introductory maps and refining data that you can use to plot your own information. This is a separate installation that is available on the MapInfo Pro DVD.

To access and open the sample data:

1. On the **HOME**, **TABLE**, or **MAP** tabs, in the **Open** list, click **Table** to display the **Open** dialog box.
2. Navigate to your data directory and double click the **Data** folder in the list.
3. To open the data file, do one of the following:
 - Double click the directory that contains the data you want until you see a list of .TAB files.
 - Select the .TAB file you want to open and click **Open** to display it.

Using either method the data file opens.

We recommend that you play with this data when you first get started to get a feel for what data is in these directories and to become familiar with the process.

Opening Special File Types

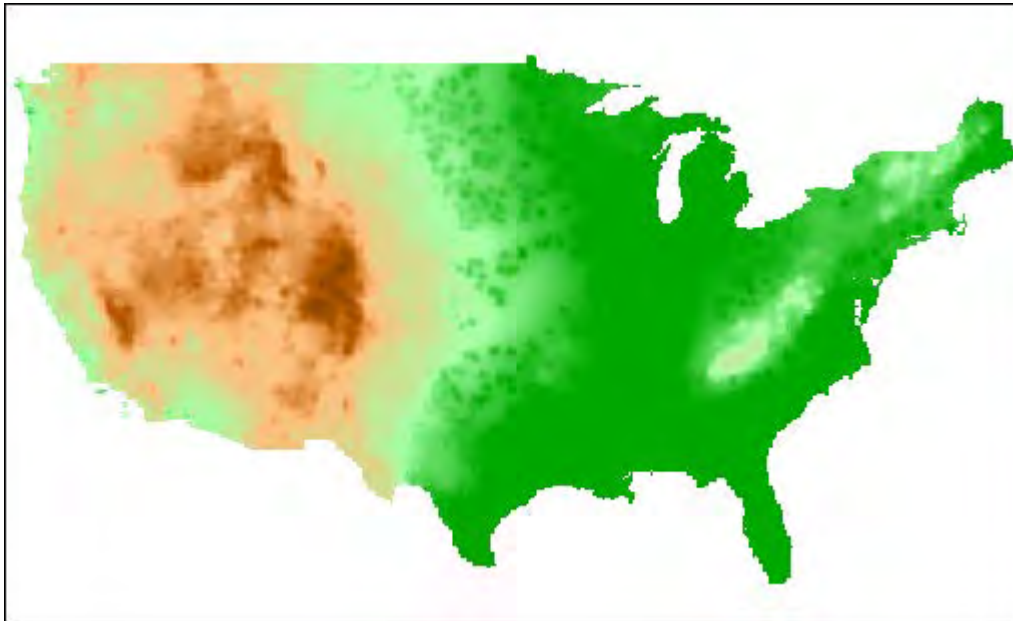
There are additional file types that MapInfo Pro can read including rasters, grids, and shape files. For details about working with raster images, see [Support for Raster Images](#).

Opening a Grid Layer

A grid layer is a type of thematic map that displays data as continuous color gradations across the map. To produce this type of thematic map, you interpolate point data from the source table. In MapInfo Pro, a grid file from the data interpolation is generated and displays as a raster image in a Map window.

To open a grid layer:

1. On the **HOME** tab, in the **File** group, in the **Open** list, click **Table** to display the **Open** dialog box.
2. Select **Grid Image** in the Files of type drop-down list.
3. Navigate to the directory in which your grid image is located and click the file you want to open.
4. Click **Open** to display the grid image.



Selecting Point Objects in Grid Files

Selecting point objects can be difficult in maps that contain hill shades and grids.

For best results when selecting most point objects, position the **Select** command in the center of the symbol. However, some symbols have a hot spot that you must hit. For the small flag on a pole (like those used to mark the hole on a golf course), the hot spot is at the base of the pole. In the case of arrows, the hot spot is the point.

Understanding Your Data in MapInfo Pro

Computer maps are organized into layers. Think of the layers as transparencies that are stacked on top of one another. Each layer contains different aspects of the whole map.

What is a Layer?

In MapInfo Pro you begin by opening your table of data and displaying it in a Map window. Each table displays as a separate layer. Each layer contains the table plus any map objects, such as regions, points, lines, and text. Additionally, the layer contains style overrides and zoom layering characteristics that you can add to give the layer more or less prominence in the Map window.

Figure: Map Layers Example

Map layers form the building blocks of maps in MapInfo Pro. Once you have created your layers, you can customize them in a variety of ways, add and delete layers, or reorder them.

For example, one layer may contain state boundaries, a second layer may have symbols that represent capitals, and a third layer might consist of text labels. By stacking these layers one on top of the other, you begin to build a complete map. You can display one, two, or many tables at a time.

Map Objects as Part of Layers

Maps in MapInfo Pro are made up of layers of map objects. There are five basic types of objects:

- **Regions:** closed objects that cover a given area. These include polygons, ellipses, and rectangles. For example, country boundaries, postal code boundaries, sales territories.
- **Point objects:** represent single locations of data. For example, customer locations, restaurants, parking meters. Points can also be combined into multipoint objects.
- **Line objects:** open objects that cover a given distance. These include lines, polylines, and arcs. Examples are streets, rivers, power lines.
- **Text objects:** text that describes a map or another object, such as labels and titles.
- **Collection objects:** combination of region, line, and multipoint objects.


You can have each type of object in a separate layer (most common), or you can combine objects in the same layer. MapInfo Pro lets you create, edit, customize, and display these objects to make maps that meet your needs.

For information about drawing and editing map objects, see *Drawing and Editing Objects* in the *Help System*.

Moving Map Objects

You can move map objects in the **Map** window using the mouse and keyboard controls, or by setting a precise distance and direction using the **SPATIAL** tab, in the **Edit** group, click **Offset Object**. With **Offset Object**, you can select objects from any layer and save a copy to the editable layer.


To move object using the mouse and/or keyboard controls:

1. Click your map to make it active.
2. In the **Layers** window click the **Editable**  icon to make the layer editable.
3. Select the object using the Select button (on the **MAP** tab, in the **Selection** group, click **Select**, and **Select**). Do one of the following:
 - To move the selected object freehand, hold down the mouse button and drag the object to its new location.
 - To move the selected object one screen pixel at a time, press **Ctrl** plus the **Up**, **Down**, **Left**, and **Right Arrow** keys.
 - To move the selected object 10 screen pixels at a time, press the **Ctrl+Shift** keys and the **Arrow** keys together.

Note: Since the moves are made in screen pixels, the zoom level affects how far the object is moved.

You can move several objects at a time. Once you have chosen multiple objects, using any MapInfo Pro selection technique, place the cursor on any one of them and proceed as if you were selecting a single object. When you move the objects, all of them move at once, maintaining their positions relative to one another.

To move objects using a precise direction and distance:

1. Click your map to make it active.
2. In the **Layers** window click the **Editable**  icon to make the layer editable.
3. Select the object(s). It does not have to be contained in the editable layer.
4. On the **SPATIAL** tab, in the **Edit** group, click **Offset Objects** to open the **Offset Objects** dialog box.
5. Specify the angle and/or distance to move the objects.
6. To create a copy of the object during the move, choose **Create Copy**. The copy will be placed in the editable layer in the new location. Click **Next**. The **Data Aggregation** dialog box displays. Skip to **step 8**.
7. To move the objects without making a copy, choose **Move Objects**. Click **OK**.
8. Choose the appropriate aggregation method (blank or value) that will be applied to the moved object. Click **Back** to return to the **Offset Objects** dialog box. Click **OK** to complete the move/aggregation operation.

Managing a Map's Layers

The key to controlling your map layers is the **Layers** window. The window shows all the layers that make up a **Map** window and the status of the layer attributes. These attributes are: Visible On/Off, Style Override, Editable, Selectable, and Automatic Labels. ToolTips display over the attribute when you move your cursor over them to help familiarize yourself with each one. It is easy to change a layer's, or multiple layers', attributes.

You also have options available to change the display and label settings; modify any thematic maps you have displayed; and reorder, add, or remove layers. See [Working with Layers in the Layers Window](#) for details about working with the map layers.

Displaying the Entire Map or a Map Layer

In the **View Entire Layer** dialog box, you can pick an individual layer to view or pick **All Layers** and view the entire map. This option is important because your map might contain layers that cover different amounts of territory.

For example, you have a map containing New York counties and highways, ZIP Codes, and streets for Utica. If you choose **All Layers**, MapInfo Pro will zoom you out to see the entire map. But if you are only interested in viewing Utica streets, you should pick that layer. Then MapInfo Pro will zoom out only as far as needed to display those streets.

Note: Many maps, such as MapInfo Pro's StreetInfo maps, are so large that View Entire Layer will take a long time to display when zoomed out all the way. We suggest that you use **View Entire Layer**, then interrupt the display of the map (by **Esc** or by pressing the right mouse-button), and zoom in on the section you are interested in.

To display an entire map or map layer:

1. On the **MAP** tab, in the **Navigate** group, click **Zoom To**, and **Entire Layer**.

The map redraws to bring the entire layer in to view in the **Map** window.

To display an entire selected layer:

1. Select an object from the layer on the map.
2. Right-click to display the context pop-up menu, and select **View Entire Selection Layer**. (This selection options do not apply to seamless tables.)

Duplicating a Map Window

If you want to do what if planning or you want to see how different types of information will display side-by-side, it may be useful to make a clone of your existing map.

To duplicate a **Map** window:

- On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Clone Window** from the list, to open a clone of the active **Map** window.

Moving the Map View to Show a New Location

The **Move To** command re-centers the map view to a new location by address or place name.

This feature is only available to MapInfo Pro Premium Option holders. The evaluation version of MapInfo Pro includes a preview of this feature, but after activating your MapInfo Pro license, you require the Premium Option to access it.

To recenter the map view to a new location:

1. On the **MAP** tab, in the **Navigate** group, click **Move To**.
2. In the **Move Map To** window, type an address or place name in the **Enter Address and/or Place** box and then click the **Find** button (or press **Enter**).
3. In the **Results** list, double click the address that you want to view in the **Map** window.

The map view re-centers to display your selection.


Select either the **Preserve Current Scale** or **Zoom to Best View** radio button to use the current map scale or to zoom on the map to a better view for the address or place you are re-centering the map to. Your selection persists between sessions.

Specifying Polygon Objects Attributes

Use the **Polygon Object** dialog box to determine the polygon's location, length, line segments, sections, smoothness, bounds, and center.

To specify polygon object attributes:

Note: The object must be editable (reside in an editable layer) before you can specify attributes.


1. Make the layer containing the map object editable. Either:
 - On the **Explorer** window, in the **Maps** panel, highlight a layer and click the **Editable**  icon to make the layer editable.
 - Select the layer on the map, right-click to display the context pop-up menu, and select **Make Selection Editable**.
2. Do one of the following to access the **Polygon Object** dialog box:
 - Select a polygon and press **F7**.
 - Double-click the polygon.
3. Specify attributes for the polygon.
4. Click **OK**.

Specifying Polyline Objects Attributes

Use the **Polyline Object** dialog box to determine the polyline's location, length, line segments, sections, and smoothness.

Note: The object must be editable (reside in an editable layer) before you can specify attributes.


To specify polyline object attributes:

1. Make the layer containing the map object editable. Either:
 - On the **Explorer** window, in the **Maps** panel, highlight a layer and click the **Editable**  icon to make the layer editable.
 - Select the layer on the map, right-click to display the context pop-up menu, and select **Make Selection Editable**.
2. Do one of the following to access the **Polyline Object** dialog box:
 - Select a polyline and press **F7**.
 - Double-click the polyline.
3. Specify attributes for the polyline.
4. Click **OK**.

Specifying Rectangle Object Attributes

To specify the attributes of a Rectangle:


The object must be editable (reside in an editable layer) before you can specify attributes.

1. Make the layer containing the map object editable. Either:
 - On the **Explorer** window, in the **Maps** panel, highlight a layer and click the **Editable**  icon to make the layer editable.
 - Select the layer on the map, right-click to display the context pop-up menu, and select **Make Selection Editable**.
2. Do one of the following to access the **Rectangle Object** dialog box:
 - Select a rectangle object and press **F7**.
 - Double-click the rectangle object.
3. Specify attributes for the polyline.
4. Click **OK**.

Specifying Rounded Rectangle Object Attributes

Note: The object must be editable (reside in an editable layer) before you can specify attributes.

To specify rounded rectangle attributes:

1. Make the layer containing the map object editable. Either:
 - On the **Explorer** window, in the **Maps** panel, highlight a layer and click the **Editable**  icon to make the layer editable.
 - Select the layer on the map, right-click to display the context pop-up menu, and select **Make Selection Editable**.
2. Do one of the following to access the **Rounded Rectangle Object** dialog box:
 - Select a rounded rectangle and press **F7**.
 - Double-click the rounded rectangle.
3. Specify attributes for the rounded rectangle.
4. Click **OK**.

Using Workspaces

Introduction

A workspace is a list of all the tables, windows, and settings you are using, stored in a file with the extension .WOR or .MWS. Workspaces are a convenient way to return to a previously created map without having to open each table file individually. The workspace keeps track of the following elements:

- Map, Browser, 3DMap, Layout, and Layout windows, including their size and position
- Query tables created from base tables using either the Select or SQL Select statements (queries on queries will not be saved)
- Thematic maps
- Legend Designer windows
- Cosmetic objects
- Labels
- Styles for fonts, symbols, lines, and fill patterns used to display objects

A .WOR file is a MapInfo Pro workspace file containing un-compiled MapBasic code that MapInfo Pro interprets to open a session with tables, windows, and settings the way a user left it. It is MapInfo Pro version-specific depending on features used in it.

A .MWS workspace file originates from the MapXtreme product line and is comprised of XML code to do things similar to a MapInfo Workspace *.wor with some limitations.

To view the contents in the workspace file, open the .WOR or .MWS file in MapInfo Pro, a text editor or word processor.

Note: When you save a workspace, you cannot save any references to selections or queries made by the Selection commands or the Query options.

You can use the Workspace Packager tool to create a copy of your current workspace in a new folder, and copy all the data referenced by the workspace in the same folder. Using this tool, the workspace looks to these internal references to find the data and .TAB file, so you can open this workspace no matter where you have moved or copied that folder, even if you move it to a different computer. To access this tool look in the Tools Manager (on the **HOME** tab, click **Tools**, click **Options**, and **Run Program**, and then choose `Packager.MBX`).

Opening a Workspace

Any previously opened tables and windows will be left untouched when you open a workspace. However, to avoid cluttering up your screen with unnecessary windows, use the **Close All** command on the **HOME** tab before adding the workspace.

There are two MapInfo workspace formats, WOR and MWS. A .wor file is written using MapBasic and a .mws file is written using XML. The MWS format contains more information about the data sources than the WOR format does. MapInfo Pro works with both workspace formats, but other MapInfo products may work with only one of the two formats.

MapInfo Pro has some limitations opening a .mws file and may not read all of the information contained within it. For details, see [Limitations opening a MWS Format Workspace](#).

To open either a .wor or a .mws workspace:

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Open Workspace**.
2. In the **Open** dialog box, from the **Files of type** list, select **Workspace (*.wor, *.mws)**.
3. From the **Look in** list, navigate to and select the workspace (.wor or .mws) file to open.
4. Click **Open**.

Note: When you exit MapInfo Pro, the MapInfo Pro workspace (MAPINFOPRO.WOR) stores the last session (unless you have set your preferences so that the workspace will not be written). If there are files you do not want added to your workspace, close them before exiting.

Opening Multiple Workspaces

To open multiple workspaces:

1. On the **HOME** tab, click **Open**, and **Open Workspace**.

2. In the **Open** dialog box, from the **Look in** list, navigate to and select the workspace (.mws) files to open.
 - To open a contiguous block of workspaces, select the first workspace that you want and then press the **Shift** key while selecting the last workspace that you want.
 - To open multiple workspaces that are out of sequence, press the **Ctrl** key while selecting the workspaces.

To deselect workspaces, press the **Ctrl** key while clicking the workspaces.
3. Click **Open**.

Reading Labels from a MapInfo Workspace File (MWS)

MapInfo Pro reads basic label information from MWS files created in MapInfo Pro or MapXtreme's Workspace Manager.

The following is a list of label properties that can be read in:

- Label expression if it is a simple column identifier
- Font style
- Callout line style
- Label placement (center center; centre left, etc.)
- Label orientation (horizontal, rotated, curved)
- Label offset
- Label visibility including zoom range
- Label adjustments like discarding overlaps, labeling partially visible objects, etc.
- Custom labels - all properties

The MWS schema supports more options for labels than MapInfo Pro supports. Therefore, MWS files created with Workspace Manager may lose some label information when imported into MapInfo Pro.

MWS Element/Option	Description
LabelLayer Visibility	Label sources inherit the parent label layer visibility.

MWS Element/Option	Description
LabelSource Visibility	<p>If there are multiple LabelSources for one feature layer without zoom enabled, then the top visible label layer is added.</p> <p>If there are no visible label layers, then the top invisible label layer is added.</p> <p>If there are multiple LabelSources with zoom ranges, then one label layer is chosen as a base label layer and all others are added as label overrides.</p> <p>The logic for finding a base label is:</p> <ul style="list-style-type: none"> • When there are visible layers without zoom range, set the top visible layer without zoom range as a base layer • Or else when there are visible layers with zoom range, set the last visible layer with zoom range as a base layer. • Or else when there are no visible layers, set the top non-visible layer without a zoom range as the base layer • Or else set the last non-visible layer with zoom range as the base layer. <p>Other label layers are added as label overrides when:</p> <ol style="list-style-type: none"> 1. They have zoom range information and zoom ranges are enabled. 2. The ranges are not completely within any previous label override's zoom ranges. <p>If the range intersects (but not completely within) all previous override ranges, then the label override is added; in this case, ranges are modified to not override previous label overrides. If the range is wider on both ends, then two overrides are added instead of one.</p> <p>The base label zoom is the union of all override zoom ranges.</p>
LabelProperties LabelVisibility	<p>This is on the AutoLabel tab in the Workspace Manager.</p> <p>The "Create labels automatically" option in the Workspace Manager maps to auto labels On/Off ("Label Auto On/Off" in MapBasic).</p> <p>There is no direct mapping of the zoom range in MapInfo Pro, so this is ignored.</p>
Modifier Edited Labels (LabelSelectionTheme Visibility)	<p>Visible custom labels are imported into MapInfo Pro. Only the custom labels that are visible are imported.</p>
Thematic Modifier	<p>No mapping; there is no support for label themes.</p>

About Writing Label Overrides to a MapInfo Workspace File (MWS)

Label override information is written as additional *LabelSource* XML elements within one *LabelLayer* XML element. The base label layer information is added as the last *LabelSource* element. (Prior to 11.0.3, MapInfo Pro added label layers allowing overlaps within a separate *LabelLayer* element.) The following rules apply when writing label information to a MWS:

- All overrides inherit the *Auto* property from the base label layer.
- If the base layer is invisible, then all label overrides are set as invisible in the MWS workspace, so that MapInfo Pro and MapXtreme can read the workspace properly.

Limitations opening a MWS Format Workspace

MapInfo Pro opens and saves to both .wor and .mws formats. When opening a .mws format workspaces, if there is more than one base layer from the same data source, then all charts are put on the top layers. This is because they relate to the data sources in the MWS file and not to layers.

Original Layer List in Workspace	Layer List after Opening Workspace
Cosmetic	Cosmetic
Graduated Symbols	Graduated Symbols
Major Cities	Population Pie Charts
Population Pie Charts	Major Cities
Major Cities	Major Cities

When MapInfo Pro saves a MWS workspace, it saves the layers in a group layer, but does not save the group layer.

About Reading/Writing Translucency Settings for a Workspace File (MWS)

MapInfo Pro includes **Layer Translucency**, **Style Override Translucency**, and **Label Translucency** settings.

The MWS schema supports more options for translucency settings than MapInfo Pro supports; the MWS Schema translucency factor is set at the geometry level, and the MapInfo Pro translucency settings are for the entire layer. If you divide a Region object into Area and Line (Border) geometries, a MWS Schema applies independent translucency for each geometry, and MapInfo Pro treats the whole region as one layer with only one translucency setting for the region. As a result, the translucency setting for a MWS file in MapInfo Pro is adjusted to fit the MWS schema.

Saving (writing) a MWS File from MapInfo Pro with a translucency setting:

- While writing translucency setting for a layer to a MWS file, MapInfo Pro writes the translucency setting to all the underlying geometry objects of the layer in the MWS file. If there is a region object in a layer then the setting gets written to both its Area and Line (Border).

Opening (reading) a MWS File from MapInfo Pro with a translucency setting:

- The MWS schema translucency setting is at the geometry level, so the first geometry that has a translucency setting is used as the translucency setting for that entire layer in MapInfo Pro.

Saving a file with a translucency setting from MapInfo Pro writes the same setting to all geometry layers.

Saving a MWS file from other Precisely products that support the MWS workspace format, such as a MapXtreme.NET's Workspace Manager, and that support separate geometry level settings may not display as expected. Opening a MWS file in MapInfo Pro that has different translucency settings for each geometry object in the layer causes MapInfo Pro to use the first translucency setting for that layer to the entire layer. MapInfo Pro ignores all other geometry translucency settings for that layer.

Consequently, how translucency displays depends on the product. MapXtreme.NET supports translucency settings for each geometry in the layer for example. Opening this file in MapInfo Pro causes MapInfo Pro to apply only one translucency to the entire layer and ignore all other translucency settings.

How Renaming Tables Affects Workspaces

When you change the name of a table listed in a workspace, you invalidate the workspace. Table names are stored in the workspace file, so if change it, the workspace cannot find it.

For example, if you create a workspace called `CUSTOMER.WOR` that contains the `STATES` table. If you later rename the `STATES` table to `AMERICA`, MapInfo Pro will not be able to open the `CUSTOMER.WOR` workspace. It will try to open the `STATES` table and not be able to locate it.

There are three ways to avoid this problem:

- Make any table name changes before you start to build workspaces.
- Open the workspace file in any text editor and manually change the table names.
- Open a workspace. Rename the table(s) using the **Rename Table** dialog box and immediately save the workspace.

Saving Printer Information to a Workspace

MapInfo Pro enables you to save your printer information to a workspace, and restore printer information from a workspace. These settings are located in the Startup preferences (on the **PRO** tab, click **Options**, and **Startup**). To save printer information to a workspace, check the **Save Printer Information into Workspaces** option. Subsequently, when you save your workspace, the printer name, paper orientation, paper size, and the number of copies are saved. When this preference is on, the printer settings are saved in a workspace file.

Note: We recommend that you leave this preference on.

To restore printer information from a workspace, select the **Restore Printer Information from Workspaces** option. When you open the workspace, the printer name, paper orientation, paper size, and the number of copies are restored. This is useful if you are sharing workspaces with other MapInfo Pro 6.0 or later users who are also using the same printers. You may want to leave it off if you want to send the workspace to someone who is using a different printer. If this preference is turned off, MapInfo Pro uses the default printer selected in the Printer preferences.

Note: You can get additional printer advice in the *MapInfo Pro Printing Guide*, which is located in the Documentation subfolder of your installation directory.

Reviewing the Windows in MapInfo Pro

Introduction

MapInfo Pro allows you to display your data in many different windows and with different views at the same time. For instance, you can display the WORLD table of country boundaries in a Map window to view the geographic boundaries. At the same time you can display the tabular data of the WORLD table in a Browser window to see the country names, population, and other data in the file. If you make a change in either window, it is reflected in the other.

Only one view can be active at a time. To make a different window active, click its title bar.

There are many different types of windows you can display your data in, depending upon what you need your data to communicate. This section covers the many ways you can display your data using MapInfo Pro. Each of these display methods: map, list, and presentation give your information a different impact. How you display the information you have should depend upon what effect you want.

Consider these options carefully before you select a display type.

- **Explorer windows** present all open maps, tables, windows, tools and connections in one convenient place.
- **Map windows** present information arranged as conventional maps, allowing you to visualize the geographic patterns of your data (for details, see [Displaying Data in a Map Window](#)). In addition, Legend Designer windows present information arranged as map legends, so that you can understand the symbols and themes used in the map (for details, see *Creating a Legend for your Map* in the *Help System*).
- **Browser windows** present information as tabular lists (just as conventional databases do), allowing you to fully examine tabular data (for details, see [Displaying Data in a Browser Window](#)).
- **Layout windows** present information in a polished and attractive way and can be embedded in other applications such as Microsoft Word or PowerPoint. For details about the **Layout** window, see *About Map Layouts* in the *MapInfo Pro: Preparing Maps for Publishing* Guide.

Note: To switch between windows to change which is active, press the **Ctrl+Tab** keys.

Explorer Window

The **Explorer** window displays all open maps, tables, windows, commands and connections in one convenient place.

To open the **Explorer** window, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list. Like other MapInfo Pro windows, you can position it as a floating, docked, or tabbed window, and show, hide or auto-hide it.

To search for any open resource, type a search term in the **Search** box and click the **Search** button. All resources that match the search term are returned. To clear the search box, click the **Clear Search** button.

Use the Explorer window to manage layer visibility, selectability, editability, labeling, styling. See [Working with Layers in the Explorer Window](#).

Each section of the **Explorer** window includes a context menu to reach commands specific to the contents. For example, in the Layers section, when you right-click on a map name, you can rename it, access the **Map Options** dialog box or change the label priorities. Right-click on a table name in the Tables section to change the table structure, update a column or add the table to the Catalog Browser.

To show or hide any of the sections, and to reset the height of each section, on the **PRO** tab, select **Options**, and click **Explorer**.

Displaying Data in a Map Window

You use Map windows to display the geographic objects from your table on a map. Map windows can display information from many tables at once, with each table a separate layer.

Opening a Table in a Map Window

You can create your maps or edit existing maps. You can open a **Map** window on the **HOME** tab, in the **File** group, from the **Open** list, by clicking **Table** and navigating to one or more tables.

Alternatively, on the **HOME** tab, in the **Windows** group, click **New Document**, and click **Map** from the list, to create a new map from a list of open tables.



Getting Around in the Map Window

There are a wide variety of commands that allow you to zoom, pan, and move objects around the **Map** window. Zooming allows you to look more closely or more widely at a particular geography. Panning allows you to move around a map left, right, up, and down. Moving selected objects in an editable layer is useful when you want to get your map right.

You can zoom using the mouse wheel or use the \pm and \mp keys on the keyboard, to zoom in and out more precisely.

- When you press \pm , you zoom in by a factor of 2.
- When you press \mp , you zoom out by a factor of .5.

You can pan in your **Map** window using the scroll bars or the **Arrow** keys **Up**, **Down**, **Left**, and **Right**.

Further, you can move an object in an editable layer more precisely by selecting it and using the following key combinations.

- **Ctrl+Arrow** moves the editable, selected objects 1 pixel at a time
- **Ctrl+Shift+Arrow** moves the editable, selected objects 10 pixels at a time

Note: These commands also apply to maps embedded in a **Layout** window.

Changing a Map's Zoom Level

You change a map's zoom level by specifying certain parameters in the **Change View** dialog box.

To change a map's zoom level right-click on the **Map** window and click **Change View** to open the **Change View** dialog box.

The **Change View** dialog box allows you to set various parameters of the map including:

- Display the current zoom, scale or cursor position in the status bar (the default unit of distance is miles which is specified on the **MAP** tab, in the **Options** group, by clicking **Map Options**).
- Change the zoom, scale, and the center point of the current map view.
- Behavior of the map when you resize the window.
- Resize the map to fit the new window, keeping the view the same.
- Set the map to preserve the current scale, so that resizing the window has the effect of letting you see more or less of the map.

Setting Margins for a Map Window when Printing

To specify margin settings:

1. Make the **Map** window active.
2. On the **HOME** tab, in the **Output** group, click **Page Setup** to open the **Page Setup** dialog box.
3. Specify the desired margin settings.
4. Click **OK**.

Editing Text in a Map

To edit the text you have just created:

1. On the **MAP** tab, in the **Selection** group, click **Select**, and **Select**.
2. Double-click the text to open the **Text Object** dialog box with the text in the **Text** box.
3. Position the cursor in the text box and make your changes.

Choose either **1.0**, **1.5**, or **2.0** line spacing.

Choose **Left**, **Center**, or **Right** justification.

Select label line properties, if necessary.

Select rotation angle, if necessary.

4. Click **OK**.

Adding Grid Lines to a Map

The grid lines on a map are a visual reference for the coordinate system of the map. You would add a grid to your map, using a specific projection and spacing, to easily identify locations. You can select to show grid lines that are the same as the map projection that was used to create the map, or you can select another coordinate system, such as Latitude/Longitude.

To add or edit the grid on your map:

1. On the **MAP** tab, in the **Content** group, click **Add To Map**, and select **Gridlines** to open the **Add Gridline** dialog box.
2. From the **Selected Coordinate Systems** drop-down list, select a coordinate system to use for the grid on the map. The default setting, is to use the coordinate system that the map is currently set to.
3. Select the **Use Auto Spacing** check box to have MapInfo Pro calculate the optimum spacing at any zoom level and then set the **Horizontal** and **Vertical** spacing of the grid lines.

You would set the spacing to optimize viewing an area at a specific zoom level. If you did not select the **Use Auto Spacing** check box, then changing the zoom level may result in poor visibility of the map, such as when zooming out to view the entire country after setting the grid line spacing for viewing a city.

4. Click **OK**.

The grid is a specialized layer on the map, so you can hide or show it in the same way as any other layer on the map. In the **Explorer** window, toggle the **Visible** check box located before the **Gridline** layer name to turn visibility to **off** and hide the grid.

You can add as many **Gridline** layers to the map as you need and hide or show them as necessary.

Changing Grid Line Properties

Use the commands on the **GRIDLINES** tab to control how a grid displays on a map. The **GRIDLINES** tab is available on the ribbon after selecting a gridline layer for a map in the **Explorer** window. For a complete list of commands, see **GRIDLINES Tab**.

Adding Another Grid to the Map

You can add as many **Gridline** layers to the map as you need and hide or show them as necessary. On the **MAP** tab, in the **Content** group, click **Add To Map**, and select **Gridlines** to open the **Add Gridline** dialog box. To hide a grid, in the **Explorer** window, toggle the **Visible** check box located before the **Gridline** layer name to turn its visibility to **off**.










Changing Grid Line Spacing






To modify the grid spacing for an existing grid layer on the map, select the **Gridline** layer name in the **Explorer** window. This displays the **GRIDLINES** tab on the MapInfo Pro ribbon. On the **GRIDLINES** tab, click **Gridline Properties**. The **Gridline Properties** dialog box shows the existing grid spacing, which you can change. You cannot change the projection for an existing grid, which displays at the top of the dialog.

Changing the Display Style for Grid Line Labels



The commands in the **Style** and **Labels** groups control how the labels on grid lines display and how they are placed relative to their grid line.

The style commands are:

Icon	Command	Description
	Apply Styles	Toggles the style override on and off.
	Use Stacked Styles	Toggles stacked styles on and off. See Stacking Display Styles to Create a Custom Look
	Font Family	Changes the font family.
	Font Size	Changes the font size.
	Increase Font Size	Changes the font size incrementally larger.
	Decrease Font Size	Changes the font size incrementally smaller.
	Bold	Bolds label text.
	Italic	Italicizes label text.
	Underline	Adds an underline to label text.
	All Capitols	Displays label text in all capitols (TEXT).
	Expanded	Adds space between the characters of label text (t e x t).

Icon	Command	Description
	Shadow	Adds a shadow effect behind label text.
	Halo	Adds a halo effect around label text.
	Highlight	Sets a color to use behind labels to make them more legible on the map.
	Label Background Color	Selects the background color to use with Halo and Highlight effects.
	Enable Preview	Enables a preview of the label while you are making style choices.

The label placement commands are:

Icon	Command	Description
	Label Offset	Sets a measurement value to place labels from their grid line. This uses the measurement type beside the Map Edge Offset command.
	Map Edge Offset	Sets a measurement value to place labels from the edge of the map. The measurement can be in inches (in), centimeters (cm), millimeters (mm), picas, or points.
	Label Placement	<p>Vertical Lines select to place labels to the left of, centered on, or to the right of grid lines.</p> <p>Horizontal Lines select to place labels above, centered on, or below grid lines.</p> <p>Label Positions select an anchor point for placing labels, such as using all sides of labels, the top and left of labels, or the bottom and right of labels.</p>
	Label Direction	<p>Label Direction select the direction in which to place labels: either horizontal or following grid lines.</p> <p>Label Format select to display labels using compass direction (N,E,S,W) or degrees (-90 to +90).</p>

Making the Grid Transparent

You can make grid lines transparent to control how much importance the grid has to the map design and to make information behind the grid lines more visible. To do this, select the **Gridline** layer name in the **Explorer** window. This displays the **GRIDLINES** tab on the MapInfo Pro ribbon. On the **GRIDLINES** tab, in the **Translucency** group, move the **Layer** slider. Zero percent makes grid lines opaque and 100 percent makes them completely transparent.

Make the labels for grid lines transparent, so that they do not obscure information behind them. To do this, move the **Label** slider.

Displaying Data in a Browser Window

You use **Browser** windows to view and manipulate your data records in traditional row and column form, typically used in spreadsheets and databases. Each column contains information about that particular field, such as name, address, phone number, cable ID number, or order amount. Each row contains all information relating to a single record.

About the Browser Format

If you have ever worked with spreadsheets or databases, you are probably familiar with the Browser format. Each row of the table contains one record, and each column in the record contains information about a particular field (for example, last name, street address, order number, price, and so forth). The name of the table appears in the **Browser** window title bar. Column titles appear directly below the **Browser** window title bar, appearing as headings. You select a row by single clicking the empty box appearing to the left of that row.

The Status Bar appears at the bottom left of the MapInfo Pro desktop. This bar displays the range of records currently displayed within the **Browser** window out of the total number of records in the table.

Opening a Table in a Browser Window

You can edit records in your table, copy records, add new ones, or delete existing records.

To open a Browser directly:

1. On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Browser** from the list.
2. If the **Browse Table** dialog box opens, then select a table from the list and click **OK**.

Your data displays within the Browser window.







The table must be editable to make changes to it—it cannot be read-only.

Browser Window Commands and Context Menu

The commands for working with data in a **Browser** window are located on the **TABLE** tab on the MapInfo Pro ribbon. When the **Browser** window is floating the **TABLE** tab displays in the **Browser** with the following additional groups of commands: **Browser Tools** and **Sort and Filter**.













Browser Tools Group

The Browser Tools group is enabled when a **Browser** window is active. It provides access to these commands.

Icon	Command	Description
	Info	Displays tabular information about map objects.
	HotLink	Enabled when the Browser references a table containing hotlink data (URL).
	HotLink Options	Opens the Hotlink Options dialog box where you can add, remove and manage the Hotlink properties.
	Pick Fields	Choose which fields display in the active Browser window. You can also use Pick Fields to temporarily rename a column, creates a new column that will display in the Browser window, or edit the expression that defines an existing column.
	Font	Opens the Text Style Dialog Box where you select how to display the text in the Browser window.
	Gridlines	Show/Hide the Browser grid lines.

Sort and Filter Group

The Sort and Filter group is enabled when a **Browser** window is active. It provides access to these commands.

Icon	Command	Description
	Filter	<p> Filter: Opens the Filter dialog box where you can set filter conditions for the column. A filter may consist of up to two conditions where each condition is built from a simple set of operations (such as equals, greater than, and so on) and some set of values. After applying a filter to a column, an icon displays in the column header to let you know that the column has a filter. You can apply as many column filters as the number of columns in the table up to a limit of 100. Each new column filter is appended to the previous filters to produce fewer records in the current view.</p> <p> Clear Filter: Clears the filter conditions from the column and refreshes the Browser window. This only clears the filter on the right-clicked column; filters and sort on other columns are preserved. The Clear Filter command is enabled after you apply a filter condition to a column.</p> <p>The Filter and Clear Filter commands are also available by right-clicking on a column in the Browser window.</p>
	Sort	<p> Sort Multi-Column: Opens the Sort dialog box where you would make selections to perform a multi-column sort in the Browser window.</p> <p> Sort Ascending: Sorts the column containing text alphabetically starting from A to Z. This is also available by right-clicking on the column.</p> <p> Sort Descending: Sorts the column containing text alphabetically starting from Z to A. This is also available by right-clicking on the column.</p> <p> Clear Sort: Removes the sort that was applied to the data in the Browser window. This removes the sort from memory, so you cannot reapply the sort after making this selection.</p>
	Clear All	Removes all sort and filters that were applied to the data in the Browser window. This removes the sort and filters from memory, so you cannot reapply them again after making this selection.
	Sort On/Off	Turns off a sort, so that you can view data as it appears in the table. After turning a sort off, you can turn it back on to view the sort result.
	Re-Sort	Reapplies the last sort/filter to the data in a Browser window. This is useful after making changes to the data or after turning the sort/filter on.
	Add to Map	Opens the Create Query dialog box which allows you to add a query with the current sort and filter conditions as a layer on the map.

Scrolling through a Table

A Browser window allows you to view tabular data in your table. Use the vertical scroll bar to view various ranges of records. Use the horizontal scroll bar to see different sets of columns.

Opening Multiple Browsers

To open multiple **Browser** windows:

1. On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Browser** from the list, to open the **Browse Table** dialog box.
2. Do the following to make your selections:
 - To open a contiguous block of tables, select the first table you want, hold down the **Shift** key and select the last table you want to open.
 - To open multiple tables that are out of sequence, hold down the **Ctrl** key and select the tables.
 - To deselect tables, hold down the **Ctrl** key and click on the tables.
3. Click **OK**.

Controlling the Appearance of a Browser Window

There are several commands that allow you to alter the appearance of the Browser (such as its display font and background color).

- To change the text style (font, size, and color), on the **TABLE** tab, in the **Browser Tools** group, click **Font**.
- To turn grid lines off, on the **TABLE** tab, in the **Browser Tools** group, click **Gridlines**.
- To change the background color used in all Browser windows, click the **PRO** tab, and click **Browser Window**. The **Browser Window Preferences** dialog box lets you choose a background color used in all Browser windows, not just in the active (front-most) Browser window. It also lets you select to display or hide grid lines by default.

Controlling what Rows and Columns Display in a Browser Window

When you first open a Browser window, it displays all of the rows and columns from your table. Tables can be very large, with many rows and many columns, so hiding some of the rows and columns makes it easier to find the data that is relevant to your work.

Limiting which Columns Display

The **Pick Fields** dialog box lets you remove columns from the current **Browser** window. These columns are not deleted from your data, they are just temporarily hidden in this **Browser** window.

To limit which columns display in a **Browser** window:

1. On the **HOME** tab, click **Window**, and **Browser**. On the **TABLE** tab, click **Browser Tools**, and **Pick Fields**.
2. In the **Pick Fields** dialog box, move column names from the **Fields in Table** list to the **Columns in Browser** list.

Only the columns in the **Columns in Browser** list will display in the **Browser** window.

Limiting which Rows Display

Filter conditions let you limit which rows to display. Each filter is specific to a particular column in the table. As an example, you have customers from all around the world, but you only want to see the data for your Canadian customers. You would set up a filter that means, "Only show me a customer record if its COUNTRY column has the value CANADA."

To apply a filter condition, right-click the column that interests you and then select **Filter**. The **Filter** dialog box lets you specify simple conditions, such as `Country Equals CANADA`. When you apply the filter, the **Browser** window hides the rows that do not satisfy the filter condition.

To see even fewer rows, you would apply filter conditions to other columns.

To return to your original view, which shows all rows, right-click the **Browser** window and then select **Clear Filter**. You can also find this command on the **TABLE** tab, in the **Sort and Filter** group, by clicking **Filter**, **Clear Filter**.

Sorting the data in a **Browser** window is similar to filtering the data. To begin, right-click the column that interests you and then choose from the sort commands in the context menu.

Clicking a column header produces a single-column sort; if you need to sort on multiple columns, on the **TABLE** tab, in the **Sort and Filter** group, click **Sort**, and **Sort Multi Column**.

Important things to note about sorting and filtering:

- Sort and Filter conditions are not saved directly in the .TAB file. To preserve your sort and filter conditions, save a workspace (.WOR) file.
- When you add new rows to a table, sort and filter conditions are automatically toggled off, so that all rows (including new rows) become visible. Newly-added rows display at the bottom of the **Browser** window. Once you are finished adding new rows, you can turn the sort and filter on again on the **TABLE** tab, in the **Sort and Filter** group, click **Sort On/Off**.
- Sort and filter conditions may be toggled off, or cleared altogether, after you use the **Pick Fields** dialog box. If you use the **Pick Fields** dialog box to remove a column or re-define that column's expression, any sort or filter condition on that column will be cleared. Also, if other columns in the **Browser** window have filter conditions, then those other column filters will be toggled off. If you remove any of the columns used in a multiple-column sort, the entire sort is cleared.

CAUTION: Editing and Deleting when there are Hidden Rows

Hiding a row does not fully protect the row from being selected, edited, or even deleted. Although filters let you hide rows in a **Browser** window, editing operations may still affect the hidden rows. As

an example, on the **TABLE** tab, in the **Edit** group, clicking **Update Column** updates every row in a table, even rows that are hidden. Also, after filtering a **Browser** window, you can still select the hidden rows by executing SQL queries or by performing a mouse selection in a Map window.

To limit an editing operation, so that it affects only the visible rows in a **Browser** window, on the **TABLE** tab, in the **Selection** group, click **SQL Select**. This command creates a named query that represents the **Browser** window's visible rows. When you perform other commands on that query table, such as Update Column, those commands affect only the visible rows.

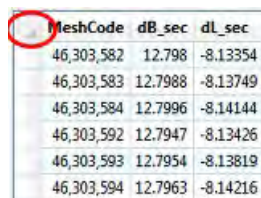
Note: The query table is a snapshot of the current **Browser** window contents. Modifying your filter conditions does not regenerate the query table.

Performing Operations on the Results from a Filter

Once you have applied a filter, you might want to perform other operations that only affect the rows that satisfied the filter. For example, if your filter caused the **Browser** window to show only 100 rows, you might want to save a copy of just those 100 rows, as a new table.

To perform operations on the filter results (on the rows that satisfied the filter):

1. On the **Browser** window, click the **Select All**  button located to the immediate left of the column heading name.



MeshCode	dB_sec	dL_sec
46,303,582	12.798	-8.13354
46,303,583	12.7988	-8.13749
46,303,584	12.7996	-8.14144
46,303,592	12.7947	-8.13426
46,303,593	12.7954	-8.13819
46,303,594	12.7963	-8.14216


2. Once you have selected all rows in the filtered **Browser** window, you can perform other operations on the selection table.

Note: Deleting or editing rows could also affect hidden rows if they are in your selection. For more information, see **CAUTION: Editing and Deleting when there are Hidden Rows**.

How a Browser Displays in a Layout

A **Browser** window displays with the column headings at the very top of the frame. Immediately below, it displays the contents of the table, starting with the row and column at the upper-left corner of the table. It displays as many columns and rows as it can fit in the frame, regardless of how many are displayed in the table. When you resize the frame, the number of rows and columns displayed are adjusted accordingly. However, fields removed from the table with the **Pick Fields** command are not displayed in a table frame (on the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box).

The number of rows and columns that can be displayed in a frame depends on font size and column width. The frame displays Table text using the font style and size for that **Browser** window. When

you want a different font style in the frame, you would select the **Text Style**  button command. When you use smaller type, you can get more rows and columns in a frame.

You can also manually adjust column width in a **Browser** window without affecting the underlying field size for the base table. You do this by clicking and dragging the short vertical bars separating the column names in the **Browser** window.

The **Browser** window always has a current cell, which is never in a deleted row. The **Browser** window scrolls as necessary to keep the current cell in view. When not in edit mode, the current cell displays with a black border. When in edit mode, the current cell has a gold outline. You can use keyboard gestures to move the current cell.

For information about setting the background color for **Browser** window rows and other preferences, see [Setting your Browser Window Preferences](#).

A Note About Workspaces

The workspace preserves, wherever possible:

- Query tables or layers created from a sorted and/or filtered **Browser** window.
- Queries applied to the base table that alter it's current view in an open **Browser** window.

There are cases where a workspace may not be able to preserve all queries, such as:

- Selecting records manually on a map.
- Browsing a selection and then filtering the **Browser** window.
- Create a query and a map layer from the filtered **Browser** window.

Note: The WOR (workspace) will not preserve the query layer, or query, due to a system limitation.

Showing or Hiding a Browser's Grid

To show or hide a Browser's grid:

1. Make the Browser window the active window.
2. On the **TABLE** tab, from the **Browser Tools** group, choose **Gridlines**. The **Browser Tools** are also available in the Browser window when the window is floating.

Adding and Editing Text in a Browser

When you move the cursor into the Browser window, it turns into an I beam. This indicates that you are ready to perform data editing functions.

To add or edit text in a Browser:

1. Position the cursor at the point where you want to enter or delete text in a cell.
2. Click on the location and type or delete the desired text. The text displays at the flashing cursor as you type.

3. Press **Tab** to move to the next editable cell in the row. When you reach the end of the row, it moves to the first column of the next row.
4. On the **HOME** tab, in the **File** group, click **Save Table** to save your changes.

MapInfo Pro recognizes carriage return characters in your data and displays text over multiple lines.

For a list of keystrokes to help you with positioning your cursor and select text within a table cell, see *Shortcuts for the Browser Window* in the *MapInfo Pro: Productivity Aids* Guide.

Entering Multi-Line Text

Ordinarily, the **Browser** window displays one line of text for each record in your table. By inserting new lines, so that text wraps across multiple lines, you can make long descriptions look like paragraphs making them easier to read.

You can apply multi-line text to map labels by inserting new lines into a **Browser** window and then using that column for automatic labeling in a Map window-the new lines affect how the labels appear in the Map window.

To enter multi-line text:

1. Click on a cell in the **Browser** window to put it into edit mode.
2. Use the arrow keys to position the blinking insertion cursor in your text.
3. Press **Ctrl+Enter** to insert a new line character.
4. Use the up and down arrow keys to move the insertion cursor from line to line.

Note: Only Character fields can store multi-line text.

Multi-line text has limitations which might make it inappropriate in some situations. Multi-line text:

- Displays on a single line in the **Browser** window of pre-11.0 versions of MapInfo Pro.
- Displays on a single line in the Info window.
- May affect copy/paste operations. Copying multi-line text in the **Browser** window and then pasting it in to another application may result in extra rows of data depending on how an application interprets the data.

Selecting and Deleting Rows in a Browser Window

Please note that deleting rows could also delete hidden rows if they are in your selection. For more information, see **CAUTION: Editing and Deleting when there are Hidden Rows**.

- To select a row in a **Browser** window, click in the row header preceding the first field to the left of the row.
- To select multiple rows, press the **Ctrl** key while making selections or while dragging the mouse across row headers.
- To deselect all rows in the selection, on the **TABLE** tab, in the **Selection** group, click **Clear**.
- To delete one or more rows, select the row, or range of rows, on the **HOME** tab, in the **Clipboard** group, click **Cut**.

The **Browser** window displays a deleted row as a thin gray line, so that you know where the deletion occurred. To undo your delete, on **HOME** tab, in the **Clipboard** group, click **Undo**.

If there are hidden rows in the selection that you wish to delete, a warning message displays. To turn off the display of this message, see *Setting your Browser Window Preferences* in the *Help System*.

To select a range of rows, click the button at the left edge of the **Browser** window and select a row. Hold the **Shift** key and click a second row in the same **Browser**. This selects all of the rows within that range (the row you clicked including the row you have selected using **Shift+Click**).

Tip: Clicking on a row selects the row, but also clears any previous selection. To add another row to the already selected row, hold down the **Ctrl** key and click on the row you want to select. Similarly, holding down the **Ctrl** key while you perform **Shift+Click** will add that range of rows to the selection, instead of clearing the previous selection.

Undoing or Redoing an Action

Press **Ctrl+Z**, or on the **HOME** tab, in the **Clipboard** group, click **Undo** or **Redo**.

See also [Toggle Sort and Filter Off or On](#) and [Re-Applying a Sort and/or Filter](#).

Adding Fields to a Browser

To add a field to a **Browser** table:

1. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
2. Choose a field from the **Fields in Table** list box.
3. Click the **Add** button. The selected fields are added to the end of the **Columns in Browser** list box.
4. Click **OK**.

Removing Fields from a Browser

To remove a field from a table:

1. Make a Browser the active window.
2. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
3. From the **Columns in Browser** list, choose a field or **Shift-click** to choose multiple fields.
4. Click the **Remove** button.
5. Click **OK** to apply your changes.

Adding a New Row to a Browser

The browser table must be editable before you can add a new row.

To add a new row:

1. Do one of the following, which adds a new row to the bottom of the table:
 - On the **TABLE** tab, in the **Edit** group, click **Add New Row**.
 - Press **Ctrl+E**.
2. When you are finished adding rows, on the **TABLE** tab, in the **Contents** group, click **Save Table**.

Resizing the Columns in a Browser Window

The **Browser** window determines the initial column width according to the content of the column for those rows in view: if the initial display of the **Browser** is 30 rows and there is a character(100) column, but the longest visible content is 25 characters, then the column width is large enough to hold 25 characters. After determining a column width, it does not automatically change. If you scroll down and the column contains a cell with 35 characters, then the column width remains the same size and does not automatically grow.

Do one of the following:

- Move the cursor to the vertical line to the right of the column heading. The cursor becomes a two-way arrow. Click and hold the mouse button. Drag the mouse left to narrow the column width or right to widen the column width. Release the mouse button to set the new width.
- Position the cursor between two column headings and then double-click. The column to the left of the cursor resizes to fit the data in view.

Resizing columns only affects how they display in the **Browser** window, and does not change their width in the underlying table. Workspaces do not save resizing information.

Printing a Browser View

When selecting to print the contents of a **Browser** window:

- Only the contents in view will print. If necessary, the contents are scaled down (preserving the aspect ratio) to fit the page size.
- Only full rows and columns print, partial rows or columns are not in the printout.
- Scroll bars, at right and at bottom, do not print. Other controls for on-screen clicking, such as a selection box, do not print.
- You cannot specify a page range for printing and you cannot print to file.

Printing a Browser to the MapInfo PDF Printer

When printing to the MapInfo PDF printer, you must enable Postscript Simulation. You can set this value for each print job, or change the default by editing the properties for this driver in Control Panel Printers.

1. On the **HOME** tab, in the **Output** group, click **Print** to open the **Print** dialog box.
2. Select the **MapInfo PDF Printer**.

3. Click **Properties**.
4. In the **Properties** dialog box, click the **Advanced Options** tab.
5. Make sure the **Enable Postscript Simulation** check box is checked.
6. Click **OK** to close the dialogs and save your setting.

Printing a Browser to the Adobe PDF Printer

When printing to the Adobe PDF printer, you must turn off Image Downsample. Since there are multiple versions of the Adobe PDF printer, these directions may vary based on which version of the Adobe printer is being used. These settings can be either be set at print time, or set in Control Panel Printers to change the default for all print jobs.

1. On the **HOME** tab, in the **Output** group, click **Print** to open the **Print** dialog box.
2. Select **Adobe PDF Printer**.
3. Click **Properties**.
4. In the **Properties** dialog box, select the **General** tab and click **Printing Preferences**.
5. Select the **Images** category.
6. For all types of Images (Color, Grayscale, Monochrome), set **Downsample** to **Off**.
7. Click **OK** to close the dialogs and save your setting.

Setting Margins for a Browser Window when Printing

To specify margin settings:

1. Make the **Browser** window active and on the **HOME** tab, in the **Output** group, click **Page Setup** to open the **Page Setup** dialog box.
2. Specify the desired margin settings.
3. Click **OK**.

Sorting Data in a Browser Window

To do a simple sort, which is only sorting by one column, right-click on any cell in the column including its header and then choose the sort option that you want from the popup menu. After sorting, icons display at the top of the sort column(s) to provide visual confirmation of the sort. If you save a workspace, the sort order is preserved.

To perform a multi-column sort:

1. On the **TABLE** tab, in the **Sort and Filter** group, click **Sort**, and **Sort Multi Column**.
2. Select column and order type from the **Sort by** lists.
3. Refine your sort further by selecting another column and order type to apply to your sort from the **Then by** lists.
4. Click **OK** to close the dialog and sort the contents of the **Browser** window.

The sort result displays in a new **Browser** window, and the sort order is in the order of the columns you select.

This example shows a sort result on the **Country** column:

Country	City	Landmark
Germany	Berlin	Fernsehturm
Germany	Berlin	Brandenburg Gate
India	New Delhi	Qutab Minar
India	New Delhi	Jama Masjid
India	Jaipur	Hawa Mahal
India	Maharashtra	Ajanta
United Kingdom	London	Buckingham Palace
United Kingdom	Blackpool	Blackpool Tower

This example shows a sort result on the columns **Country**, then **City**, then **Landmark**:

Country	City	Landmark
Germany	Berlin	Brandenburg Gate
Germany	Berlin	Fernsehturm
India	Jaipur	Hawa Mahal

Country	City	Landmark
India	Maharashtra	Ajanta
India	New Delhi	Jama Masjid
India	New Delhi	Qutab Minar
United Kingdom	Blackpool	Blackpool Tower
United Kingdom	London	Buckingham Palace

If you sort a **Browser** window and then edit that table, the **Browser** window may turn the sort off. Specifically, any edit operation that adds new rows to the table causes the **Browser** window to unsort, so that newly-added rows are visible at the bottom of the window. Note that this unsorting can occur even if you add new rows in a different window (for example, if you add new rows by drawing new lines in a Map window). After adding a new row to the table, you can re-apply the sort to the **Browser** window on the **TABLE** tab, in the **Sort and Filter** group, click **Sort On/Off**.

Toggle Sort and Filter Off or On

To turn sorting off and view data as it appears in the table, on the **TABLE** tab, in the **Sort and Filter** group, click **Sort On/Off**. To revert back to your last sort order, on the **TABLE** tab, in the **Sort and Filter** group, click **Re-Sort**.

To turn off filters, on the **TABLE** tab, in the **Sort and Filter** group, click **Filters**, and **Clear Filter**. You cannot revert back to your last filter.

Filtering a Column in a Browser Window

Right-clicking on a column displays a pop-up menu from which you can select the Filter option. A filter may consist of up to two conditions where each condition is built from a simple set of operations (such as equals, greater than, and so on) and some set of values. After applying a filter to a column, an icon displays in the column header to let you know that the column has a filter. There is a limit of 100 filters per **Browser** window. Each new column filter is appended to the previous filters to produce fewer records in the current view.

When sorting or filtering the contents of a **Browser** window, some restrictions apply to the special columns ROWID and OBJECT:

- The ROWID column cannot be used with any of the sorting or filtering menu items.

- The OBJECT column can be sorted as though it were a character column (A to Z or Z to A); ungeocoded rows appear as blank cells.
- If you want to apply a filter to the OBJECT column, you must first modify the OBJECT expression in the **Browser** window. To do this, click the **Pick Fields** button and in the **Fields in Table** list, select **Expression**. In the **Expression** dialog box enter Str\$(object) where object is the name of the column. This enables the Filter right-click menu, and you can continue with the instructions in this section.

To apply a filter to a column:

1. Right-click on a column and select **Filter** from the pop-up menu.
2. In the **Filter** dialog box, select the filter type from the drop-down list, such as **Equals**, **Does not Equal**, **Contains**, **Does Not Contain**, **Begins With**, **Ends With**, and **Is Empty**.

In the textbox, enter the text to use for this filter. Do not use quotation marks or wildcard operators.

3. Select either the **And** or the **Or** operator.
4. From the **Select an Operator** drop-down list, select the type of operator to apply to this filter.
in the textbox, enter the text to use with this operator.

5. Click **Apply** to apply this filter to the data in the **Browser** window.

Clicking **Reset** in the **Filter** dialog box clears your selected parameters, but does not clear the applied filter.

Clicking **Clear Filter** in the **Filter** dialog box, clears the applied filter, so that you can start over again.

Clicking **Close** (or pressing the **Esc** key) closes the **Filter** dialog box without applying your selections.

The following table lists the data types that may be used with each operator type:

Data Type	Operators
Character	<ul style="list-style-type: none"> • Equals, Does not Equal • Contains, Does not Contain • Begins With, Ends With • Is Empty
Number (Integer, SmallInt, LargeInt, Float, Decimal)	<ul style="list-style-type: none"> • Equals, Does not Equal • Greater than, Greater than or Equal to • Less than, Less than or Equal to

Data Type	Operators
Date or Time (Date, Time, Date/Time)	<ul style="list-style-type: none"> • Equals, Does not Equal • Is Before • Is After • Is Empty
Logical	<ul style="list-style-type: none"> • IsTrue (Yes) • IsFalse (No)

The following are filter examples. To begin, you would display the **Filter** dialog box by right-clicking on a column and selecting **Filter** from the pop-up menu.

Simple text sort: I want to display only records that are for the city named Sidney. (Character sorts are not case sensitive and do not require quotation marks.)

1. Select the **Equals** operator from the first drop-down list.
2. Enter **Sidney** into the first textbox.
3. Click **Apply**.

Text sort with wildcard matching: I want to display only those records containing the phrase "ing". (A wildcard operator, such as the asterisk * symbol, is not needed for wildcard matching.)

1. Select the **Contains** operator from the first drop-down list.
2. Enter **ing** into the first textbox.
3. Click **Apply**.

Sort on date: I want to display only records where the last updated date is before Jan 1, 2011. (Ensure the date format matches that used in the Browser window, such as mm/dd/yyyy, mm/dd/yy, or dd-MMM-yyyy for example.)

1. Select the **Is Before** operator from the first drop-down list.
2. Enter **1/1/2011** into the first textbox.
3. Click **Apply**.

Numeric sort: I want to display all records that are either high or low sales, my outliers. (You may use commas, decimal points, and minus signs when entering numerical text.)

1. Select the **Greater than or Equal to** operator from the first drop-down list.
2. Enter **5,000,000** into the first textbox.
3. Select the **Or** radial button.
4. Select the **Less than or Equal to** operator from the second drop-down list.
5. Enter **10,000** into the second textbox.
6. Click **Apply**.

Sort for records that are empty or begin with: I want to find all records where the Category field is empty or begins with "Earth".

1. Select the **Is Empty** operator from the first drop-down list. The textbox is disabled, because they do not apply to this type of sort.
2. Select the **Begins With** operator from the second drop-down list.
3. Enter **Earth** into the second textbox.
4. Click **Apply**.

Clearing a Sort and/or Filter

After applying a sort or filter you have the option to clear it. Clearing a filter can apply to a specific column by right-clicking on the column and selecting **Clear Filter**, or to all filtered columns by selecting to clear the filter from the **TABLE** tab.

On the **TABLE** tab, in the **Sort and Filter** group, click:

- **Filter**, and **Clear Filter**.
- **Sort**, and **Clear Sort**.

To clear both sort and filters at the same time, on the **TABLE** tab, in the **Sort and Filter** group, click **Clear All**.

Selecting to clear a sort or filter refreshes the **Browser** window.

Re-Applying a Sort and/or Filter

Re-applying a sort and/or filter is useful after making changes to the data or after selecting to turn the sort/filter off.

On the **TABLE** tab, in the **Sort and Filter** group, click **Re-Sort**.

This only applies to queries from within the **Browser** window, and does not apply to map layers that were built from a query window or to queries made from SQL Select operations.

Adding a Filtered View to a Map

It is useful for analytical purposes to filter the data in a Browser window and then see the results display on a map. You can do this after creating a filter/sort by selecting the **Add to Map** option from the **Sort and Filter** group on the **TABLE** tab. This option lets you create a new named query and then add it to an existing or to a new Map window.

The **Add to Map** option is active after having applied a filter and/or sort and when the table in the Browser window contains mappable objects.

To add a new named query to an existing or new Map window:

1. Click the **TABLE** tab and then select **Add to Map** from the **Sort and Filter** group.. The **Create Query** dialog box displays.

2. In the **New query name** text box, enter a name to apply to the query result, or use the default name.

Query names can be up to 31 characters and cannot have special characters, such as spaces, in them. If you use spaces in the query name, they are converted to underscores, so that "Accounts 2000" becomes "Accounts_2000" for example.

3. Select the **Open a new Browser for this query** check box if you want the results of this query to open in a new **Browser** window.
4. Select the **Add this query as a layer to** check box to add the results of this query as a layer to:
 - **An existing map** - Select this option and a Map window from the drop-down list, which contains the names of the existing Map windows.
 - **A new map named** - Select this option and then type a name for the new Map window in the textbox. If a table is not mappable, then the **Add This Query As A Layer** check box is grayed out and unavailable.
5. Click **OK** to apply your selections.

The resulting query reflects the current state of the **Browser** window. After creating the query, you can perform other operations in the **Browser** window without affecting the query, such as modifying your sort and/or filter conditions, or closing the **Browser** window. However, if you close the original table, the query automatically closes too.

Creating a Default Browser View

When you open a table's **Browser** window, you can save the expressions and column order you create for this data so that it displays each time you open the **Browser** window for this table. To achieve this, save these columns, their order and the expressions in the **Pick Fields** dialog box.

To select and save columns and expressions to a Browser's metadata:

1. Make a Browser window the active window.
2. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
3. In the **Pick Fields** dialog box, to create a new **Browser** view, click **Add** to add the fields from the left column to the list on the right and use the **Up** and **Down** buttons to arrange the columns in the order you want them to display. Any columns you do not move to the **Columns in Browser** list do not display in the new view.

To remove a column from the **Columns in Browser** list, click the column entry. Click **Remove**.

To return the lists to their original entries, click **Reset**.

4. To create an expression to save to the **Browser** view, scroll to the bottom of the left hand column and click the **Expression** entry. Use the **Expression** dialog box to enter the expression and click **OK** to complete it.
5. When you have your expressions and columns set the way you want them to display, select the **Save as Default Browser View** check box. Click **OK** to save these settings.

Note: If you change the data structure of the table the **Browser** is based on, MapInfo Pro removes this column and expression setting information from your table.

Choosing a Font for Your Browser Window

To customize the display of text in the Browser window:

1. Click on the Browser window to make it the active window.
2. Do one of the following:
 - From the **Browser Tools** group on the **TABLE** tab, click **Font** to open the **Text Style** dialog box.
 - Press **F8**.
3. In the **Text Style** dialog, set font, color, and style preferences.

You cannot mix fonts in a Browser window-you can use only one font.

Setting the Background Color for Browser Window Rows

You can choose the color to use for the background on alternating rows in the Browser window. This setting makes it easier to distinguish between rows. MapInfo Pro applies this setting to all **Browser** window instances (in a layout, printout, and in all **Browser** windows).

To change the background color for rows in the **Browser** window:

1. Click the **PRO** tab, and select **Options** to display the options screen.
2. Click **Browser Window** to open the **Browser Window Preferences** dialog box.
3. From the **Alternating Row Color** list, select a background color.
4. Click **OK** to close the dialogs and apply the color to your **Browser** window.

MapInfo Pro saves this setting between sessions.

Preserving Column and Expression Settings in a Browser Window

Use these instructions to preserve expression and column information you set in a **Browser** window as the default view for the table. This ensures that when you open the table's **Browser** window again, the expressions and column order you created remains the same.

To select and save columns and expressions to a Browser's metadata:

1. Make a Browser window the active window.
2. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
3. In the **Pick Fields** dialog box, do any of the following:
 - Create a new **Browser** view.

Click **Add** to add the fields from the left column to the list on the right and use the **Up** and **Down** buttons to arrange the columns in the order you want them to display. Only columns you move to the **Columns in Browser** list display in the new view.

- Remove a column.

From the **Columns in Browser** list, click the column entry and then click **Remove**.

To return the lists to their original entries, click **Reset**.

- Create an expression to save to the **Browser** view.

Scroll to the bottom of the left hand column and click the **Expression** entry. Use the **Expression** dialog box to enter the expression. Click **OK** to complete it.

When you have your expressions and columns set the way you want them to display, select the **Save as Default Browser View** check box. Click **OK** to save these settings.

Note: If you change the data structure of the table the **Browser** window is based on, MapInfo Pro removes this column and expression setting information from your table.

Using the HotLink Command in a Browser Window

The **Hotlink** command is available for a **Browser** window when the table being browsed has hotlink options stored in its metadata. If a field expression in the table matches the Hotlink Filename Expression, then the text in that browser field is drawn underlined and the **Hotlink** command is enabled. Clicking with the **Hotlink** command on the underlined text launches the URL or file specified by the text.


To use hotlink in a **Browser** window:

1. Make sure the **Hotlink Options** are saved in the table metadata (see *Selecting a Drawing Command and Making the Map Window Active*) in the *Help System*.
2. Open the table. On the **HOME** tab, in the **File** group, click **Open**, and **Table** to open the table in a **Browser** window.
3. If the Hotlink Filename Expression is a table field name, then the corresponding text in the browser field will be underlined. If the Hotlink Filename Expression is complex, then you need to create your hotlink browser field by following these steps:
 - a. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
 - b. Click the **Expression** item in the **Fields in Table** list to open the **Expression** dialog box.
 - c. Type the Hotlink filename expression into the edit control box. Click **OK**.
 - d. Click **OK** in the **Pick Fields** dialog box. The text in the new field should be underlined and the **Hotlink** command enabled.
4. On the **TABLE** tab, in the **Browser Tools** group, click **Hotlink**.
5. Click the underlined text in the browser field to launch the URL or file specified by the text.

Adding an Expression for a Hotlink as a Column to a Browser Window

The follow describes how to use an expression for a hotlink and how to add the expression as a column to a **Browser** window and persist it.

To add an expression as a column to a geographic table:

1. Open the table in both a **Map** and **Browser** window.
2. In the Layer Control (on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list.), select your layer.
3. On the **MAP** tab, in the **Options** group, click **Hotlink Options** .
4. In the **Hotlink Options** dialog box:
 - a. Click **Add** to add a new filename expression to the list.
 - b. From the **Filename Expression** drop-down list, select the column to add a hotlink expression for, such as for country name or capital name.
 - c. From the **Alias Expression** drop-down list, select **Expression**.
5. In the **Expression** dialog box:
 - a. Before the column name, add the hotlink URL followed by the plus sign (+). The URL must be within quotation marks (" "). The following example replace the URL with the one you want to use and replace ColumnName with the column name selected in the previous step:
`"http://www.myurl.com"+ColumnName`
 - b. Click **Verify** to check that the expression works.
 - c. Copy the expression to the clipboard by selecting it and pressing **Ctrl+C**.
 - d. Click **OK** to close the dialog box.
6. In the **Hotlink Options** dialog box, check the **Save options to table metadata** check box and click **OK**.
7. Right-click on the **Browser** window and in the pop-up menu that displays, select **Pick Fields**.
8. In the **Pick Fields** dialog box, from the **Fields in Table** list, select **Expression**.
9. In the **Expression** dialog box, paste your expression field by pressing **Ctrl+V**. Click **OK** to close the dialog box.
10. In the **Pick Fields** dialog box:
 - a. In the **Name** field, type a descriptive name, such as **URLlinks**.
 - b. Check the **Save as Default Browser view** check box and click **OK**.

In the **Browser** window, there is a new column at the end of your table (you may need to scroll to see it) containing a list of hotlinks.

Changing a Record's Data, Font, and Style

Changing Text Font and Size

To choose a font for your text:

1. On the **TABLE** tab, in the **Browser Tools** group, click **Font** to open the **Text Style** dialog box. The currently selected font appears in the **Font** box.
2. Choose a new font from the drop-down list. Click **OK**. When you enter text, it displays in the font size that you specified.

Changing Table Information

You can change information in a table using the **Info** command. Select a record in the **Browser** window and click **Info**. In the **Info** window, position the cursor in the appropriate **Info** field and use basic text-editing techniques to change the information.

Mouse Wheel Support for Browser Window

When you are working in the **Browser** window, you can use the mouse wheel to scroll through the records. Roll the mouse button down to scroll down the list, and roll the mouse button up to scroll up the list. You can use the **Tab** key to scroll right and the **Shift+Tab** keys to scroll left in the **Browser** window.

Displaying Data in a Layout

The **Layout** window lets you stylize your map for presentation and publishing. You can design a map layout for print or to export to an image file for distribution.

There are two ways to open a **Layout** window:

- On the **LAYOUT** tab, click **New Layout**.
- On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Layout** from the list. This adds the **LAYOUT** tab to the ribbon if it is not already present.

You can add **Map** and **Browser** windows to your layout, add images and shapes, and create a legend for the map layout. How you stylize the map and browser in your layout does not affect the styles in your open **Map** and **Browser** windows.

You can save your map layout to a workspace to work on it in later sessions. Besides printing a layout you can also export it to an image to include within a presentation or for distribution.

For details about the **Layout** window, see *About Map Layouts* in the *MapInfo Pro: Preparing Maps for Publishing* Guide.

Other Windows for Displaying Data

There are two other ways of displaying data that are used less often or can be used in conjunction with display options we have already reviewed.

- **Legend Designer** windows display legends, or keys, to the cartographic data on your map. (Map legends are the key boxes at the bottom of a map that explain what the map symbols mean.) The **Legend Designer** window displays information for any map layer including thematic map layers. The legend frames can all be in one **Legend Designer** window, or can be split among several **Legend Designer** windows for the same map. Therefore, each map can have one or more **Legend Designer** windows containing the frames of your choice. Additionally, you can customize the text and style of the information presented. Modifications to the legend can be made through shortcut menus you access by right-clicking in the **Legend Designer** window or on the **LEGEND** tab.

You can learn more about legends in *Working with a Thematic Map Legend*, in the *MapInfo Pro: Creating Thematic and Themed Maps* Guide.

- **Redistricter** allow you to create groupings of spatial information. This is a little more complex than these other options. For more information about redistricting windows, see *Redistricting* in the *MapInfo Pro Help System*.

Working with Tables in the Tables List

Introduction

The **Tables** window lets you perform operations on open tables in MapInfo Pro using fewer clicks. You can organize tables into groups and sort them alphabetically and recently opened first. The **Tables** window is accessible on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Tables** from the list.

The **Tables** window has the following features:

- Modeless, so that you can open it and leave it open for the duration of your session. (Modeless windows do not have **OK** or **Cancel** buttons.)
- Dockable to any of the four sides of the MapInfo Pro window: top, left, bottom, and right. The **Tables** window can also share the same space with the **Layers** window.

- Drag and drop enabled, so that you can select tables and drag and drop them to a blank area to open them in a new **Map** window. When dropping tables on to an existing **Map** window, MapInfo Pro adds them to the **Map** window as new layers.
- Sorting enabled, to sort tables based on ascending order of table alias (name), descending order of table alias, and recently opened. Sorting criteria persist across different MapInfo Pro sessions.
- Multi-Selection enabled, to select multiple tables using the **Ctrl** or **Shift** keys.
- Context Menu enabled, so that when you right-click on table aliases (names) a pop-up menu displays and you can perform the desired operations.
- Searching enabled, you can search for a table name in the **Tables** window by typing characters in a **Search** text box. The **Tables** window list refreshes itself to show only those tables that contain the search characters.

Accessing the Tables

The **Tables** list lets you manage open tables and their attributes. This list is available from the **Explorer** and **Table** windows. These windows are resizable, floatable, dockable, and can be hidden.

Select either of these methods.

- Look in the **Explorer** window, which is open by default in MapInfo Pro. If this window is not open, then on the **HOME** tab, in the **Windows** group, click **Tool Windows**.
- On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Tables** from the list.

In **Table** windows, on the **List** drop-down, choose how to display the entries from the following:

- **Group by Type**: Tables are grouped in a tree view according to type.
- **Ascending** or **Descending**: Sort tables in ascending or descending order.
- **Recently Opened**: Sort tables based on the order they were opened. The most recently opened table displays first. This is the default view.





About the Tables Window

Tables in the Tables window can be ordered in several ways. If the tables are organized by group, double-click on the group name to expand or collapse to view or hide the table names.

Hovering over an entry in the **Tables** window displays the path of the open table as a tool tip.

Like other windows, the **Tables** window is resizable, floatable, dockable, and can be hidden. On the **List** drop-down, choose how to display the entries from the following commands:

About the Tables Window Commands

	Group By Type	Group tables by type into a tree view.
	Ascending order	Click to sort tables in ascending order.
	Descending order	Click to sort tables in descending order.
	Recently Opened First	Click to sort tables based on the order they were opened. The most recently opened table displays first. In tree view mode, the table type nodes always display in ascending order.

About the Tables Menu Options

Right-click on a table in the **Tables** list to view a pop-up menu with the following options:

- **Select All Rows from Table** - Select this option to select all the rows in the table together. If a table is selectable, this menu item includes the table name. For unsupported tables, this menu option is unavailable.
- **Browse** - Select this option to open a table in a **Browser** window and edit records, copy records, add new records, or delete existing records.
- **Open in new Map Window** - Select this option to open the table in a new **Map** window.

For more information, see [Opening MapInfo Tables](#).

- **Export** - Select this option to open the **Export Table to File** dialog box to export the table. You can export graphics and tabular data to MapInfo Pro format (MIF). Only tabular data can be exported to Delimited ASCII (*.txt), dBASE DBF (*.dbf), and Command delimited CSV (*.csv).
- **Rename Table** - Opens the **Rename Table** window where you can enter a new name for the table file. The table file name is the layer name in the **Tables** list.
- **Open Containing Folder** - Open folder in explorer and select tab file for each selected table.
- **Copy Path** - Copy path to clipboard for selected tables.
- **Refresh** - Select this option to refresh WFS, Universal Data, and DBMS tables. It is enabled for single selection only.

WFS table - It refreshes the WFS layer based on the WFS server settings and the filter options set for WFS Refresh in the Web Services Preferences. It is enabled for a WFS table when connection to the Internet or intranet is established.

Universal Data table - It refreshes the Universal Data table, such as AutoCAD®, Microstation Design®, and ESRI ArcSDE datasets.

DBMS table -It refreshes a MapInfo Pro linked table with the most recent data residing on the remote database for that linked table. It is enabled when there are no pending edits against the table.

- **Table Structure** - Select this option to specify the field name, field type, number of characters (width), and whether the field is to be indexed for each field in your new database. You also indicate whether or not the table is mappable by associating graphic objects with records and, if so, whether the map is to be an earth or a non-earth map. Collectively, this information is the structure of your database.

For more information, see *Modify Table Structure Dialog Box* in the *Help System*.

- **Create Points** - Select this option to create point objects for a database that has X and Y coordinates or longitude/latitude coordinate information. These points can be displayed on a map. If you do not have coordinates in your table, then use Geocode to match some other geographic information (such as street address) against a table that already has graphic objects.

For more information, see *Create Points Dialog Box* in the *Help System*.

- **Update Column** - Select this option to change a column's value by updating a table based on its own data values or by updating a table based on data from another table. This dialog box remembers the column that was updated the last time update was run and the expression that was used for updating a column the last time an update was run.

For more information, see *Update Column Dialog Box* in the *Help System*.

- **View/Edit Metadata** - Select this option to view the metadata of a managed table.
- **Add to Library** - Select this option to create a metadata record for the layer in the **MapInfo Manager Library**. You can perform this operation only after selecting the **Catalogs and Library Mode** preference for library services and while at least one unmanaged native table is open.

For more information, see the *Catalog Browser Help System*.

To set preferences for library services: on the **PRO** tab, click **Options**, and **Web Services**. Click the **Library Services** tab.

Note: To load the **Catalog Browser** tool into MapInfo Pro, on the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and click the **Registered** tab, and then select the **Catalog Browser** check box.

- **Close** - Closing a table removes it from active use in your current session. When you close a table, you automatically close all views of that table. When closing a table that displays in a **Map** window with other tables, MapInfo Pro removes that table from the window and keeps the **Map** window open.

For more information, see [Closing a Table](#).

Selecting Multiple Tables in the Tables

Multiple tables can be selected with **Ctrl**, **Shift** keys, or arrow keys. Only **Browse**, **Open in new Map Window** and **Close** options are enabled in the context menu for multi-selected tables.

Note: In tree view mode, only tables can be selected. Table type nodes are not selectable.

Dragging and Dropping in the Tables





To open multiple tables in a new **Map** window, select them (using the **Ctrl** and **Shift** keys) and then drag and drop them on to a blank area. When dropping tables on to an existing **Map** window, MapInfo Pro adds them to the **Map** window as new layers.

Note: Tables can be dropped only on a **Map** window or an empty area in the MapInfo Pro.

Sorting in the Tables Window

You can sort tables based on ascending order of table alias (name), descending order of table alias, and recently opened. Sorting criteria persist across different MapInfo Pro sessions.

The following options under the **List** drop-down are available in the **Tables** window:

	Group By Type	Group tables by type into a tree view.
	Ascending order	Click to sort tables in ascending order.
	Descending order	Click to sort tables in descending order.
	Recently Opened First	Click to sort tables based on the order they were opened. The most recently opened table displays first. In tree view mode, the table type nodes always display in ascending order.

Searching the Tables

Searching Tables

You can search for a table name in the **Tables** window by typing characters in the **Search** text box. The **Tables** view refreshes itself to show only those tables that contain the search characters.

Clear Search

Typing in the **Search** text box causes the **Search** button to change to a **Clear Search** button. To clear the contents of the **Search** text box, click the **Clear Search** button.

About Automatic Metadata Updates when Using a Library Service

MapInfo Pro seamlessly works with MapInfo Manager through Library Service. A Library Service lets you access the metadata records published in MapInfo Manager.

Effect of a Metadata Update

The automatic metadata update feature updates the date and time of the managed table's metadata in MapInfo Manager. It also updates the bounds in metadata with respect to new data saved by a user in a managed table. Updating the bounds in the metadata helps while searching managed records within a map or drawing bounds on a map using the **Catalog Browser**.

Note: To properly show updated metadata in the **Catalog Browser** records, refresh the records in the **Catalog Browser** by searching again in the MapInfo Manager exposed catalog that you are working with.

Managed Table's Metadata Update

A table managed by the **MapInfo Manager** library is called a **Managed Table**. When saving edits made to a managed table, its metadata is updated automatically using Library Service. This feature is active when running MapInfo Pro with MapInfo Manager integration mode set to **Catalogs and Library**. For details about **Managed Tables**, see the help topic [Working with MapInfo Manager Library Services](#).

If you are not running MapInfo Pro in **Catalogs and Library** mode, then the metadata update feature is disabled.

Activating Library Service Mode

You can activate the Library Service by setting the **MapInfo Manager Integration** mode to **Catalogs and Library**. To do this, on the **PRO** tab in the **Options** group, click on **Web Services**. In the **Web Services Preferences** dialog box click **Library Services**.

For details about enabling the Library Services, see the help topic *Setting the Library Services Preferences* in the *Help System*.

After setting the Library Services preferences to **Catalogs and Library**, the **Tables** window shows the status of the tables and if they are managed or not by the **MapInfo Manager** library.

MapInfo Operations Triggering Automatic Metadata Update

A metadata update occurs automatically when performing some MapInfo Pro operations.

Saving Recent Edits to Managed Table

A metadata update occurs automatically when you commit edits back to a table.

Changing Structure of a Managed Table

A metadata update occurs automatically when changing the structure of a managed table by performing following operations:

- Adding fields to a table
- Removing fields from a table
- Changing the order of fields
- Adding indexes to a table
- Removing indexes from a table
- Adding a map to a table
- Dropping a map from a table

Working with Layers in the Explorer Window

Introduction

The **Explorer** window lets you control the layers on display for all maps open in MapInfo Pro.

Clicking on a map name in the **Layers** list, brings the map to the front of view in MapInfo Pro. This is also done by selecting the map name and pressing **Enter**.

Putting the Focus on to a Map

Double-clicking on a map name takes the focus to the map window. You can then use the arrow keys to pan the map. This is useful when you want to put the focus in the map window without click in the map window, because doing so might clear a table selection. You can also do this by selecting the map name and then pressing the **Ctrl** and **Enter** keys.

Rearrange the Order of Layers

To reorder the layers, select a layer (map) name and press the up or down arrow keys to reposition it in the list.

Select and Modify Many Layers at Once

Select multiple layers at once in the Layer list by using the **Shift** and **Ctrl** keys. Selecting a check box for one of these layers then selects the check boxes for all selected layers. This is useful when turning several layers off, because the map redraws only once instead of redrawing for each layer selection.

Modify multiple layers at once instead of having to modify layer properties one layer at a time. Use the **Shift** and **Ctrl** keys to select multiple layers in the Layer list, and then right-click to open the **Layer Properties** dialog box. Changes apply to all selected layers making it easier to ensure consistency in your layer settings. You can also set the style override for all selected layers by clicking the style swatch for one of the layers, or set the labeling font for all the selected layers by right-clicking on one of the layers and then choosing **Label Font**.

You can only modify a selection of similar layers; if you select different types of layers, such as a raster layer and a pie theme, then the dialog box is not enabled.

Preview Style Changes before committing them

Style dialog boxes that are launched by clicking a style swatch for a layer in the Layers list include a **Preview** button. Use this Preview button to see what the map will look like with your style changes before committing the change. You can cancel the preview if you do not like what you see by clicking the **Cancel** button in the style dialog box.

Apply Display and Label Overrides for when zooming the Map

At different zoom levels information on the map may be difficult to view. Changing (overriding) the display style for specific zoom levels can help. As an example, to make the map easier to read, you may want roadways to display using a thick line when zoomed in to the map, but a very thin line when zoomed out of the map.

Right-clicking on a layer in the Layers list and clicking the **Add Display Override** option creates a display override for that layer. Right-clicking and clicking the **Add Label Override** option creates an override for labels for a layer. The first display override defaults to the zoom range of the layer. Adding subsequent display overrides splits the zoom range of the first display override. You can then customize the display style for the layer at each specific zoom level.

Reorder Layers

The Layers list has multi-select capabilities. To change the order of one or more contiguous layers, hold down the **Shift** key, select the layers, and drag them up or down. To change the order of one or more layers that are out of sequence, hold down the **Ctrl** key, select the layers, and drag them up or down.

When you begin to drag the layers, the cursor will change shape to represent the number of layers being dragged. If you are dragging one layer, the cursor becomes an arrow icon with a single layer icon attached to the top. If you are dragging multiple layers, the arrow icon will display multiple layer icons at the top. If you select layers that cannot be dragged or if you are attempting to insert layers where they cannot be inserted, the cursor becomes a circle with a line through it.

Note: A selection of layers that is out of sequence will become contiguous upon insertion.

Use the **Move Layers Up** or **Move Layers Down** buttons to move one or more layers. You cannot reorder or remove the Cosmetic layer. It will always be the top layer.

Group Layers

Group layers to organize them, so that you can show or hide the entire group with a single click.

Note: Group Layers are not preserved when you do a Save Workspace As to a .MWS file.

Quick View an Entire Layer

Right-click on a layer name and choose **View Entire Layer** to see the layer as a whole without going through a dialog box.

Rename Maps

You can give a descriptive title for your map by right-clicking on the Map name (at the top of the layer list) and choosing **Rename Map**.

Suspend or Resume Map Drawing

For those times when you want to make many quick changes, and you do not want the map to redraw after each change, you can toggle the **Redraw** button on the **MAP** tab to temporarily turn off map display.

See also:

- [Reordering Map Layers](#)
- [Grouping Layers](#)
- [Suspend or Resume Map Drawing](#)

Accessing the Explorer Window

On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list.

The **Explorer** window displays a list of the layers for each map that you have open in MapInfo Pro.

Layers Window

The **Layers** window displays the list of layers in the open **Map** window or in all **Map** windows depending on what your **Layer Control** options are set to. It indicates whether each layer displays, is editable, selectable, or zoom layered. Layers include data tables, thematic maps and the Cosmetic layer. Layers are stacked in a **Map** window. The order of layers in the **Layers** window is the order of the layers in the **Map** window. For instance, when boundary layers are placed below point layers, the points remain visible. The Cosmetic layer is always the topmost layer. When there are more layers than can be displayed in the dialog box at one time, a scroll bar appears on the right.

To open the **Explorer** window, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list.

Note: Selecting an object, such as a point or line, in the **Map** window causes the layer name to appear in bold.

See Also:

[Add Layer Dialog Box](#)

[Adjust Labeling Priorities Dialog Box](#)

[Layer Properties Dialog Box](#)

[HotLink Options Dialog Box](#)

[Layer Control Options Dialog Box](#)





[Setting Different Styles for Different Zoom Levels](#)

[Setting Different Label Styles for Different Zoom Levels](#)

[Stacking Display Styles to Create a Custom Look](#)

Layers Window Settings

Each row represents a layer on the map. You can select the following for each layer:

	<p>Visible Indicates whether the layer is visible.</p> <p>Check to display the layer. The Cosmetic layer display is always on. When zoom labeling is in effect and the layer is outside of its zoom range, then the layer name is dimmed and there is an asterisk (*) beside the Visible On/Off check box. Zoom labeling specifies the layer displays only within a certain zoom range.</p>
	<p>Editable Indicates whether the layer is editable.</p> <p>Click for the layer you want to make editable. Only one layer per map can be editable. Objects in an editable layer can be edited (moved, colored, deleted, reshaped, etc.). Objects are also drawn or pasted to the editable layer. Neither thematic nor raster layers can be edited. A layer must be displayed to be made editable</p>
	<p>Selectable Indicates whether the layer is selectable.</p> <p>Click to make selectable. Layers must be selectable if you want to choose or label objects or use the Info command. A layer must be displayed to be made selectable. More than one layer may be selectable at the same time. You may, however, only select from one layer at a time.</p>
	<p>Automatic Labeling Indicates whether the layer should be labeled automatically.</p> <p>Click to view labels on the map. Labels come from the table column designated in the Layer Properties Dialog Box, by selecting from the Label with list in the Label Display tab. When zoom labeling is in effect and the layer is outside of its zoom range, then the layer name is dimmed and there is an asterisk (*) beside the Automatic Labeling icon.</p>

Visual Indicators

Visual indicators in the Layer list provide more information about a layer:

- When a layer is outside of its zoom range, the layer name is dimmed and there is an asterisk (*) beside the Visible On/Off check box.

- Selecting an object, such as a point or line, in the **Map** window causes the layer name to appear in **bold**.
- When you select a layer, it is highlighted in the list. You can select multiple layers by using the **Ctrl** and **Shift** keys when making your selections.

Layer Types

The **Layer Type** indicate the types of items in the layer, such as points, lines, regions, theme, or raster images. If the layer has a style override, then the icon indicates the style. You can show or hide layer type icons by setting the preference in the **Layer Control Options** dialog box on the **PRO** tab, select **Options**, and click **Layers**. **Layer Type** icons include:

Clicking the **Layer Type** icon lets you edit style properties for the items in the layer.

- For points, lines, and regions, click the icon to open the corresponding style dialog box and edit style properties for the layer.

 **points**

 **lines**

 **regions**

- A layer with a theme shows a thematic icon. For more about thematic layers, see [Working with Thematic Layers](#).

 **Range Theme**

 Bar Chart Theme

 Pie Chart Theme

 Graduated Symbol Theme

 Dot Density Theme

 Individual Theme

 Grid Theme

- A map tile server layer or a raster layer shows the following icon.

 **Raster or Tile Server Layer**








- A group layer icon indicates a group of layers. You can drag to move layers in to or out of the group.





 **Group Layer**

Note: Group layers are not preserved when you do a **Save Workspace As** to a .MWS file.

Layers Window Buttons



The following buttons in the **Layers** window help you to control how the map displays layers:

	Add	<p>Click to open the Add Layer dialog box and add one or more layers to the map. Select from the list of open tables. Your additions display in the Layer list.</p> <p>The Add Layers button enables when there is an active Map window; the layers you add are for the active Map window. Before clicking the Add Layers button, make a map active (bring it to the front) by clicking on the map title in the layer list.</p>
	Remove	<p>Click to remove selected layers from the Layer list. To select multiple layers, press the Shift or Ctrl key while selecting layers.</p> <p>Note: The Remove Layers button displays a confirmation dialog box. If you would rather not see these confirmation prompts, set the preference in the PRO tab, click Options, and Layers. Clear the Confirm Removal of Layers check box in the Layer Control Options dialog box.</p>
	Move Layers Up	Click to reorganize one or more layers in the list. To select multiple layers, press the Shift or Ctrl key while selecting layers.
	Move Layers Down	<p>Click to reorganize one or more layers in the list. To select multiple layers, press the Shift or Ctrl key while selecting layers.</p> <p>The order determines which layers obscure the contents of the other layers; the bottom layer in the list is the most obscured.</p>
	Layer Properties	<p>Click to open the Layer Properties Dialog Box and set display attributes, including label display and labeling rules, for selected layers.</p> <p>The Layer Properties button enables after selecting a single layer or multiple layers of the same type. If you select two different layer types, such as the Cosmetic layer and a raster layer, then this button does not enable.</p>
	Modify Theme	Click to open the Modify Thematic Map dialog box and set display attributes for a thematic layer. This button is only active after selecting a thematic layer.
	Hotlink Options	<p>Click to open the Hotlink Options dialog box where you can specify filename expression, file locations, what activates HotLink, and saving options to table metadata.</p> <p>The Hotlink Options button enables only after selecting a single layer.</p>

	Adjust Labeling Priorities	<p>Click to open the Adjust Labeling Priorities dialog box where you can move layers up and down in the list to adjust layer priority when Automatic Labeling is turned on for layers.</p> <p>The Adjust Labeling Priorities button is enabled when the active map has at least two layers that can be labeled (this does not include raster, theme, or cosmetic layers).</p>
	Selectable Labels	<p>Click To control whether you can select labels when you click on the map. By default, labels are selectable. You might make labels unselectable if you find that you are accidentally selecting labels on the map when you were trying to select points or lines. This is a per map setting, so each Map window has its own setting. Each map's Selectable Labels setting is preserved when you save a workspace.</p>
	Automatic Map Drawing	<p>Click to allow map redraw or to turn off map display as changes are made to layers. Select to suspend automatic redraw when there are many layers that slow the redraw process.</p>
	Layer Control Options	<p>Click to open the Layer Control Options dialog box and set which maps show in the Layer list, enable confirmation when removing a layer, disable tooltips in the Layers window, and show or hide icons in the Layers window.</p>

Layer Level Context Menu

Right-click on a layer in the **Layers** window to view a pop-up menu with the following options:

- **Browse Table** - Select this option to open a **Browser** window containing the table data for a layer.
- **View Entire Layer** - Select this option to view the entire layer, not just part of it, in the **Map** window. You do not have to go through a dialog box when selecting this option.
- **Extents of Selected Objects** - Zoom to the extents of the selected objects on the map.
- **Zoom to Nearest Tile Server Level** - Select this option to change the zoom of a tile server layer so that the images in a tile server will be displayed at an optimal zoom level. Based on the tile server and current screen resolution, the optimal zoom will be calculated.
- **Layer Properties** - Select to open the **Layer Properties** dialog box and customize the display for a layer. For information about the **Layer Properties** dialog box, see [Changing How a Layer Displays on the Map](#). For more about changing the look of data on your layers, see [Changing a Map's Style](#).
- **Rename** - Select to assign a friendly name to the selected layer. To restore the default layer name for a renamed layer, select this option again to display the  icon on the far right of the selection. Click  to delete the friendly name.

Note: You can only rename layers when the **Show Friendly Names** preference is enabled. On the **PRO** tab, click **Options**, and **Layers**. Select the **Show Friendly Names** check box.

- **Label Font** - Select this option to open the **Text Style** dialog box and set the font style for the labels in a layer. For information about the **Text Style** dialog, see [Text Style Dialog Box](#).
- **Clear Custom Labels** - Remove custom labels from the layer. This resets any custom labels in the layers you have selected.
- **Add a Display Override** - Select this option to change (override) the display style when zooming the map to make it easier to view information. For more information, see [Setting Different Styles for Different Zoom Levels](#).
- **Add a Label Override** - Select this option to change (override) the label style when zooming the map to make it easier to view information. For more information, see [Setting Different Label Styles for Different Zoom Levels](#).
- **Select All** - Selects all the rows in this table displayed in this layer.
- **Make Other Layers Non-Selectable** - Select this option to make a layer selectable in the **Map** window and all other layers in the **Layers** window non-selectable. This is useful when editing data on the map to ensure that you are updating data in only a single layer.
- **Set Map Projection from Layer** - Select this option to set your map coordinate system to the coordinate system of a table/layer. You can also quickly change the map projection using the status bar for a map window. It shows you map's coordinate system. Double-click projection name in the status bar displays the coordinate system picker.
- **View/Edit Metadata** - Select this option to view the metadata of a managed table.
- **Add to Library** - Select this option to create a metadata record for the layer in the MapInfo Manager Library. You can perform this operation only after selecting the **Catalogs and Library Mode** preference for library services and while at least one unmanaged native table is open. For more information, see the Catalog Browser *Help System*.

To set a library service preference, on the **PRO** tab, click **Options**, and **Web Services**, and then click the **Library Services** tab.

Map Level Context Menu

Right-click on a map name in the **Layers** window to view a pop-up menu with the following options:

- **View Entire Map** - Select this option to view the extents of the map in the **Map** window. You do not have to go through a dialog box when selecting this option.
- **Rename** - Rename the map.
- **Map Options** - Change settings for the map.
- **Add Layers** - Add layers to the map.
- **Clear Cosmetic Layer** - Clear all objects in the Cosmetic Layer.
- **Save Cosmetic Objects** - Save all objects in the Cosmetic Layer to a table.
- **Priority** - Change the priorities for labels in different layers.
- **Add Group** - Add a new, empty group layer.

Adding Layers to the Map

You can add one layer to the current Map window at a time or use the multi-select functionality to add layers simultaneously.

Note: You can only add layers from tables that are open. If you want to add a layer and you do not see it in the list, make sure the table that contains that layer is open.

To add a layer to the current **Map** window:

1. On the **Explorer** window, click the **Add** button.
 - To add a contiguous block of tables, select the first table, hold down the **Shift** key, select the last table.
 - To add multiple tables that are out of sequence, hold down the **Ctrl** key, select the tables.

To deselect tables, hold down the **Ctrl** key, click on the tables,
2. Click **OK** to add the tables to the **MAps** list.



Each table is ordered automatically according to the type of table it is. For instance, table with points are placed above table with lines, which are placed above table with regions. Drag the new tables to the appropriate position in the **MAps** list as necessary.

Reordering Map Layers

Map layers display in the order that they are listed in the **Layers** window, with the bottom layer drawn first and the top layer (which is always the Cosmetic Layer) drawn last. It is important to order your layers correctly.

For example, you have a layer of customer points and a layer of census tracts. If the layers are incorrectly ordered in the **Map** window, MapInfo Pro might draw the customer points first and then display the census tract layer second. Your points would be obscured by the census tract layer. You can reorder how layers are displayed in a **Map** window two ways.

To reorder the layers in a map:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Do one of the following:
 - Select the layer or layers you want to reorder and use the **Move Layers Up**  and **Move Layers Down**  buttons to position the layer(s) where you want them.

- Click the layer or layers and drag it (or them) to the new position. When you use the click and drag method, the cursor changes and as you move the cursor, a marker displays indicating the layer's new position.

If you cannot move a layer to a particular position (for example, attempting to move a layer above the Cosmetic layer), the cursor changes to a circle with a slash through it to let you know that you cannot move the layer to the proposed position.

Note: Since the Cosmetic layer is always the top layer, reordering has no effect on it. You cannot move a layer above the Cosmetic layer.

Layer order is also important when you use the **Select** button. The **Select** command selects objects from the topmost Selectable layer. If you have several objects at the same location, it is difficult to select the exact one you want. You can reorder your layers in **Layers** window so that the layer you want to select from is the new topmost layer.

MapInfo Pro does not allow you to control the front-to-back ordering of objects within a single map layer. If you are editing a table, and you draw a line on top of a circle, the line might appear in front of or behind the circle; you cannot control whether it is in the front or the back. You can, however, control the front-to-back ordering of objects in a **Layout** window.

Note: If you need to control the ordering of objects (for example, you need to make sure that your lines display on top of your regions), put the different object types in separate layers. Put your line objects in one table, and put your region objects in another table. Then use the **Layers** window to order the layers.

These topics are useful in understanding the reordering of Map Layers.

- [Changing the Order of Contiguous Layers](#)
- [Changing the Order of Random Layers](#)
- [Grouping Layers](#)
- *Reordering Thematic Layers* in the *MapInfo Pro: Creating Thematic and Themed Maps* Guide

[Changing the Order of Contiguous Layers](#)

To change the order of one or more contiguous layers in the **Layer** list:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.

The **Maps** list has multi-select capabilities.

2. Hold down the **Shift** key.
3. Select the layers and drag them up or down in the list.
4. Click **OK** to save your changes.

Changing the Order of Random Layers

To change the order of one or more layers in the **Layers** window:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.

The **Maps** list has multi-select capabilities.

2. Hold down the **Ctrl** key.
3. Select the random layers you want to move and drag them up or down in the list.

Note: A selection of layers that is out of sequence will become contiguous upon insertion.

You can also use the **Move Layers Up** ↑ or **Move Layers Down** ↓ buttons to move one or more layers. You cannot reorder or remove the Cosmetic layer. It will always be the top layer.

See also:

- [Reordering Map Layers](#)
- [Removing a Layer from the Map](#)
- [Changing how a Layer Displays on the Map](#)

Grouping Layers

You can group layers in the **Explorer** window to make it easier to make them visible or invisible (showing or hiding them).

To hide a group of layers, so that they are not drawn on the map, check the Visible On/Off check box in the **Maps** list.

Note: Group Layers are not preserved when you do a Save Workspace As to a .MWS file.

Adding a Group to the Layer List

To add a group to the **Layer** list:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. In the **Maps** list, right-click on a map name and choose **Add Group** from the pop-up menu.

The new group displays in the **Layer** list for the map.

3. Type a name for the new group.

To add a group (as a subgroup) to an already existing group:

- Right-click on the group name and select **Add Group** from the popup menu.

Changing the Name of a Group

To change a group name:

1. Right-click on the group name and select **Rename** from the popup menu.
2. Type the new name for the group.

Adding or Removing Layers for a Group

Add layers to the **Maps** list as described in [Adding Layers to the Map](#). You can then drag and drop layers to add or remove them for a group.

Removing a Group

To remove a Group Layer from the **Maps** list either:

- Ungroup layers by right-clicking on the group name and selecting **Ungroup** from the popup menu. This deletes the group, but does not delete the layers that are inside the group.
- Delete layers by selecting the group and then clicking the **Remove** ✕ button. This deletes the group and deletes all of the layers inside the group.

The group is removed from the **Maps** list. The layers contained within the group now display in the **Maps** list, they are not removed.

Working with a Catalog Browser Group Layer

The Catalog Browser tool lets you add a translucent overlay to a map window that shows the location of a particular metadata record. See the *Catalog Browser Help System* for help on using this feature. The overlay information saves to a temporary group layer in the **Explorer** window called Catalog Browser.

You can make Catalog Browser group layers selectable and visible in the **Explorer** window. If you double-click on the overlay in the map window, then the **Rectangle Object** dialog displays with location information for the overlay, such as bounds, centroid, and size. You cannot label the overlay.

To remove an overlay from the map window, either close the map window or close MapInfo Pro. You can also remove the layer from within the Catalog Browser by clicking the **View Bounds on Map** button for the metadata record.

Note: To load the **Catalog Browser** tool into MapInfo Pro, on the **HOME** tab, in the **Tools** group, click the **Registered** tab, and then select the **Catalog Browser** check box.

Renaming a Map

To rename a map in the **Explorer** windows list:



1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the a window with a list of the map layers.
2. Right-click on the map name and select **Rename** from the pop-up menu.

The map name redisplay with the new name.

Renaming a Layer

You can rename a layer in the same way that you would rename a map:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the a window with a list of the map layers.
2. Right-click on the layer name and select **Rename** from the pop-up menu.

To restore the default layer name for a renamed layer, select this option again to display the  icon on the far right of the selection. Click  to delete the friendly name.

Note: You can only rename layers when the **Show Friendly Names** preference is enabled in the **Layer Control Options** dialog. To set this, on the **PRO** tab, select **Options**, and click **Layers** to open the **Layer Control Options** dialog box. Select the **Show Friendly Names** check box to enable assigning a friendly name to layers.

Map legend titles default to the friendly names (friendly names also display in the **Create Legend – Choose layers** dialog). For thematic legends this does not happen when the title is updated during theme creation (or when **Title AUTO** is set in the MapBasic `Set Legend` statement).

You can also assign a default name to a layer using the `Description` field (part of `Definition` section) in a TAB file. To do this, a preference must first be set in the **Layer Control Options** dialog. On the **PRO** tab, select **Options**, and click **Layers** to open the **Layer Control Options** dialog box. Select the **Use Description Field for Friendly Name** check box.

Removing a Layer from the Map

To remove a layer from the current Map window:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Click the layer or layers you want to remove, using the **Shift** key to select adjacent layers or the **Ctrl** key to select random layers.

3. Click the **Remove Layers** × button. MapInfo Pro removes the layers from the list.

The Map window redraws without the removed layers.

Removing Multiple Layers from a Map

To remove multiple layers:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Do one of the following:
 - To remove contiguous layers select the first layer, hold down the **Shift** key and select the last layer. Click the **Remove Layers** × button.
 - To remove multiple layers that are out of sequence, hold down the **Ctrl** key, select the layers. Click the **Remove Layers** × button.

The Cosmetic layer cannot be removed. You cannot remove all of the map layers. There must always be at least one main layer displaying in the **Maps** list. Selecting all the map layers disables the **Remove Layers** button.

Suspend or Resume Map Drawing

All changes made to map layers in the **Explorer** window take effect immediately. If make many changes quickly and do not want the map to redraw with each change, then you can suspend the redraw feature.

To suspend map redraw:

- Click the **Redraw** command on the **MAP** tab's **Options** group.

With the map drawing suspended, you can make as many changes as you like to the layer properties, without having to wait for any map redraws. When you are finished changing layer properties, click **Redraw** again, to resume normal map redrawing.

Changing how the Layer/Maps List Displays in the Explorer Window

You can control how the layer list behaves and how it displays in the **Explorer** window by specifying whether the list automatically collapses to save space or lists only the active maps, and if the layers in the list show or hide the layer type icon for example.

To open the **Layer Control Options** dialog box to specify how the layer list behaves and displays:

1. On the **PRO** tab, select **Options**, and click **Layers**.
2. Change settings as necessary and click **OK**.

Setting Options

Maps to show in the Layer list:


- **List all maps** - This displays all layers for all maps in the **Layers** window.
- **List only the active map** - This displays only the layers for the active map in the **Layers** window. Inactive map layers do not display.
- **Collapse list to save space** - The Layers window lists all the layers in all the maps in the workspace. The list is automatically expanded or collapsed as you switch from map window to map window, so that only the active map window is expanded.
- **Confirm removal of layers** - Check to enable a confirmation prompt that displays when deleting a layer from the Layers list.
- **Show ToolTips when cursor is over layer list** - Check to display table names, .TAB file paths, and zoom range information in ToolTips as you move the cursor over the layer list.
- **Show icons for styles and layer types** - Check to show the layer type icons in the layer list. These are the icons that indicate the types of items in the layer, such as points, lines, regions, theme range, or raster images.

Changing How a Layer Displays on the Map

The **Layer Properties** dialog box customizes the display for each layer in a Map window.

To change the display options of a layer:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Do one of the following:

- Select a layer and right-click **Layer Properties** .
- Double-click a layer name to open the **Layer Properties** dialog box.

You can change the default styles for the layer, set the zoom at which a layer displays, and show line direction, object nodes and centroids.

3. On the **Layer Display** tab, check the **Style Override** or the **Display within Zoom Range** check boxes.

The **Zoom Layering** options allow you to determine zoom levels at which the selected layer displays, so that the map layer displays only when the map's zoom level falls within this preset distance.

For more about zoom layering, see [Setting the Zoom Layering](#).

The **Show** options at the bottom of the Layer Display tab, allow you to set the way points, lines and regions display on the current layer.

Note: For information about using stacked styles, see [Stacking Styles for a Layer](#).

4. Select the **Show line direction** check box to show the direction of line objects.
5. Select the **Show Nodes** check box if you plan to edit objects in a layer and need to see the object's nodes.
6. Select the **Show Centroids** check box to show the centroid of an object.
7. Click on **Expression** to set the layer filter expression using the **Expression** builder dialog. Verify the expression and click **OK**. You can turn the expression filter **On** or **Off** as required.

Note: When a layer in the map has a filter expression (not empty), then the item for that layer in the **Layer** control will also show a toggle button to turn the layer filter On or Off. Also, the Preview button will not work for a filtered expression.

You can open the filtered Browser window using the Browse Table command from the Layer context menu. The header of the filtered Browser window will show a small filter icon next to the Browser Icon, to distinguish it from a normal table browser.

8. Click **Styles for New Objects** to set specific styles (for lines, symbols, or regions) that will be applied to every item in the layer. This button is enabled when a layer is editable. Clicking **Styles for New Objects** opens the **Insert Style** dialog box where you can add, remove, and reorder styles for the layer. In this dialog box, clicking on a style swatch opens the **Style** dialog box for setting color, line pattern, or symbol shape.
9. Make your new selections and then click **OK** to return to the **Layer Properties** dialog box.
10. Click **OK** to return to the **Layers** window.

The map redraws with your changes.

For more information about changing the look of data on your layers, see *Changing a Map's Style* in the *Help System*.

When you select a layer in the layer list, the **STYLE** tab displays on the MapInfo Pro ribbon. You can change style settings using the commands on this tab. For an overview of these commands, see the [STYLE Tab](#).

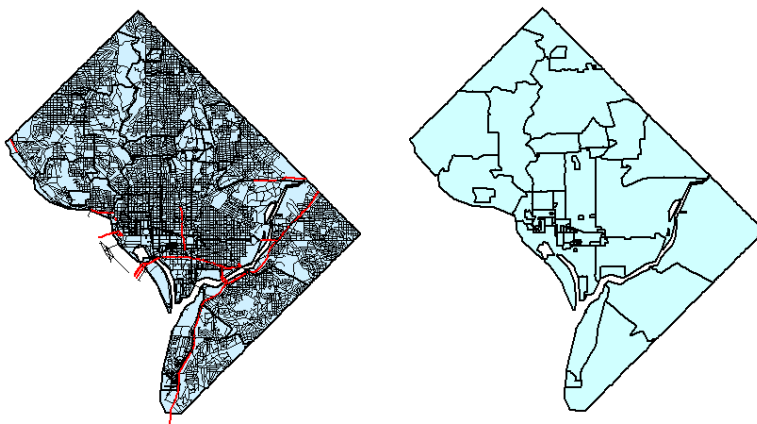
Changing Display Options for Multiple Layers

You can change layer properties for multiple layers at the same time, so long as they are the same type of layer (lines, regions, or symbols). Press the **Shift** or the **Ctrl** key while selecting layers to make multiple selections, and then right-click and choose **Layer Properties**. If the layers you select are not all the same type (you selected a line layer and a symbol layer for example), then the Layer Properties command is disabled.

You can also set a style override for all the selected layers by clicking the **Style Override** swatch, or set the labeling font for all the selected layers by right-clicking on one of the selected layers and then choosing **Label Font**.

Setting the Zoom Layering

Sometimes you want a map layer to display only at certain zoom levels. Zoom layering controls the display of a map layer so that it displays only when the map's zoom level falls within a preset distance.



For example, you have a layer of streets and a layer of postal code boundaries. When you zoom out past 10 or so miles, the streets look like a black smudge in the window. This is because the zoom (window width) is too wide to show detailed street maps. Use zoom layering to tell MapInfo Pro to display the street layer only when the zoom is set to a distance that allows you to see the street detail properly, for instance, less than 5 miles.

The first map does not have zoom layering set for its street layer. At a zoom of 15 miles across, notice how difficult it is to see any detail. The second map has zoom layering set to display the streets when the zoom is less than five miles. Therefore, the streets layer does not display when the window is set at 15 miles.

To set zoom layering:

1. Make the target table editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. In the Maps list, double-click the layer name for which to set zoom layering. The **Layer Properties** dialog box displays.
3. On the **Layer Display** tab, click the **Display within Zoom Range** check box to activate the zoom distance boxes.
4. Specify a minimum and maximum distance within which you want the layer to display. Note that you cannot change display settings for more than one layer at a time.
5. Click **OK** to save your settings.

You can display different layers in the same Map window at different zoom levels. For example, you have a layer of streets, a layer of county boundaries, and a layer of state boundaries. You want the streets layer to be visible only when the zoom level is less than eight miles. You want the county boundary layer to display when the zoom level falls between 20 miles and 200 miles. You want the

states boundary layer to be visible only when the zoom level is greater than 100 miles. You can set a different zoom level for every layer in your Map window.

Note: When you add an object, a region, a line, or a polyline in the Map window and zoom out beyond where the zoom layer would permit you to see that feature, MapInfo Pro turns off zoom layering so you can continue to see what you are working on. When you complete the add process, a message displays asking you if you want to leave zoom layering off (so you will still be able to see the feature). If you click **Cancel**, MapInfo Pro cancels the zoom layering. If you click **OK**, you need to adjust your zoom settings to see this feature again.

Changing a Map's Zoom Level

You change a map's zoom level or scale by specifying certain parameters in the **Change View** dialog box.

To scale your map:

1. Right-click on the map and select **Change View** from the pop-up menu to open the **Change View** dialog box.
2. Type the new Zoom [window width].
3. Type the new Map scale.
4. Type the new X and Y Center of window coordinates to position your map.
5. Click **OK**.

The **Change View** dialog box allows you to set various parameters of the map including:

- Display the current zoom, scale or cursor position in the status bar (the default unit of distance is **miles**. This is set on the **PRO** tab, by clicking **Options**, and **Map Window**).
- Change the zoom, scale, and the center point of the current map view.
- Behavior of the map when you resize the window.
- Resize the map to fit the new window, keeping the view the same.
- Set the map to preserve the current scale, so that resizing the window has the effect of letting you see more or less of the map.

Zooming In on a Map

To zoom in on a **Map** window:

1. On the **MAP** tab, in the **Navigate** group, click **Zoom In**.
2. Do one of the following:
 - Click on the center of the area you want to zoom in on. The area magnifies by a factor of two. This point will be at the center of the map in the zoomed-in view. You can repeat this procedure until you have the desired level of enlargement.
 - Draw a marquee around the area by dragging the mouse diagonally across it. MapInfo Pro then enlarges the selected area to fill the Map window. The area enclosed by the dotted rectangle is the area that is being zoomed in on.

When you are done, the area enclosed by the Zoom In marquee occupies the entire map. However, the aspect ratio is not changed, so if you choose an area that has a very different shape from the window, you will end up seeing a much wider or taller area of the map than you selected.

See Also:

- *Re-Center and Specify a Zoom Level for the Layout Window* in the *MapInfo Pro: Preparing Maps for Publishing* Guide.

Zooming Out on a Map

To zoom out on a **Map** window:

1. On the **MAP** tab, in the **Navigate** group, click **Zoom Out**.
2. Do one of the following:
 - Click on the center of the area you want to zoom out from. This will increase the visible area of the map by a linear factor of two. The map is redrawn placing the point at the center of the Map window in the zoomed-out view. You can repeat this procedure as desired.
 - Draw a marquee in the Map window by diagonally dragging the mouse. The map is redrawn so that the area you started with is positioned within the marquee area and more of the map appears around it.

The Zoom Out marquee shows the area that will be occupied by the current map image when the zoom out is complete. That is, the current map image is reduced to that size, and more of the map displays.

See Also:

- *Re-Center and Specify a Zoom Level for the Layout Window* in the *MapInfo Pro: Preparing Maps for Publishing* Guide.

Setting Different Styles for Different Zoom Levels

A zoom range layer override is a set of display properties that replace the default properties of objects or labels in a single map layer. Each layer override has a unique zoom range in which its properties are applied to the layer.

At different zoom levels information on the map may be difficult to view. Changing (overriding) the display style for specific zoom levels can help. As an example, to make the map easier to read, you may want roadways to display using a thick line when zoomed in to the map, but a very thin line when zoomed out of the map.

Right-clicking on a layer name in the **Maps** window list and clicking the **Add Display Override** option creates a display override for that layer. The first display override defaults to the zoom range of the layer. Adding subsequent display overrides splits the zoom range of the first display override. You can then customize the display style for the layer at each specific zoom level.

When you first create an override none of its properties are set. It has the same properties as the layer. Setting a property for the override, such as changing the font color for labels, does not affect the layer. If you select the layer and open the **Properties** dialog box for it, it shows the original font color is still set for the layer.

You cannot apply style overrides to raster type maps, such as bitmap (*.bmp) images, JPG images, or tile server images.

Creating Override Styles for Different Zoom Levels

At different zoom levels information on the map may be difficult to view. Changing (overriding) the display style for specific zoom levels can help.

To create a display override:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Right-click on a layer in the Layers list and then select **Add a Display Override**.

This creates a display override for that layer. It displays as an indented layer in the Layers list. It may be necessary to click the Expand arrow to the left of the layer name in order to see the zoom range display overrides.

The first display override defaults to the zoom range of the layer. Adding subsequent display overrides splits the zoom range of the first display override.

3. Double-click on the display override or right click it and then select **Display Override Properties** to open the **Zoom Ranged Label Override** dialog box.
4. Set display settings and then click **OK**.

For details about these settings, see the next section **Changing Override Style Properties already set for Different Zoom Levels**.

Changing Override Style Properties already set for Different Zoom Levels

To add and change the properties for a display override:

1. In the Layers list, double-click the display override name to open the **Zoom Ranged Label Override** dialog box. Or, right-click on the display override name and select **Display Override Properties**.
2. Make any of the following settings for the display override for the layer:
 - **Style Override** - To override the default style of a layer, select the **Style Override** check box.
 - **Style buttons** - One or more buttons display, depending on what is in the layer. For example, if a layer contains points and lines, there will be two buttons, allowing you to set Symbol Style and Line Style. Click the button to display the appropriate style dialog box.
 - **Apply within zoom range** - Check to activate zoom layering.
 - **Min Zoom** - The minimum distance at which a layer is visible.

- **Max Zoom** - The maximum distance at which a layer is visible.

You can set the layer zoom range that determines which layers in your Map window are displayed at any one time. Zoom Layering allows you to set the minimum and maximum distances at which a layer is visible. This is particularly useful if you have an open table of street-level data for an entire state. It is not effective to see this map with all local streets displayed. Set the zoom layer to display the streets only when the map zoom level is within a particular range.

For instance, if you want your streets to be visible only when you are zoomed in closer than three miles, set the minimum zoom to 0 and the maximum zoom to 3.

- **Translucency** - Use the **Translucency** slide bar to adjust the translucency for the image. Translucency can be set between 0-100%. An image with 0% translucency is completely opaque (or cannot be seen through). An image with 100% translucency is completely transparent (or completely invisible).
- **Show Line Direction** - To show the direction of line objects, select the **Show Line Direction** check box. This is particularly helpful on a street layer when you need to determine which side of the street is the **FromLeft**, **ToLeft** and **FromRight**, **ToRight** for proper addressing.
- **Show Nodes** - Select the **Show Nodes** check box if you plan to edit objects in a layer and need to see the object's nodes.
- **Show Centroids** - To show the centroid of an object, select the **Show Centroids** check box.

3. Set display settings and then click **OK**.

Splitting an Override Property

Splitting overrides creates more overrides, which means that you see more changes as you zoom in and out of the map. This is useful for situations such as when you want roads to look wider as you zoom in closer. To achieve this effect, you need more than one display override. You would split the display override in two, and then give the different overrides different display settings.

To split an existing display override for a layer:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. To see a list of overrides for a layer, expand the layer in the Layers window by clicking the expand/collapse icon to the left of the layer name.
3. Right-click the override for a layer and select **Split** from the list.

The override zoom range is split evenly. You can now customize the style for the layer at each specific zoom level, see [Changing Override Style Properties already set for Different Zoom Levels](#).

Removing an Override Property

Removing an override does not affect the other overrides in the list.

To remove a display override from a layer:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. To see a list of overrides for a layer, expand the layer in the Explorer window by clicking the expand/collapse icon to the left of the layer name.
3. Right-click the display override to remove from a layer and select **Remove** from the list.

To remove multiple display overrides, press the **Ctrl** key while making your selections.

The override is removed.

Drag and Drop an Override to a Different Layer

You can copy a layer's display overrides or label overrides on to other layers in the map window or other map windows. This lets you reuse layer settings on other layers without having to re-enter all of the settings manually.

To copy overrides onto another layer:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Locate the layer that already contains the overrides that you want to copy.
3. If necessary, click the **Expand** icon to the left of the layer name to view the layer's list of overrides.
4. Select the overrides that you want to copy (using **Shift**-click and/or **Ctrl**-click to select multiple overrides).
5. Drag the overrides over another layer name in the Layers list. When the cursor is over a layer that can receive the overrides, the cursor changes to a pointer with a plus sign (+). Release the mouse to complete the drag operation. The overrides copy onto the layer.

Customizing the Override Style

You can customize the override style, by clicking on the style swatch.

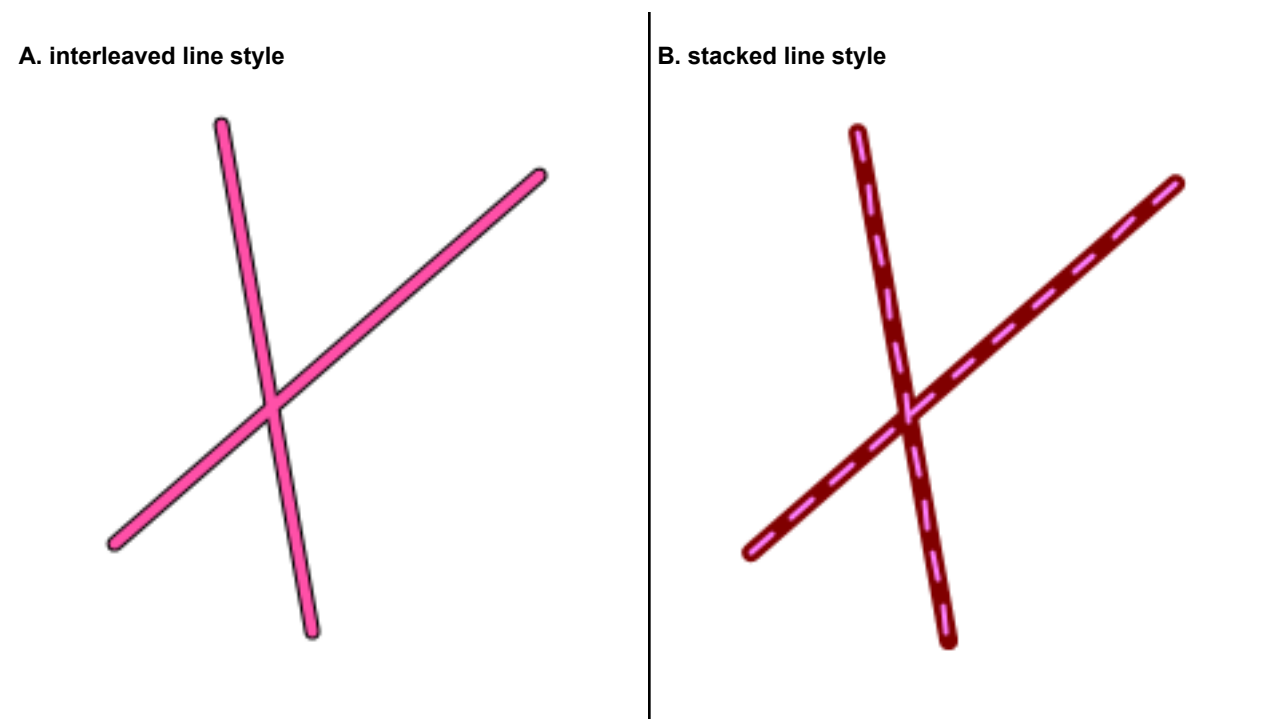
See Also:

- [Changing a Map's Zoom Level](#)
- [Zooming In on a Map](#)
- [Zooming Out on a Map](#)

Stacking Display Styles to Create a Custom Look

You can stack styles for a layer, so that they become a list of styles drawn on top of each other, to create a more complex or interesting looking map feature. You can stack styles for points, polylines, and polygon features. This is especially useful for polyline styles.

Figure A shows a sample line using one of MapInfo's interleaved line styles. Figure B shows the same sample using a stacked line style.



Stacked styles create more meaningful display styles for your application without having to add your data as multiple layers in a map. You can define as many styles in a stacked style as you want. However, the more styles you define the more you will impact the map's rendering performance. Typically, most cartographic maps would use two or three styles in a stacked style to draw features.

Stacked Styles are part of Layer Style Overrides

To set up a stacked style, you must first check the layer's Style Override check box, which you access through the **Layer Properties** dialog box (or, similarly, through the **Zoom Ranged Display Override** dialog box). Stacked styles become part of your layer's display settings and apply to every object in the layer. Stacked styles are not stored as part of a TAB file; instead, they are saved in a workspace, because they are part of a layer's display settings. This means that you can apply stacked styles even if the TAB files you are working with are read-only.

How Ranged Themes and Individual Value Themes apply to Stacked Styles

When applying a ranged theme or an individual value theme to a layer that has stacked display styles, the stacked styles are modified by the theme.

If the theme modifies:

- color, then the color for each style in the stack are modified.

- size, such as symbol size or line width, then the largest style in the stack is modified and all other styles are scaled according to it. This ensures that symbols, and lines, do not obscure one another.

Themes work across all styles in a stack, you cannot apply a theme to an individual style in a stack.

Stacking Styles for a Layer

To set stacked styles for a layer:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. In the Layers list, right-click a layer to add stacked styles to and select **Layer Properties** from the pop-up menu.
3. In the **Layer Properties** dialog box, on the **Layer Display** tab, select the **Style Override** check box.
4. Select the **Use Stacked Styles** check box.
5. Click on the **Style** button.
6. In the **Stacked Styles** dialog box, click **Add** to add another style to the stack.

When you click the **Add** button the top two passes in the list are the same. The new pass is a copy of the previous style pass. Modify one or more of the style passes, so that the top style does not cover up the lower passes. For example, when creating a stacked symbol style, you might give the top pass a smaller symbol size, or give the second pass a larger symbol size.

7. In the Styles list, click on a style swatch and modify its settings. This opens a style dialog for the object type: region, symbol, or line. Make your changes and click **OK**.

Note: When creating a stacked region style, uncheck the **Background** check box in the **Region Style** dialog to make the top style transparent.

8. Repeat the previous step to modify styles settings for the other style swatches in the Style list.
9. Optionally, reorder styles in the style list by clicking the **Move Up** and **Move Down** buttons.
10. Click **OK** to close the stacked styles dialog box and apply your settings. Your settings display on the map for the layer.

Once you have set up a stacked style, you can modify the style by clicking the layer swatch in the Layers list.

Changing a Stacked Style Back to a Simple Style


To change a stacked style back to a simple style:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. In the Layers list, click on the style swatch of the stacked style that you want to modify.
3. Select the item from the **Style list** that you do not want and click **Remove**. Continue until only a single style is left in the list.

4. Click **OK** to apply your changes to the layer.

Positioning and Sizing Labels

To label a map object using the Label button:

1. Make sure that the layer containing the objects you want to label is selectable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window. Click the **Selectable**  icon to set layer selection to **On**.
2. On the **MAP** tab, in the **Label** group, click **Label Tool**.
3. Click on an object on the map to display a label for that object.

MapInfo Pro labels the object with the values (from the column that you specified for that layer in the **Layer Properties** dialog box on the **Label Display** tab).

Changing Label Options

Two features in the **Layer Properties** dialog box help you with label placement: Label Position and Offset.

To change label options:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. In the list, double-click the layer name to open the **Layer Properties** dialog box.
3. Select the **Label Display** tab and specify the desired label options, such as label style.
4. Select the **Labeling Rules** tab and specify the desired label placement and label adjustments, such as allow or discard overlapping text, try other positions when overlapping occurs, allow duplicate text, and label partial objects.

Label Position (also called the anchor point) is the label's position relative to the map object. Click on one of the buttons to select an anchor point. You have nine choices.

The anchor point is an ongoing attribute of the label. For example, if you anchor a point object's label at Center Left and you increase the label's font size, the text will grow to the left. This way, the text can never overwrite the point.

The default anchor point varies with the type of map object you are labeling:

- Regions default to Center.
- Lines default to Below Center.
- Points default to Right.

Label Offset is how far away a label is from its anchor point. Specify the number of half spaces you want the label to be from the anchor point in the **Label Offset** box.

5. Click **OK**.

The map redraws with your changes.

Label Size

Label size does not change with zoom or scale changes. Labels display at the size you specify at all zoom levels as well as on printed output. Labels are never hidden behind other geographic objects because they are always the last objects drawn on the map.

Understanding the Behavior of Label Style Overrides on Custom Labels

Edited label properties take precedence over override properties. For example, if a custom (edited) label has an anchor position of lower left, and an override comes into effect that changes the position of labels to center, then the custom label remains at lower left.

For polyline data, overrides may change the orientation of labels between horizontal, rotated with the line segment, or curved. Curved labels can be dragged to reposition them along their polyline. However they cannot be dragged away from their polyline like horizontal or rotated labels can be. Therefore, once you drag a horizontal or rotated label, it cannot be changed into a curved label by an override, even if the label was previously curved.

Displaying the Lines, Nodes, and Centroids

The **Layer Properties** dialog box allows you to display line directions, nodes, and object centroids. Select the **Show Line Direction** check box when you want to show the direction in which line objects are drawn. Check the **Show Nodes** check box to display the nodes in a layer.

The Show Centroids box displays the centroids of each object in a layer. In MapInfo Pro, a region's centroid does not represent its center of mass. Instead, the centroid represents the location used for automatic labeling, geocoding, and placement of thematic pie and bar charts. If you edit a map in Reshape mode, you can reposition region centroids by dragging them. You can work in reshape mode on the **SPATIAL** tab, in the **Edit** group, by clicking **Reshape**.


For instructions on inserting table-based style in the **Layers** window, see [Inserting Styles into Tables](#).

Changing a Region's Centroid

Autolabels, thematic bar and pie graphs, and point objects created by geocoding are drawn at the object's centroid. You can move a region's centroid, which will in turn affect the location of all future objects drawn in this region. However, autolabels, and geocoded point objects drawn prior to changing an object's centroid remain unchanged.

To move a region's centroids:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. In the Maps list, double-click the layer name to open the **Layer Properties** dialog box.
3. On the **Layer Display** tab, check the **Show Centroids** check box.
4. Click **OK**.
5. On the **MAP** tab, in the **Selection** group, click **Select** from the drop-down list.
6. Select the object on the map whose centroid you want to move.
7. On the **SPATIAL** tab, in the **Edit** group, click **Nodes**, and **Reshape**.

If this option is not available, then check that the layer you selected is set as editable. In the Layers list, click  beside the layer name to turn on editing.

8. Click the centroid and drag it to another location within the object.

See Also:

[Drawing Autolabels](#)

Editing a Layer's Labeling Options

The **Layer Properties** dialog box lets you to customize the automatic labeling for each layer.

To change the label options of a layer:


1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. In the **Maps** list, double-click the layer name to open the **Layer Properties** dialog box.
3. Select the **Label Display** tab, and make any changes.
 - You can select a new labeling column or labeling expression for this layer from the **Label with** drop-down list. (You can only set a **Label with** expression on a single layer. After selecting multiple layers in the **Layers** list, the **Label with** list disables and shows a message that says *Mixed*.)
 - You can set the label styles by clicking **Aa** and translucency using the **Translucency** slider.
4. Select the **Labeling Rules** tab, and make any changes.
 - You can determine the label's position relative to the object (line) by selecting a **Label Position** and offset value.
 - You can set the label visibility options in this layer based on overlap, duplication, partial labeling of objects, and zoom criteria.
5. Click **OK**.

The map redraws with your changes.

Editing a Label's Style

A label is a text object, and can be edited like any text object. When closing a table containing edited labels, you will be prompted to save or discard the labels. If you choose to save the labels, the table will be saved as a workspace with a .WOR extension.

To change the style of a label:

1. Click the **Select**  command and then double-click a label on the map to open the **Label Style** dialog box.
2. Make your changes and click **OK**.
3. Alternatively, make changes to the selected label from the **LABELS** tab on the ribbon.

The map refreshes with the changes.

See Also:

[Drawing Autolabels](#)

Drawing Autolabels

You activate automatic labeling for a label from the **Layers** window.

To automatically label a layer in a map using information from that layer:

- Click the **Automatic Labels**  icon beside the layer name that you want to turn labeling on for.

The map redraws, so that labels for this layer are visible.


Labels are from the table column set in **Layer Properties** dialog box from the **Label with** list on the Label Display tab. To open this dialog box and see the label settings, double-click the layer name. You can change visibility, content, font, text color, line style, and position of labels.

Note: You can only set a Label with expression on a single layer. After selecting multiple layers in the Layer list, the Label with list disables and shows a message that says Mixed.

Deactivating Automatic Labeling

You deactivate automatic labeling for a label from the **Layers** window.

To deactivate automatic labeling:

- Click the **Automatic Labels**  icon beside the layer name that you want to turn labeling off for.


The map redraws, so that labels for this layer are no longer visible.

Working with Text or Objects

You can add text to a **Map** window to add labels or to annotate your map in some way. MapInfo Pro treats the text you enter as an object.

Entering Text

To enter text into the current **Map** window:

1. From the **Explorer** window, click the **Editable**  icon for the layer you want to add the text to.
2. On the **SPATIAL** tab, in the **Create** group, click **Insert** and **Text**.
3. Click the mouse button to place the cursor where you want the text to display. Do not worry about the precise location, you can drag the text to another location later, if necessary.
4. Type the text you want to display.
5. Click elsewhere on the map to save this entry.

If you want to change the text or text properties, double-click the text object to display the **Text Object** dialog box. Here you can change the content, the font size and style, the line spacing, the justification, the rotation, and the label line.

Deleting Text or Objects

To delete objects in a **Map** window, the text or objects must be editable and selectable. The selection is not placed on the clipboard.

To delete text or objects:

1. Select the text or object you want to delete.
2. Do one of the following:
 - Press the **Backspace** key.
 - Press the **Delete** key.
 - On the **SPATIAL** tab, in the **Clipboard** group, choose **Cut**.

The selected text or object is deleted. You can use the **Undo** command immediately after using **Cut** to reverse the action.


The **Clear** command clears the selection, not the object or text.

Specifying the Font Styles of Existing Text

The Text Style command on the **SPATIAL** tab applies to text, text objects, and all text in browsers.

Text Style does not apply to symbols, lines, or closed objects such as rectangles. To change them, on the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Symbol Style**, **Line Style**, and **Region Style**.

To change the font styles of existing text:


1. In the **Explorer** window click the **Editable**  icon for the layer where the text resides.
If you are changing text objects, make the Cosmetic Layer editable.
2. Select the text or text objects you want to change.
3. On the **SPATIAL** tab, choose **Text Style** from the list in the Create group. The **Text Style** dialog box opens.
4. Choose a font, size, and color.
5. Choose **OK**. The text's font, size, and color change according to your selections.
6. To make your changes permanent, save your table.

Specifying the Font Styles of New Text

The Text Style command applies to text, text objects, and all text in browsers

Text Style does not apply to symbols, lines, or closed objects such as rectangles. To change them, on the **SPATIAL** tab, in the **Create** group, click **Symbol Style**, **Line Style**, and **Region Style**.

To specify the font styles of new text:

1. In the **Explorer** window click the **Editable**  icon for the layer where the text resides.
If you are creating text objects, make the Cosmetic Layer editable.
2. On the **SPATIAL** tab, choose **Text Style** from the list in the Create group. The **Text Style** dialog box opens.
3. Choose a font, size and color.

MapInfo Pro honors the use of non-TrueType fonts, but we recommend the use of TrueType fonts wherever possible.


When you use the **Text Style** dialog box, you may notice that only TrueType fonts display in the Font list by default. If you have used a non-TrueType font in an old workspace or table, this font appears in the Font list. If you use a non-TrueType font in an existing workspace or .TAB file and begin using the curved labels feature, MapInfo Pro substitutes the font you are using with a TrueType font.

4. Create the text or text objects. The text displays with the font, size, and color you selected.
5. Click **OK** to save your text.

Erasing an Object or a Portion of an Object

You can erase either closed objects (regions, ellipses, rectangles, rounded rectangles) or open objects (polylines, lines and arcs) using the **Erase Target** command. You cannot use **Erase Target** on points or text objects.

To erase an object or a portion of an object:

1. In the **Explorer** window click the **Editable**  icon for the layer containing the objects to erase.
2. Select the object(s) to be the target for editing, and on the **SPATIAL** tab, in the **Edit** group, click **Set Target**.
3. Create and select the erasing object (or use objects from the same or another layer). The erasing object must be closed.
4. On the **SPATIAL** tab, in the **Edit** group, click **Erase Target**.
5. At the **Data Disaggregation** dialog box, set the field functions to be either blank, value or area proportion.
6. Click **OK**.


The target object is erased where the erasing object was.

Erasing the Outside of an Object

You can erase either closed polygons (regions, ellipses, rectangles, or rounded rectangles) or open objects (polylines, lines and arcs) using the **Erase Outside Target** command. You cannot use **Erase Outside Target** on points or text objects. The erasing object must be selected.

The difference between **Erase Outside Target** and **Erase Target** lies in which portion of the map object is removed. **Erase Outside Target** removes the portion of the target object outside the erasing object while **Erase Target** removes the portion inside the eraser.

To erase the outside of an object:

1. In the **Explorer** window click the **Editable**  icon to make the layer editable.
2. Set the object(s) to be the target for editing.
3. Create and select the erasing object (or use objects from the same or another layer). The erasing object must be closed.
4. On the **SPATIAL** tab, in the **Edit** group, click **Erase Target**, and **Erase Outside Target**.
5. At the **Data Disaggregation** dialog box, set the field values to be either blank, value or area proportion.
6. Click **OK**.

The target object is erased *except* where the erasing object was located.

Removing Associated Data after Using Erase Outside Target

Data disaggregation removes the data associated with the portion of the map object that is eliminated during the **Erase Outside Target** and **Erase Target** operations. For instance, if you edit your sales territory using **Erase Outside Target** to remove all but a 25 mile zone around the home office, you

can remove all the data from the target object (your sales territory) except that which is proportional to the zone's area.

The **Data Disaggregation** dialog box displays after you initiate the **Erase Outside Target** command. For each field choose whether the data from the target region is maintained (by choosing **Value**), removed (by choosing **Blank**) or proportioned (by choosing **Area Proportion**).

Undoing Your Last Action

If you perform an action that produces an unwanted result, you sometimes can reverse or undo the action.

To undo an action, on the **SPATIAL** tab, in the **Clipboard** group, click **Undo**.

The **Undo** feature is affected by the number of undo objects specified in the **System Preferences** dialog box (on the **PRO** tab, click **Options**, and **System Settings**).

Note: You cannot undo the following: **Revert**, **Save**, **Save As**, or **Modify Table**, or any operations whose effects are primarily cosmetic.

Understanding the Cosmetic Layer

Every Map window in MapInfo Pro has a Cosmetic Layer. Think of the Cosmetic Layer as the blank transparency that lies on top of the other map layers (transparencies). It can store map titles and other graphic objects you create during a work session. The Cosmetic Layer is always the top layer of the map. You cannot remove or reorder the Cosmetic Layer.





You can only make the Cosmetic Layer editable or selectable. Other layer options (labeling, zoom layering, display mode) are not available for the Cosmetic Layer. To select fill patterns, line types, symbols, and text font for the Cosmetic Layer, use the **Line Style**, **RRegion Style**, **Symbol Style** and **Text Style** commands on the **SPATIAL** tab, in the **Create** group, from the **Style** list.

The contents of the Cosmetic Layer are linked proportionally to the map. Map objects (except for symbols) and text in the Cosmetic Layer are proportionally linked to the zoom level of the map. If you draw objects in the Cosmetic Layer and then change the map's zoom from 30 to 100 miles, the size of the objects will appear smaller.

Using the Cosmetic Layer

The Cosmetic Layer is the topmost layer of a Map window. It contains labels, map titles and other graphic objects and can be used for drawing. It is always displayed. In the **Layers** window, you can make the Cosmetic Layer editable or selectable. This allows you to make changes to any labels or objects you have created in this layer.

To make the Cosmetic Layer editable or selectable:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Click the **Editable**  icon to make the layer editable.
3. Click the **Selectable**  icon to activate it for the Cosmetic Layer.

CAUTION: Objects created in the Cosmetic Layer are not saved when you close a Map window. You must save them to a table (either an existing table or a new one).

Removing Cosmetic Objects

To clear objects from the Cosmetic Layer:

- In the **Explorer** window, right-click on the map name and choose **Clear Cosmetic Layer**.
- On the **MAP** menu, in the **Content** group, click **Cosmetic**, and click **Clear Cosmetic Layer** from the list.

Removing All Objects from the Cosmetic Layer

To remove all objects from the cosmetic layer:

1. In the **Explorer** window, right-click on the map name and choose **Clear Cosmetic Layer**.
2. Click the **Discard** button. All objects are removed from the Cosmetic Layer.

Saving Cosmetic Objects

When you close a Map window, MapInfo Pro does *not* save the objects in the Cosmetic Layer automatically. To save objects drawn on the Cosmetic Layer, you must either save the table to a workspace or to a table. When you close a Map window without saving the Cosmetic objects first, MapInfo Pro prompts you with the **Save Map Objects** dialog box to encourage you to do so. You can turn this prompt off in **Map Preferences** dialog box.

To save the objects in the Cosmetic Layer to a workspace:

1. Click the **Close** button in the upper right hand corner of the Map window. The **Save Map Objects** dialog box displays.
2. Click **Save** to display the **Save Workspace** dialog box.
3. Type the name of the workspace in the **File name** field and click **Save**.

You can also save the contents of the Cosmetic Layer to a table.

Saving Objects on the Cosmetic Layer

You can save cosmetic objects to an existing table and to a new table.

To save cosmetic objects:

1. On the **MAP** tab, in the **Content** group, click **Cosmetic**, and click **Save Cosmetic Objects** from the list (or right-click on the **Map** window). The **Save Cosmetic Objects** dialog box displays.

The drop-down list displays the available layers or allows you to create a new layer. MapInfo Pro displays a list of all open mappable tables, regardless of whether the table is part of the current Map window.

2. Do one of the following:
 - To save the objects to an existing table, choose the table to which you want to transfer the cosmetic objects from the list.
 - To save the objects to a new table, choose the **New** option in the dialog box. Select the path for the new table and enter the name in the **Save Objects to Table** dialog box. Click **Save**.
3. Click **Save** in the **Save Cosmetic Objects** dialog box.

MapInfo Pro either saves the cosmetic objects to the specified table or creates the new table and saves the cosmetic objects to it. New tables are saved as the top layer in the current Map window.

Disabling the Save Cosmetic Objects (Warning) Dialog Box


To disable the **Save Cosmetic Objects (Warning)** dialog box:

1. On the **PRO** tab, in the **Options** group, click **Map Window** to open the **Map Preferences** dialog box.
2. Clear the **Cosmetic Objects** check box.
3. Clear the **Map Labels** and **Thematic Layers** check boxes.
4. Click **OK** to confirm.

Making the Layers "Editable"

To make changes to the graphic objects in a layer, you must make the layer editable. You can draw objects on that layer, add text, combine, or delete objects. You can only make one layer editable at a time.

To make a layer editable:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Click the **Editable**  icon to make the layer editable.

You can also control whether the layer is editable via the **Status Bar** at the bottom of your screen.

To change the editable layer from the **Status Bar**:

1. Click the **Editing** box to display a list of the layers used in the **Map** window.
2. Choose the layer you want to make editable. Its name displays in the **Status Bar**.
3. To deactivate the ability to edit all the layers, choose **None**.

Making a Read-Only Table "Editable"

If you are working with tables that were opened from Excel, Lotus, or ASCII files, you may have noticed that they come in as read-only tables. Because the files are not in native MapInfo Pro formats or standard DBF format, MapInfo Pro is unable to edit the tabular information contained in these tables.

If you wish to modify the table information, you must save a copy of the table. You can do this when you open the table in MapInfo Pro by selecting the **Create copy in MapInfo format for read/write** check box before selecting **Open** in the **Open** dialog box.

To make read-only tables (layers) editable:

1. Open the read-only table you want to make editable.
2. In the **Open** dialog box, select the **Create copy in MapInfo format for read/write** check box before selecting **Open**.

OR, continue with the following steps.

1. On the **HOME** tab under the File group, click **Save Copy As**.
2. Choose a new name for the file.
3. Click **Save**. There is now a copy of the Excel file saved in MapInfo Pro native format. Open the new file, and you will have full edit capabilities.

See Also:

- [Drawing Autolabels](#)

Getting Layer Information

You can use the Info command to get information pertaining to the map layer.

To get information about an object in a particular layer:

1. Make sure the layer you want information about is the selectable layer.
2. On the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info** to open the **Info** window.
3. Click on the object that you want information about.

Note: If the information that displays is not what you were looking for, check to see that the layer you are interested in getting data for is selected.

Press the **Ctrl** key while clicking on objects to toggle through all selectable layers and access overlapping objects.

When you click a map location using the **Info** command where two or more selectable map objects overlap, the data tied to the objects on each layer display in the **Info** window. If you do not want the information for all layers to display, turn off **Selectable** for those layers in the **Layers** window.

You can also view an object's label expression in an InfoTip when you use the **Select**, **Info**, or **Label** commands. InfoTips work very much like ToolTips. Using one of these commands, place your cursor over an object. An InfoTip displays the label expression for the object in the topmost selectable layer. To set InfoTips for a particular layer, adjust the Selectable attribute in the **Layers** window so that the tips display for the layer you want. InfoTips are active by default, but you can turn them off in the **Map** window preferences (on the **PRO** tab, click **Options**, and **Map Window**).


See Also:


- [Drawing Autolabels](#)

Selecting Objects in a Layer


If you only want to select objects for further analysis rather than edit the objects, make the layer selectable. More than one layer can be selectable at a time. If a layer is editable, it is also selectable.

Many MapInfo Pro functions require that map objects be selected before performing the particular operation. To use **Select**, **Label**, or **Info** you must first make the layer selectable. Unlike the editable feature, more than one layer may be selectable at the same time. You may, however, only select from one layer at a time.

The **Select** command selects objects from the topmost Selectable layer. To select an object that is not in the top Selectable layer, you can turn off the Selectable option in the **Layers** window for every layer above the layer you want to select from by selecting a layer's **Selectable**  icon to deactivate it. Alternatively, you can leave all layers Selectable and use the **Ctrl** key in combination with the **Select** button to cycle through each Selectable layer.

Note: The instructions for making a layer editable are the same, except that you select **Editable On/Off**  instead.

To make a layer selectable:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window.
2. Click the **Selectable**  icon to make the layer selectable.
3. Click **OK** to return to the Map window.

To make more than one layer at a time selectable, select the layers you want and then select the **Selectable** icon for one of the layers.

For example, if you want to find all customers who live within a fifty kilometers radius of Paris, make the Street layer selectable. If the map also includes a layer of hospitals (which you do not want to include in the radius search), turn off the Selectable option for the hospital layer.

The Editable or Selectable options only apply to the Map window itself. You can always select objects using the Select or SQL Select commands regardless of whether a layer is selectable.

See Also:

- [Drawing Autolabels](#)

Working with Raster and Grid Layers

A raster image is a type of computerized image that consists of row after row of tiny dots (pixels). If you have a scanner and scanner software, you can create a raster image by scanning a paper map. After you scan a map image and store the image in a file, you can display the file using MapInfo Pro.

In contrast, vector images contain coordinate-based data structures represented by x and y coordinates (most of MapInfo Pro's data is in vector format).

The *Help System* contains these related topics:

- *Registering the Coordinates of a Raster Image*
- *Working with Raster Images*

Displaying a Raster Image

To open a raster image:

1. On the **HOME** tab, on the **File** group, from the **Open** list, click **Table**.
2. Select **Raster Image** in the **Files of type** drop-down list.
3. Navigate to the directory in which your raster image is located and click the file you want to open.
4. Click **Open** to display the **MapInfo (Display or Register)** dialog box.

If you are going to work with the raster image, you need to register it and specify a projection within which to work.

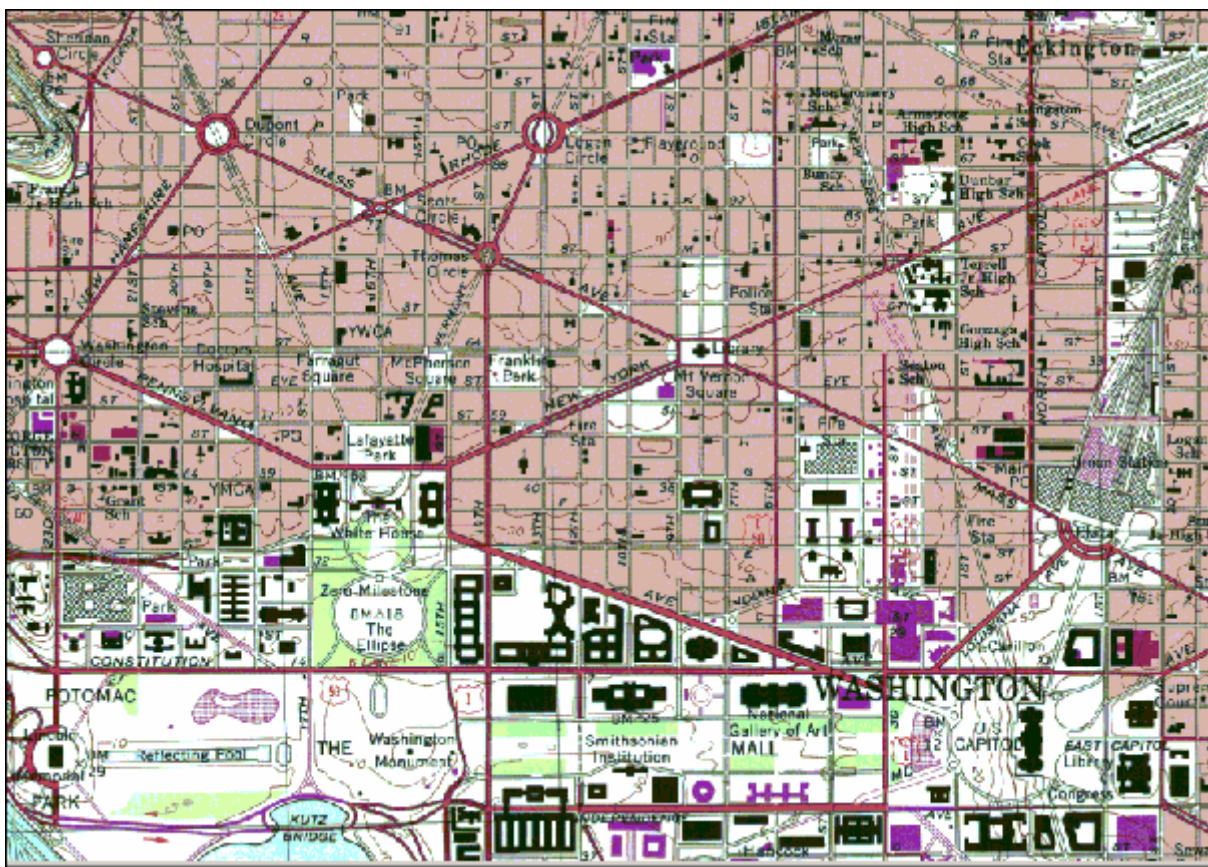
5. Do one of the following:
 - Click **Display** to simply display the raster image.
 - Click **Register** to set up registration points for the raster image.

Changing the Display of a Raster Image

Raster images can also be layers in MapInfo Pro. They appear in the **Layers** window just like any other layer. You can change the display style of a raster layer within the **Layers** window.

To change the display of a raster layer:

1. On the **Layers** window, double-click the raster layer name. The **Layer Properties** dialog box displays.
2. On the **Layer Display** tab, select the **Style Override** check box and click a **Style** button. The **Adjust Image Styles** dialog box displays, where you can make changes to the transparency, brightness, contrast, and translucency settings.
3. Click **OK** to save your changes.



In MapInfo Pro, raster images are used as display layers only. They cannot have any data attached to them like vector map images. Raster images are particularly well-suited for use as a backdrop for vector map layers because they provide a much greater level of detail than vector maps.

Understanding the Adjust Image Styles Options

You can display additional map layers, such as StreetPro street maps, on top of a raster image. However, when you overlay raster and vector data in this manner, you may find it hard to tell which lines are part of the raster image and which lines are part of the vector data. Adjusting the display style of the raster image can make it easier to differentiate the separate layers. For example, if you set the image Contrast to a low setting, such as 30%, and set the image Brightness to a high setting, such as 70%, MapInfo Pro displays the image in a subdued style, which is appropriate if you want the raster layer to act as a backdrop.

If your raster image was scanned in and the resulting image is too dark or light, use the controls in the **Adjust Image Styles** dialog box to correct the display of the image.

Adjusting the Translucency of a Raster Image

You can adjust the percentage that layers show through raster images. A translucent image allows you to partially see through the image. Translucent images can be layered on top of other layers so that the lower layers are partially visible through the image.

To adjust translucency of a Raster Image:

1. Open a raster image table.
2. On the **TABLE** tab, in the **Maintenance** group, click **Raster**, and **Adjust Image Styles**.
3. If the **Choose Raster Table** dialog box opens, select the raster file to adjust and click **OK**.
4. In the **Adjust Image Styles** dialog box. Use the **Translucency** slider control to adjust the percentage that layers show through the raster image.

Translucency can be set between 0-100%. An image with 0% translucency is completely opaque (or cannot be seen through). An image with 100% translucency is completely transparent (or completely invisible).

5. Click **OK**.

This setting becomes your default setting for the raster table (TAB file). You can override the default setting by adjusting translucency per layer on a map.

Adjusting the Translucency of a Raster Layer on the Map

You can adjust the translucency on a per layer basis for your map. This overrides, but does not change, the default translucency setting for a layer (set for the TAB file). This is useful when you want to see the layers of your map under a raster overlay, but you do not want to change the translucency set for the raster file.

To adjust the translucency of a raster layer on your map:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

If you have the **Explorer** window open, you can use the layers list in it.

2. Double-click on the layer name in the **Layer** list to open the **Layer Properties** dialog box.
3. On the **Layer Display** tab, use the **Translucency** scale bar to adjust the translucency level of the raster image.

For more adjustments, including translucency, check the **Style Override** check box and then click the **Style** button. This opens the **Adjust Image Styles** dialog box where you can make contrast, brightness, greyscale, and translucency adjustments, and you can make the layer transparent.

4. Click **OK** to save your changes and close the dialog.

Working with Seamless Layers

Use or create a seamless map layer to treat a group of base tables as if they were one. A seamless layer allows you to change display attributes, apply or change labeling or use the **Layers** window for an entire group of tables at once. You can also retrieve information using the Info command, and select or browse any one of the layer's base tables. A base table can be any regular MapInfo Pro table. Grid layers cannot be made seamless.

This feature is especially useful when you want to display a vector or raster backdrop for your maps such as joining street or boundary maps. For example, you may have a seamless layer of county boundaries made up of several individual county tables.

When zooming in on a seamless layer, MapInfo Pro only opens data for displaying the map at the specific zoom level-only those component tables on display open. If you change the zoom level, then MapInfo Pro analyzes which tiles to open and which tiles to close, and does not cache the data. Specific raster handlers open raster images, which are usually slower than vector tables.

Features Available with Seamless Layers

Since a seamless layer is actually made up of several base tables, MapInfo Pro does treat it a little differently than a regular MapInfo Pro table. You can use the following MapInfo Pro features with a seamless map layer:

- **Layer control** - Use any of the functions except thematic mapping from the **Layers** window on your seamless layer. Add, remove, or reorder layers or set display, zoom layering or label options for the seamless layer (*all* base tables) at one time. However, you cannot make a seamless layer editable.

- **Info Command** - Retrieve information about a particular object in a base table.
- **Select commands** - Select objects from the seamless layer. You can only select a group of objects if they reside in the same base table. Press the **Shift** key while using the **Select** command to do so. If you attempt to select several objects that reside in different base tables, MapInfo Pro will only select objects in one base table. If you use the **Marquee Selection** or **Radius Selection** commands and the selected area spreads across two different base tables, MapInfo Pro selects the table in either the center of the circle or polygon.
- **Browse table** - Display a Browser window of a particular seamless table. You are prompted to select a base table.

Turning Seamless Layers On and Off

If you need to edit the structure of your seamless layer, you will need to turn your seamless layer off.

To turn your seamless layer off:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic** from the list, to open the **MapBasic** window.
2. Type `set table "tablename" seamless off`. MapInfo Pro turns off the seamless layer.
3. Display the table in a Browser to view or edit its table structure. If you edit the table structure, you will need to recompile the seamless layer.

MapInfo Pro turns off the seamless layer. Display the table in a Browser to view or edit its table structure. Use the Seamless Table Manager to add or create seamless tables.

To turn the seamless layer on:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic** from the list, to open the **MapBasic** window.
2. Type `set table "tablename" seamless on`. MapInfo Pro turns the seamless layer on again.

Opening a Seamless Map Layer

MapInfo Pro includes sample seamless maps or you can create your own. Some of these data files are available on the Precisely web site in the MapInfo Pro Tutorial data. We recommend you download this data for use with these examples.

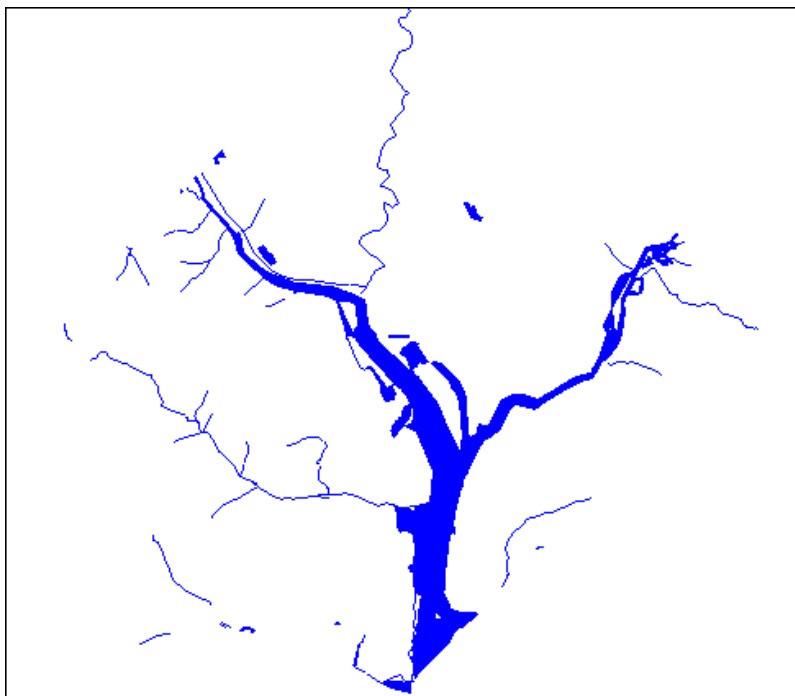
From the `mapinfo\tutorial\tut-usa\usa\dc\seamless` directory, choose **dcmetrow**. A seamless map layer of water areas in Washington DC displays. Notice at first glance that the seamless layer looks like any other MapInfo Pro table. However, the `Dcmetrow` seamless map layer is made up of the following base tables:

- VAARLIW.TAB (Arlington Virginia water areas)
- VAALEXW.TAB (Alexandria Virginia water areas)
- DCWASHW.TAB (Washington DC water areas)

To display a sample seamless map:

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Open**.
2. From the data directory, choose a seamless layer.

The following is an example of a map layer of water areas in Washington DC.



The structure of each seamless layer includes the path name of each base table plus a description that defaults to the table name (alias). To view the table structure, turn the seamless layer off and display the seamless table in a Browser. Refer to [Turning Seamless Layers On and Off](#).

Characteristics of a Seamless Layer

Since a seamless layer is actually made up of *several* base tables, MapInfo Pro does treat it a little differently than a regular MapInfo Pro table. You can use the following MapInfo Pro features with a seamless map layer:

- **Layers.** Use any of the functions except Thematic Mapping from the **Layers** window on your seamless layer. Add, remove, or reorder layers or set display, zoom layering or label options for the seamless layer (*all* base tables) at one time. However, you cannot make a seamless layer editable.

- *Info*. Retrieve information about a particular object in a base table.
- *Select Commands*. Select objects from the seamless layer. You can only select a group of objects if they reside in the same base table. Press the **Shift** key while clicking the Select button to do so. If you attempt to select several objects that reside in different base tables, MapInfo Pro will only select objects in one base table. If you use the Marquee or Radius select buttons and the selected area spreads across two different base tables, MapInfo Pro selects the objects in the center of the circle or polygon.
- *Browser Table*. Display a Browser window of a particular seamless table. You will be prompted to select a base table.

Creating/Compiling a Seamless Layer

To create your own seamless layer, run the Seamless Table Manager. Your seamless layer will be most useful if you use homogeneous tables that ideally have the same projection and the same number of columns. For example, you may want your seamless layer to contain several counties, each stored in a separate base table, or an interstate highway that runs between several states, each stored in a separate base table. If your tables are not homogeneous, maps and labels will not display correctly and map items will not be selectable. Grid tables cannot be made seamless.

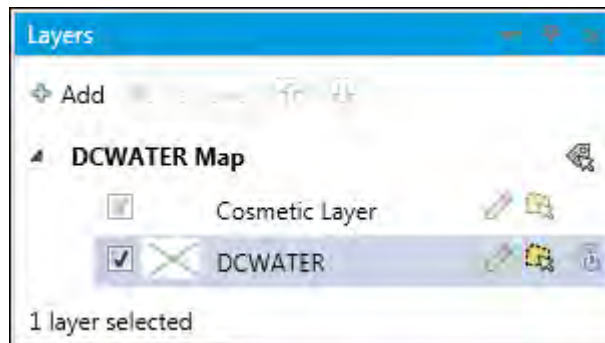
To use the Seamless Manager:

1. On the **HOME** tab, click **Tool Extensions** in the **Tools** group, to open the **Tools Manager**.
2. On the Registered tab, check the **Autoload** check box alongside Seamless Manager if you wish to have it load when MapInfo Pro starts. See *Loading a Tool* in the *Help System*.
3. Click the Load Tool (Run) command that displays alongside the Seamless Manager entry.
4. Under the Running tab, double-click on Seamless Manager to start the tool. Click on the Help icon to learn more about the tool.

You use the tools of the Seamless Manager to create and compile a seamless layer.

Experimenting with a Seamless Layer

Open a seamless layer, click **Layers** to display the **Layers** window.



In the **Layers** window, you can add, remove, or reorder seamless layers as if they were conventional MapInfo Pro layers. You can also set Label and Display options for *all* the tables in the seamless layer as if they were one table. Notice the editable option for a seamless layer is grayed.

Choose your seamless layer and experiment with order, display, and labeling options.

To retrieve information from a seamless layer:

1. On the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info**.
2. Click the object on the map for which you want information, which displays in the **Info** window. This information includes the name of the base table in which the object is stored.

To browse the seamless layer:

1. On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Browser** from the list, to open the **Browse Table** window.
2. Select a layer (table) from the list and click **OK** to open the **Select Base Table** dialog box.
3. Type the name of the base table you want to browse. We typed XX to indicate an unknown table. A **Browser** window with the base table you selected displays. If a base table matching your description is not found, a list of possibilities displays.

Keep in mind, base tables are treated like any other MapInfo Pro tables. Once a base table from a seamless table is browsed, it will be opened as any other regular MapInfo Pro table.

4. To select a base table from the list, highlight it and click **OK**.

Specifying Search Paths for Component Tables of Seamless Layers

You can set search paths to look for the component tables of a seamless layer.

To set the search path for the component tables of a seamless layer:

1. On the **PRO** tab, click **Options**, and **Directories** to open the **Directory Preferences** dialog box.
2. In the **Search Directories for Tables** group, click **Add**.
3. Specify a drive and directory in the **Choose Directory** dialog box and click **OK**.

You can set up to four paths. Use the Up and Down keys to change the search order and use the **Add** and **Remove** buttons to add or remove paths from the list.

4. Click **OK** to close the dialog box.

See Also:



- [Turning Seamless Layers On and Off](#)
- [Using the Tools in the Tools Manager](#)

Working with MapInfo Manager Library Services

The Library Service lets you access the metadata records published in MapInfo Manager. You can access Library Services on the **PRO** tab, by clicking **Options**, and **Web Services**. Settings are on the **Library Services** tab.

For enabling the Library Services, refer to *Setting the Library Services Preferences* in the *Help System*.

After setting the Library Services preferences to **Catalogs and Library**, the Tables window shows the status of the tables and if they are managed or not by the MapInfo Manager library.

- If the table list shows  against a particular table, it means the table is managed by the MapInfo Manager.
- If the table list shows  against a particular table, it means the table is not managed by the MapInfo Manager.
- If the table list shows no icon against a particular table, it means that the table is not manageable, such as a selection table, query table, or seamless table.

To manage a table, on the **TABLE** tab, in the **Maintenance** group, click **Library**, and **Add to Library**.

Add to Library

To create a metadata record for a table in MapInfo Manager Library:

1. On the **TABLE** tab, in the **Maintenance** group, click **Library**, and **Add to Library**.
2. In the **Select Table for Adding to Library** dialog box, select the table you want to add to the library. This operation can be performed only if the **Catalogs and Library Mode** is selected from **Library Service Preferences** and at least one unmanaged native table is open.
3. In the **Select Library Folder** dialog box, select a writeable folder where you want to add the table.

This dialog displays the folders published by a Library Service in a hierarchical structure. You can select the appropriate check boxes from the **After upload is complete** section to get the preferred operations after the table uploads. If the table is added successfully, its metadata window is displays.

- **View Metadata of Managed Table** - If this option is enabled, MapInfo Pro displays metadata for the uploaded table. This option will persist across different sessions of MapInfo Pro.
- **Open Managed Table** - If this option is enabled, MapInfo Pro opens a managed table in a separate mapper window. This option will persist across different sessions of MapInfo Pro.

Saving, Closing, and Exporting Your Work

Preserving your work is an important part of being productive. MapInfo Pro has a wide variety of ways you can save what you are working on, depending upon what needs to be saved and how you need to retrieve it.

Saving a MapInfo Workspace

If you work with the same tables repeatedly, you know that opening each one individually every time you use it can be tedious. With MapInfo Pro's workspace feature, you can automate this process so you can get back to the business of creating maps and analyzing data sooner.

When you work with MapInfo Pro you generally use many different tables and windows. A Map window, for instance, is likely to be built of several layers. MapInfo Pro uses *workspaces* to save your work setup from session to session. Workspaces prevent you from having to reassemble all the pieces of your earlier setup from scratch. So, you do not have to reopen tables, re-create maps or layouts, resize windows, or do anything else just to duplicate what was on your desktop the last time you were using MapInfo Pro.

CAUTION: Saving a workspace will not save edits you have made to tables in the workspace.

If you close a window or table and you have thematic maps, graphs, label settings or label edits, or cosmetic objects pending, MapInfo Pro will prompt you to save the session to a workspace.

To save your current work setup:

1. On the **HOME** tab, in the **File** group, click **Save Workspace**, and select **Save Workspace As** from the drop-down list.
2. In the **Save Workspace** dialog box, type a name for the workspace and select the directory location to save it to.

There are two MapInfo workspace formats, WOR and MWS. A .wor file is written using MapBasic and a .mws file is written using XML. The MWS format contains more information about the data sources than the WOR format does. Depending on the MapInfo product you are working with you may open and/or save to one or both formats.

3. Click **Save**.

When you start your next session, you can open this workspace right from the **Quick Start** dialog box and continue where you left off.

You can change the directory path that MapInfo Pro uses for opening or saving workspaces as a directory preference: on the **PRO** tab, click **Options**, and **Directories**.

To change the directory path for opening/saving workspaces:

1. On the **PRO** tab, click **Options**, and **Directories**.
2. In the **Directory Preferences** dialog box, in the **Initial Directories for File Dialogs** list, highlight the **Workspaces** path and do one of the following:
 - Click **Modify**.
 - Double-click the path.

Using either method, the **Choose Directory** dialog box displays.

3. Select the path you want to use, and click **OK**.

If you have edited a table (added, deleted, or modified items) you must explicitly save those changes first using **Save Copy As** or **Save Workspace As** commands on the **HOME** tab.

Saving a Map Window as a .TAB File

You can save the current **Map** window and automatically register it by creating a .TAB file.

To save the current map as a .TAB file:

1. On the **HOME** tab, in the **Output** group, click **Save**, to open the **Save Window to File** dialog box.
2. Select the path of the file and type the file name in the field provided. Click **Save** to open the **Save Window As** dialog box.
3. Select the **Create a Geographically Referenced Tab File** check box and click **Save**.

MapInfo Pro automatically creates registration points based on the current map view and saves it as a .TAB file. The file you created is the first file in the **Recent Files** list on the **HOME** tab, in the **File** group, when you click **Open**.

Note: If MapInfo Pro cannot create registration points for the window image, an error message displays. This might happen if you pan outside the bounds of the map.

To specify advanced export options from the **Save Window As** dialog box, click the **Advanced** button to open the **Advanced Exporting Options** dialog box.

See *Advanced Exporting Options Dialog Box* in the *Help System*.

1. Specify the settings you want to use for exporting a window.
2. Click **Save**.

Specifying the Resolution (DPI) when Exporting Raster Images

To specify resolution (DPI) when exporting images to Raster formats:

1. On the **HOME** tab, in the **Output** group, click **Save**, to display the **Save Window to File** dialog box.
2. Click **Save** to open the **Save Window As** dialog box.
3. Set the **Height** and **Width** in pixels and select the Resolution in DPI (dots per inch).
4. Click **Save**.

Saving Your Workspace as an XML-Based MWS File

You can save the maps in your workspace out to an XML format for use with MapXtreme. When saving a workspace to MWS format, only the map windows and legends are saved. All other windows are discarded as MapXtreme applications cannot read that information. Once your workspace is saved in this format, it can be opened with the Workspace Manager utility that is included in the MapXtreme installation or with an application developed using MapXtreme. The file is valid XML you can view it using any XML viewer or editor.

You can set the visibility of a modifier theme without regard to its reference feature layer, so you can turn the visibility of the main reference layer off but still display the theme. In MapXtreme, the modifier themes (Dot Density, Ranges, Individual Value) are only drawn if the reference feature layer is visible. To ensure that modifiers marked as visible in MapInfo Pro display in tools like Workspace Manager, we force the visibility of the reference feature layer so that its modifier themes display.

To save a workspace in the MWS format:

1. Create the workspace you want to save.
2. From the **HOME** tab, in the **File** group, click **Save Workspace/Save Workspace As**, to display the **Save Workspace** dialog box.
3. In the **Save as type** drop-down list, select **MapInfo Workspace Format (*.mws)** and type the name of the workspace in the File name field.
4. Click **Save**. Your workspace is now saved and is available for use in MapXtreme applications.

What is saved in MWS Workspaces

The following information is included in the MWS workspace file:

- Tab files' name and alias;
- Coordinate system information;
- Map center and zoom settings;
- Layer list with implied order;

- Map size as pixel width and height;
- Map resize method;
- Style overrides;
- Raster layer overrides;
- Automatic labels;
- Custom labels;
- Queries referenced by map windows;
- Individual value themes;
- Dot density themes;
- Graduated symbol themes;
- Bar themes;
- Range themes;
- Pie themes;
- Grid themes as MapXtreme grid layers with a style override;
- Themes and label expressions based upon a single attribute column;
- Zoom-ranged overrides.
- Queries are saved when the Save Queries to Workspace option is selected in the Startup Preferences

Note: There is label and thematic expression support for the MWS (XML-based) workspace files in MapInfo Pro. When saving themes and label expressions to a MWS file, we translate the expressions into the MapInfo SQL language supported by MapXtreme.

What is Not Saved in MWS Workspaces

The following information is not saved in the MWS workspace file:

- Any non-map windows (Browser windows, charts, redistricters, 3D map windows, Prism maps, Layout windows);
- Distance, area, or XY and military grid units;
- Snap mode, autoscroll, and smart pan settings;
- Printer setup information;
- Any table that is based on a query that is not referenced by a window;
- Labels based on expressions that cannot be translated from MapBasic syntax to MI SQL syntax;
- Queries with "sub-select" statements;
- Layers based on queries that includes "sub-select" statements;

Note: A "sub-select" statement is any **Select** statement nested inside another **Select** statement.

- Export options;
- Hot links for labels and objects;
- Group layers;

- Whether object nodes, centroids or line direction is displayed.

Caveats for Saving Label Expressions to MWS

- If MapInfo Pro cannot translate the label expression when writing MWS, MapInfo Pro replaces the entire label expression with the default. The default label expression is the same table field (column) used by the Label Display tab in the **Layer Properties** dialog box. No error message is generated in this case.
- The resulting label string may not be exactly the same in MapXtreme as it was in MapInfo Pro (particularly for functions that take formatting arguments). Our goal is to translate MapBasic to the equivalent MapInfo SQL, as closely as possible.

Caveats for Saving Thematic Expressions to MWS

- If MapInfo Pro cannot translate the thematic expression when writing MWS, MapInfo Pro skips the thematic layer and the thematic layer is not part of the MWS map definition. No error message is generated in this case.
- Any theme that is based upon computed columns, or based on an expression that cannot be translated from MapBasic syntax to MI SQL syntax.

Saving a Table or a Copy of a Table

To save changes to map objects or data, you must save the table. (On the **TABLE** tab, in the **Content** group, click **Save**, and **Save Table**.) A dialog box displays asking you to choose which table you want to save.

You can also save a copy of the table under a new name, using the **Save Copy As** command. This, in essence, creates a new table. This is helpful in several instances, as when you want to:

- Retain any changes while preserving the original table.
- Save a table with a temporary column (from Update Column).
- Create a new table before you make editing changes to the original table.
- Save spreadsheet files that you wish to modify in MapInfo Pro.
- Save a table in a different projection.

To save a copy of the table:

1. On the **TABLE** tab, in the **Content** group, click **Save**, and **Save Copy As** to open the **Save Copy of Table** dialog box.
2. Select the **Save in Background** check-box to execute the save operation in background.

Note: This option is supported and selected by default for input table types Native, NativeX, OGR and GPKG and for output to Native and NativeX.

3. Choose the file to save and click **OK**.

4. Give the file a new name.

The original table remains unchanged and open for all further changes. The new table does not open immediately after its creation, but can be opened for use at any time. When choosing a name for your new table that begins with a number, MapInfo Pro adds an underscore to the beginning of the table name. For instance, your table `1STREETS.TAB` will become `_1STREETS.TAB`.

Saving a copy of a raster table only saves a copy of the *.tab file, not the image. You cannot change the projection of a raster or grid table using **Save Copy As**. To do this, on the **TABLE** tab, in the **Maintenance** group, click **Raster**, and **Modify Image Registration**. Click the **Projection** button and then save the file from there.

Since MapInfo Pro supports long filenames, it is easier to give the new table a name that is descriptive and at the same time distinguishes it from the original file.

See also:

- [Using Data Files in Any Language or Character Set](#)
- *Saving Changes Made to a DBMS Table* in the *Help System*
- *Saving a Copy of a Table to a DBMS Server* in the *Help System*

Saving a Copy of Your Table as a New Table

You can create a new table from any open table that is not a raster table. The original table remains unchanged and open for all further edits.

To save a copy of your table as a new table:

1. Do one of the following:
 - If you have only one table open, then on the **TABLE** tab, in the **Content** group, click **Save Table**, and **Save Copy As** to open the **Save Copy of Table As** dialog box.
 - If you have several tables open, then on the **HOME** tab, in the **File** group, click **Save Copy As** to open the **Save Copy As** dialog box. Choose a table from the drop-down list.
2. Select the **Save in Background** check-box to execute the save operation in background.

Note: This option is supported and selected by default for input table types Native, NativeX, OGR and GPKG and for output to Native and NativeX.

3. Choose **Save** to open the **Save Copy of Table As** dialog box.
4. Type the name of your new table in the **File Name** box.
5. Specify the directory where the new file is to be saved.

Note: If the name of the file starts with a number, the table gets saved with a `_` prefix before the name.

6. Click **Save**.

The new table does not open immediately after it is created, but it can be opened for use at any time using the **Open** commands on the **HOME**.

Saving a Copy of Your Table in a Different Projection

To save in a different projection (default coordinate system):

1. Do one of the following:
 - If you have only one table open, then on the **TABLE** tab, in the **Content** group, click **Save**, and **Save Copy As** to open the **Save Copy of Table As** dialog box.
If the **Save Copy As** displays, select the table from the list and click **Save As**.
 - If you have several tables open, then on the **HOME** tab, in the **File** group, click **Save Copy As** to open the **Save Copy As** dialog box. Choose a table from the drop-down list. Click **Save** to open the **Save Copy of Table As** dialog box.
2. Select the **Save in Background** check-box to execute the save operation in background.
Note: This option is supported and selected by default for input table types Native, NativeX, OGR and GPKG and for output to Native and NativeX.
3. Type the name of your new table in the **File Name** box of the dialog box.
4. Specify the drive and directory where the new file is to be saved.
5. Click the **Projection** button to open the **Choose Projection** dialog box.
6. Choose a projection category and choose one of the projections in the category.
7. Click **OK**; MapInfo Pro returns you to the **Save Copy of Table As** dialog box.
8. Click **Save**.

MapInfo Pro creates the new table, but it is not open. When you want to work with the new table, you must first open it on the **HOME** tab, in the **Open** list, click **Table**.

Saving a Copy of Your Table to a Different Character Set

You can work with characters from any language in your data files, so that multi-language tables display properly in maps, browsers, the Info tool, and other locations. MapInfo Pro can open tables, files, or workspaces with Unicode characters in the file name or path name regardless of the locale of MapInfo Pro or which localized version of MapInfo Pro you are running.

You can also save a copy of a table to a different character set than the one currently in use. Though, we recommend that you do not save a copy of a table between Unicode and non-Unicode character sets.

Note: You can encounter data corruption, due to truncation or conversion, when saving a copy of a database table between Unicode and non-Unicode character sets. When saving non-UTF-8 (non-Unicode) to UTF-8 (Unicode), there is the potential for data truncation. When saving UTF-8 or UTF-16 (Unicode) to a non-Unicode, there is the potential for conversion issues.

When saving data to the MapInfo Extended TAB format (NativeX format), MapInfo Pro interprets the width of character fields in tables with a UTF-16 character set (charset) as the number of

characters with two bytes (16-bits) per character. It interprets the width of character fields in tables with any character set other than UTF-16 (such as WindowsLatin1, Cyrillic, and UTF-8) as the number of bytes. For non UTF-8 character sets each character takes up one byte, but could also take from one to four bytes. For UTF-8, since it is used to store characters from any language, it is more likely to require more than one byte. This means that you need to allow for larger field widths to avoid data truncation.

Using the UTF-16 character set is the best way to ensure that all data is preserved, but it results in larger file sizes. The UTF-8 character set can be used to encode all characters faithfully, but truncation could occur. When you save a copy of a table from a non UTF-8 character set to UTF-8, increase the field width to avoid truncation.

To save to a different character set:

1. Do one of the following:
 - If you have only one table open, then on the **TABLE** tab, in the **Content** group, click **Save**, and **Save Copy As** to open the **Save Copy of Table As** dialog box.
If the **Save Copy As** displays, select the table from the list and click **Save As**.
 - If you have several tables open, then on the **HOME** tab, in the **File** group, click **Save Copy As** to open the **Save Copy As** dialog box. Choose a table from the drop-down list. Click **Save** to open the **Save Copy of Table As** dialog box.
2. Select the **Save in Background** check-box to execute the save operation in background.
Note: This option is supported and selected by default for input table types Native, NativeX, OGR and GPKG and for output to Native and NativeX.
3. Type the name of your new table in the **File Name** box of the dialog box.
4. Specify the drive and directory where the new file is to be saved.
5. Select the file type from the **Save as type** list to save to.
You can only use Unicode character sets, UTF-8 and UTF-16, with the MapInfo Extended (*.tab) file type.
6. Click the **Charset** button to open **Select a Charset** dialog box.
7. Choose a character set from the list of those available.
8. Click **OK**; MapInfo Pro returns you to the **Save Copy of Table As** dialog box.
9. Click **Save**.

MapInfo Pro creates the new table, but it is not open. When you want to work with the new table, you must first open it on the **HOME** tab, in the **Open** list, click **Table**.

See also:

- [Using Data Files in Any Language or Character Set](#)
- *Setting Your Language Preferences in the Help System*

Save a Copy of Multiple Tables

To save a copy of multiple tables:

1. On the **HOME** tab, in the **File** group, click **Save Copy As** to open the **Save Copy As** dialog box. Select one or more than one table from the drop-down list. Click **Save** to open the **Save Copy of Table As** dialog box.
2. The following options are available in the **Save Copy of Table As** dialog box:
 - a. **Output Folder** - Folder to save the output tables into.
 - b. **Name Pattern** - Output file naming in pattern <prefix><filename><suffix>.
 - c. **Sample** - Displays sample based on the naming pattern.
 - d. **Save as Type** - Type of output table, MapInfo Extended (NativeX) or MapInfo (Native).
 - e. **Charset** - Character set of the output table, by default same as the source table.

Note: **Charset** is enabled only if all selected tables have an option to set charset.

- f. **Projection:** Select the **Override Projection** check-box to choose the output table projections.

Note: **Projection** is enabled only if all selected tables are mappable, and projection could be changed.

- g. **Open Table** - Select the **Open New Tables** check-box to set the **View**.

3. Select the **Save in Background when possible** check-box and click **OK** to execute the save operation in the background.

Note: This option is supported and selected by default for input table types Native, NativeX, OGR, and GPKG and for output to Native and NativeX.

Note: When saving the tables in the background, the new table will not be listed in MRU, but the table can be Opened using the task command.

Tables You Cannot Update

Although you cannot update the following tables, temporary columns can still be added.

- ASCII files
- Excel and Lotus files
- StreetInfo main tables. You cannot update component files (see the *User Guide* for editing street maps).
- Tables formed using SQL Select with a Group By clause
- Read-only tables

Choosing Ascending vs. Descending Sorts

By default, MapInfo Pro sorts the table in ascending order. If you sort using a character field, ascending order means that A's appear above B's, etc. If you sort using a numeric field, ascending order means that small numbers appear above large numbers.

To sort in descending order, so that large numbers appear above small numbers, place the word `desc` after the column name in the Group By Columns field. For example, if you query the World table, the following Order By criterion:

```
Order By Columns:  Population desc
```

sorts the table by the Population column, in descending order.

When MapInfo Pro performs a multi-level sort, each level of the sort has its own ascending/descending setting. Thus, the following example performs an ascending sort by the State column, and then performs a descending sort by the Population column:

```
Select Columns:    *
From Tables:      City_1K
Order By Columns:  State, Population desc
```

Column Name Syntax in the Order By Columns Field

In Order By Columns field, there are two ways you can enter a column name:

- Enter the name of the column (as in the column name State in the preceding example).
- Enter the number of the column, where 1 represents the first column listed in the Select Columns field. Do not type `col` before the number.

If you want to sort using a derived column, and the derived column has an alias, you may enter the alias name in the Group By Columns field. If the derived column does not have an alias, enter the number of the column (e.g. 1).

Rearranging a Table's Column Order

Sometimes the default order of columns in a table is not the order you want for a particular session. You may want to change the default order but not change the structure of the underlying table.

To rearrange a table's column order:

1. Move the cursor over the column heading in the **Browser** window. The cursor changes to a hand.
2. Click and drag the column heading left or right.
3. Release the mouse button when the column heading appears in the desired place.

Closing a Table

Closing a table removes it from active use in your current session. To close tables, on the **HOME** tab, in the **File** group, click **Close Table**. When you close a table, you automatically close all views of that table. If you close a table that is displayed in a **Map** window with other tables, MapInfo Pro removes that table from the window, but the **Map** window remains open.

In addition, any subset tables of the original table (known as query tables) also close. You can use the Close command for any table, whether or not it is displayed in a window. Opening and closing *tables* is different from opening and closing *windows* in which you view your tables. You can open a table without opening any views of the data. Similarly, closing a window does not close the table (or tables) you are viewing in the window. They are still open and available for use. To close a window, click the **Ctrl**-menu box in the upper-left corner of any window and select **Close**.

If you have made changes to a table but have not yet saved those changes, MapInfo Pro will ask you if you want to save them before closing the table. To save your changes, on the **HOME** tab, in the **File** group, click **Save**, and **Save Table**, or **Save Copy As** from the list.

Closing a Single Table

To close a table:

1. On the **HOME** tab, in the **File** group, click **Close Table** to open the **Close Table** dialog box.
2. Choose the table you want to close from the list.
3. Click **OK**.
 - When closing a table that you are currently editing, you are prompted to save the changes. The table is closed along with any windows associated with it.
 - When closing a window but not the associated table, click the **Ctrl-menu box** [Close box] in the upper-left corner of the window.

Closing All Open Tables

To close all open tables:

1. On the **HOME** tab, in the **File** group, click **Close All**. If you have edited one or more tables without saving before closing, a message displays for each table you edited prompting you to either save or discard your changes.
2. Click **Cancel** to leave your pending edits unsaved and the table remains open.

Closing Multiple Tables

To close multiple tables:

1. On the **HOME** tab, in the **File** group, click **Close Table** to open the **Close Table** dialog box.

- To close a contiguous block of tables, select the first table you want, hold down the **Shift** key and select the last table you want.
 - To close multiple tables that are out of sequence, hold down the **Ctrl** key and select the tables.
2. To deselect tables, hold the **Ctrl** key and click on the tables.
 3. When you have selected the tables you want to close, click **Close**.

Opening vs. Importing

You must open a table before you can use it. The Open command activates a dialog box for opening tables, (opening a table is described below). Choose the appropriate table by double-clicking on it in the dialog box.

Most programs require you to import files created in some other programs. MapInfo Pro allows you to work directly with files created in other programs. When you have a file in one of the following non-MapInfo Pro formats, you do not have to import it:

- dBase DBF
- Delimited ASCII
- Lotus 1-2-3
- Microsoft Access Database
- Microsoft Excel

By not importing data you save time; opening a file is quicker than importing it. You also save disk space. When you import a file, you make a copy of it. Since MapInfo Pro works directly with files from other programs, it does not have to make a copy.

When MapInfo Pro opens a file from some other program, it creates a file with a .TAB extension. This file describes the format of the file that actually contains the data. When you have opened a non-MapInfo Pro file, such as a Lotus file, in a previous session and attempt to open it again, the following prompt appears:

Table definition already exists. Overwrite it?

The table definition referred to is the .TAB file. It does not hurt anything if you continue. MapInfo Pro overwrites the .TAB file and opens the file.

When importing files, you cannot select a character set for **MapInfo (*.tab)** and **MapInfo Extended (*.tab)** file formats. MapInfo Pro uses the local system character set when creating MapInfo and MapInfo Extended tables.

Note: When importing GML files, you can specify a character set within the file itself, but MapInfo Pro does not use it. Instead, the resulting MapInfo or MapInfo Extended table uses the system character set. When importing MIF/MID files, the resulting MapInfo or MapInfo Extended table use the character set from the file header. If "Charset" is not in the file header, then the system character set is used. If the file header has a UTF byte order mark at the start of the file, then the UTF character set is used instead.

Exporting Your Data to a New Format

You can export your Map window to other file formats with the Save Window As command (on the **HOME** tab, in the **Output** group, click **Save Image**). This enables you to use your map in another application, such as word processing, presentation, or computer publishing packages.

Supported Export Formats

You can save data in a number of formats in MapInfo Pro. Windows .bmp is the initial default. The **Save Window to File** dialog box sets the last-used format as the default. Formats include:

- Windows Bitmap (*.BMP)
- Windows Metafile (*.WMF)
- Windows Enhanced Metafile (*.EMF)
- EMF + Metafile (*.EMF)
- EMF + Dual Metafile (*.EMF)
- JPEG File Interchange Format (*.JPG)
- JPEG 2000 (*.JP2)
- Portable Network Graphics Format (*.PNG)
- Tagged Image File Format (*.TIF)
- TIFF CMYK (*.TIF)
- TIFF CCITT Group 4 (*.TIF)
- TIFF LZW (*.TIF)
- Graphic Interchange Format (*.GIF)
- Photoshop 3.0 (*.PSD)

Exporting a Table to a new Format

If exporting to CSV or TXT, your column type must be set to **Decimal** with specified precision (number of digits in the number). Other data formats, such as Float, cause your data to truncate and generates an error message that displays after processing the table.

You can export a single or multiple tables to export:

1. On the **TABLE** tab, in the **Content** group, click **Export**.
 - a. If multiple tables are loaded in MapInfo Pro, the **Export Table** dialog box with a list of open tables is displayed. Select the tables to export and click **Export** to open the **Export Table(s) to File(s)** dialog box.
 - b. If a single table is loaded in MapInfo Pro, the **Export Table(s) to File(s)** dialog box is displayed.

2. The **Export Table(s) to File(s)** dialog box has two variants:
 - a. Exporting a single file.
 1. Choose a directory and a file name for your **Output File**.
 2. Click the **Export as Type** drop-down list and choose the file format you want the file saved in.
 3. Select the **Show All OGR Formats** to populate the **Export as Type** drop-down list with additional OGR formats along with the default ones.
 - b. Exporting multiple files.
 1. Choose a directory for your **Output Folder**.
 2. **Name Pattern** - Output file naming in pattern <prefix><filename><suffix>.
 3. **Sample** - Displays sample based on the naming pattern.
 4. Click the **Export as Type** drop-down list and choose the file format you want the file saved in.
 5. Select the **Show All OGR Formats** to populate the **Export as Type** drop-down list with additional OGR formats along with the default ones.
3. Click **OK**. If the format chosen was the MapInfo Pro Interchange Format (*.mif), then the file was exported. If the format you chose was .TXT, .DXF, .DBF, .MIF, or .CSV a dialog box pertaining to each format displays.

Exporting a Window

To export a window:

1. On the **HOME** tab, in the **Output** group, click **Save** to open the **Save Window to File** dialog box.
2. Type a name for this file and select the file format you want to export to in the **Save as type** drop-down list. Click **Save** to open the **Save Window As** dialog box.
3. Specify the image size settings. You can keep the image the same size as the window or choose a custom size. If you choose **Custom**, also make any desired changes to the width and height of the image. You can make these changes in inches or in pixels.

If you are exporting a simple map or layout that does not contain raster or grid images, or any transparent fill patterns, you may be able to bypass the advanced settings.

Note: If you are saving the window to a raster format, select a resolution for the image. Metafile formats do not use the resolution option (WMF, EMF files).

4. Click the **Advanced** button to open the **Advanced Exporting Options** dialog box. See [Understanding the Advanced Exporting Options](#) for these details.

To include a border for your exported file, to select the **Export Border** check box.

5. Complete the dialog box according to information in the following section, and click **OK**.
6. To specify the file format, choose the desired format from the **File Format** box.

Exporting a Map in a Different Projection

You may want to export a map in a projection that is different from its native projection. In order to do this, you must save a copy of your table.

1. On the **HOME** tab, in the **File** group, click **Save Copy As**.
2. Choose the map table you want to copy (if more than one table is open) and click **Save As**.
3. Type a name for your copy.
4. Click the **Projection** button to open the **Choose Projection** dialog box.
5. Choose a new projection for your copy.
6. Click **OK** and then **Save**.

Understanding the Advanced Exporting Options

The **Advanced Exporting Options** dialog box settings allow you to apply the color, transparency, and border handling that are available for printed maps to your exported files.

Note: Borders are not exported from layout windows.

The settings are the same as in the **Advanced Printing** dialog box.

Export Border

Select this check box to include a black border on images you are exporting. Clear this check box to export the image without a border. This check box is selected by default.

Internal Handling for Transparent Vector Fills and Symbols

Special programming has been added to handle transparent fill patterns and bitmaps for vector images when exporting. Select this check box to use this functionality or clear it to let the printer or Windows export functions to handle this. This check box is selected by default.

Use ROP Method to Display Transparent Raster

Select this check box to allow the internal ROP (Raster Overlay by Pixel) to manage the transparent pixel display in raster images. Since the ROP Method is largely a display method, not all export

programs can use it. We recommend that you either check with the manufacturer before using this option or try a few test exports to get the results you want. This check box is cleared by default.

Export Raster in True Color When Possible

Select this check box to print and export your 24-bit raster or grid file images in true color (make sure your printer settings are set to greater than 256 colors). Clear this check box if you are not working with a color printer. This check box is selected by default.

Note: You can select dither method options in the **Display**, **Printing**, and **Exporting** dialog boxes.

- Overriding the default settings also works the same way. As with the advanced printing options, the options that are selected when you initially display the **Advanced Exporting Options** dialog box are the default settings, which are set in the Output Preferences. The **Advanced Exporting Options** dialog box enables you to override the default export settings for individual file export operations. To actually change the default export settings, you must go to the Output preferences (on the **PRO** tab, click **Options**, and **Output Settings**) and change the settings there.

Importing and Exporting Data in AutoCAD Format

Because CAD packages represent drawings in non-earth coordinates, all drawings imported or exported between MapInfo Pro and CAD suffer some distortion. This comes from trying to display non-earth information on a spherical coordinate system (like the globe). Coordinate conversions are used to assign longitude/latitude coordinates to CAD drawings that were created using non-earth coordinates. Conversions near the equator are more exact than conversions at the extremes of the hemispheres. To minimize distortion, import and export with no coordinate conversions and avoid translating maps that cover large areas.

How does MapInfo Pro Treat Coordinates?

MapInfo Pro treats coordinates as specifying longitude and latitude on a sphere. In the Western hemisphere, this means that X coordinates (longitude) increase to the left, rather than to the right, as in standard non-earth coordinates. This means that a point on the left side of your map has a greater longitude than a point on the right side of your map.

In the Eastern hemisphere this is not the case. X increases to the right as you would normally expect.

Latitude (the Y coordinate) increases in a downward direction for maps of areas south of the equator. For areas north of the equator, latitude increases as you move up. This corresponds to the way it works in non-earth coordinates.

How do DXF Files Treat Coordinates?

Typically, DXF data does not include projection information. They have X and Y coordinates that can reference any possible coordinate system. The DXF import procedure imports the DXF file using

its encoded coordinates and optionally allows you to set a transformation between the DXF coordinates and the real world coordinates, if you know them. Also, you can use the **Projection** button in the DXF Import Information dialog box to reset the projection, if you know that information. By default DXF files are projected in the 'Non-Earth' projection.

Most DXF maps use state plane coordinates or some other coordinate system. When the maps show floor plans, they probably use a non-earth system (simple X and Y). Typically, coordinates in these systems increase to the right and up.

Importing DXF Files

MapInfo Pro lets you import and export files with DXF (drawing interchange file) format. DXF is a format used by AutoCAD and other CAD packages. MapInfo Pro can import both graphical and tabular information from DXF files.

To import a DXF file and set a coordinate transformation for it:

1. On the **HOME** tab click the **Open** command list and choose **Import** to open the **Import File** dialog box.
2. From the **Files of type** drop-down list, choose **AutoCAD DXF**.
3. Navigate to the DXF file that you want to import by selecting its location from the **Look in** drop-down list.
4. Click **Open** to open the **DXF Import Information** dialog box.
5. Select from the following options for your DXF file.

Preserve DXF Blocks as Multi-Polygon Regions - Select this option to import the layer data as regions. If you do not select this check box, MapInfo Pro produces multiple objects which each contain objects. For example, a block for New York State might contain 2 polygons: one for the mainland, and one for Long Island.

Preserve Attribute Data - Select this option to read the tabular attribute information from DXF file into the table. You might not want to import data that does not contain relevant map attribute data.

Create Separate Tables - Select this option to import each layer as a separate table. You might want to do this to give you more control over the appearance or display of each layer.

Suppress Warning Messages - Select this option to suppress warning messages. Sometimes warning messages display that do not affect the import of the file. If the results of your import are unexpected, we recommend you clear this check box to get more information about the errors that affect your image.

6. Click **Set Transformation** to open the **Set Coordinate Transformation** dialog box.
7. Select the coordinate points appropriate for this data and click **OK**.
8. Click the **Projection** button to open the **Choose Projection** dialog box.
9. Choose one of the following to select a coordinate assignment:

- Choose the **Longitude/Latitude** Category option when you are importing a map stored in longitude/latitude coordinates and look for the appropriate projection from the Category Members drop-down list. This is the most commonly selected option.
- Choose another, more appropriate category and projection option to locate the projection you want for the selected map.
- Choose the **Non-Earth** option when you are working with a non-earth map, such as a floor plan and the **Non-Earth Coordinate System** dialog box displays.

When you do not choose a coordinate system when importing graphic files, MapInfo Pro defaults to a non-earth map with units in feet. You can set coordinate units in the **Non-Earth Coordinate System** dialog box.

10. Click the **Options** button to display DXF data storing options. Make your selections and click **OK** to continue.
11. Click **OK** to display the **Import into Table** dialog box.
12. Type a file name in the **File name** field and select the file type to save to: native **MapInfo (*.tab)** format, or nativeX **MapInfo Extended (*.tab)** format. Use the extended format for data that is larger than 2GB.
13. Click **Save**.

Importing DXF Attributes into MapInfo Pro

Some DXF files contain textual information associated with graphic objects. In DXF, this is done by creating a block that contains the graphic objects and the textual information (stored in "attributes"). This block is then inserted into the drawing in one or more places, with possibly different data values in each case. There is no database structure imposed on attributes. For example, you might have two types of objects in your DXF file with the following attributes:

```
Pipes: WIDTH
      TYPE (sewer, water, storm sewer, etc.)
      MATERIAL
Streets: NAME
        ADDRESS_RANGE
```

When MapInfo Pro creates a tabular database from a DXF file, it must decide on a database structure. All the records in a Table contain the same fields. MapInfo Pro builds a database structure by scanning the entire DXF file for all attributes in the layers that are being imported, and creating a union of these fields. The data type of each field is determined by the contents of the attributes.

For example, when all attributes with a given name contain a number, the resulting MapInfo Pro field is a numeric data type.

Continuing the examples above, when pipes and streets are both imported into the same DXF file, the database structure is as follows:

1. ADDRESS_RANGE
2. MATERIAL

3. NAME
4. TYPE
5. WIDTH

Most well-designed DXF files put objects of different types in different layers. The above DXF file probably contains 2 layers: pipes (which holds all the pipes of the map) and streets (which hold all the streets of the map). Run DXF Import twice, importing a different layer each time. You would create two MapInfo Pro tables, one with the correct pipe structure, and one with the correct street structure.

When you load both layers of our sample DXF file into one MapInfo Pro table, the records for the pipes have blank or zero values for the NAME and ADDRESS_RANGE fields. Likewise, WIDTH, TYPE, and MATERIAL are blank for the street records.

Note: It takes much longer to import attributes from a DXF file into MapInfo Pro than it does to import files with no attributes. The entities section of the DXF file must be read twice. We recommend that you run the import several times, checking to make sure that you are loading the correct layers and using the correct coordinate transformation, before importing the data attributes.

Importing Attributes with Nested Blocks

In the DXF file format, blocks can be nested. The following is the logical structure of our example nested block:

```
Block A
  Line
  Attribute STREETNAME = "Broadway"
Block B
  Point
  Attribute ADDRESS = "200"
Block C
  Polygon
  Attribute BUILDING_NAME = "Hendrick Hudson Building"
```

This block consists of a line, an attribute, and two blocks. One of these blocks is a point with the address of a building; the other is a polygon with the name of the building. If all of these blocks were on the same layer (and they do not have to be), the database structure would be as follows:

ADDRESS

1. BUILDING_NAME
2. STREETNAME

Objects get the value of all attributes in their current block, and inherit attributes from their parent blocks. In this case, our database is created as follows:

Object	ADDRESS	BUILDING_NAME	STREETNAME
--------	---------	---------------	------------

line	0	<blank>	Broadway
point	200	<blank>	Broadway
polygon	0	Hendrick Building	Broadway

As you can see, it is better to put objects of different types in different layers. The problem is figuring out which layer names correspond to which type of objects.

Cropping Images

When MapInfo Pro exports a window, it does not clip objects that extend beyond the edges of the windows, but it does export information about where the clipping is.

Other programs always honor the clipping of bitmap files. As for other formats, the behavior varies depending on the program that is used to display and print the file. Many programs, such as drawing programs, "explode" the file into individual objects. A file containing several country boundaries would explode into several polygon objects, one for each country. Programs like these usually ignore the clipping information that MapInfo Pro stores in the file.

Other programs, such as word processing programs and spreadsheets, typically open files as one compound object, without trying to explode them into component objects. These programs usually honor the clipping information and clip the contents appropriately.

For example, if you are exporting a Map window that displays part of Germany, but not all of it, the exported file contains the entire image of Germany. It also contains information about where MapInfo Pro clipped that image in its Map window. But when you open the exported window in your target application, a drawing package for example, the image of Germany may not be clipped.

Exporting to ASCII Format

MapInfo Pro also allows you to export your tabular data to a delimited ASCII file. This file can later be edited with a text editor or imported into another package. When you export to ASCII, MapInfo Pro displays the **Delimited ASCII Information** dialog box, where you choose your delimiter character. You can also choose to have the first row of the ASCII file become column titles.

MapInfo Pro also displays a dialog box that you use to indicate the character set for the exported ASCII file. Different platforms use different character sets. MapInfo Pro must know the platform where you are going to use the exported file in order to provide the appropriate character set. No graphical data is exported to ASCII.

Exporting to dBase (*.DBF) Format

MapInfo Pro can export tabular data into dBASE DBF format. Exporting to DBF creates only the .DBF file. No graphical data is exported to dBASE. When you save your table in DBF format, you create a .DBF file, as well as some other files. These other files contain graphic information (for example, MapInfo Pro indices and other information that MapInfo Pro uses).

MapInfo Pro also displays the **dBASE DBF Information** dialog box that you use to indicate the character set for the exported DBF file. Different platforms use different character sets. MapInfo Pro must know the platform where you are going to use the exported file in order to provide the appropriate character set.

Smoothing Map Images during Export

You can anti-alias a table during the export process to give you more control over your map images. This is particularly important when you are saving maps created in MapInfo Pro for use in other Windows-based applications, in particular in slide presentations or for web pages.

Anti-aliasing allows you to smooth images in all types of windows such as Map windows, layouts, and legends.

Note: You cannot anti-alias images you are exporting to .EMF or .WMF format, because these are not true raster formats.

There are three smoothing options you can use to customize your raster image:

1. Smooth using a Filter value: You can set a flag that selects one of six filters that allow you to choose the direction the filter is applied to the image from.
2. Smooth using a Mask value: You can select a value that indicates the size of the area you want to smooth. For example, to create a 3x3 pixel mask value, you would enter a 3 in this field. This would limit the amount of change in the color of the pixels. Typically mask sizes would be 2-3 pixels when exporting at screen resolution. If you are exporting at a higher resolution, a larger mask might be appropriate.
3. Smooth using a Threshold value: You can select a threshold value to indicate which pixels to smooth. Each pixel in an image has a value based on its color. The smaller the pixel value, the darker the color. Select this option to smooth all of the pixels above the threshold you enter in this field. When you set this value to 0, MapInfo Pro will smooth all of the pixels.

You must either set a global preference for these anti-aliasing options or set them locally during the export process (using the Advanced button).

To set the anti-aliasing preference for exporting images:

1. On the **PRO** tab, in the **Options** group, click **Output Settings** to open the **Output Preferences** dialog box.
2. Click the **Exporting** tab to display the anti-aliasing options.
3. To use anti-aliasing automatically, select the **Use Anti-aliasing** check box and select from these options:

Smooth using a Filter value

Choose a filter for the smoothing you want to use. Select from these filters:

- Vertically and Horizontally (Smooths the image vertically and horizontally)
- All Directions (1) (Smooths the image in all directions)
- All Directions (2) (Smooths the image in all directions using a different algorithm)
- Diagonally (Smooths the image diagonally)
- Horizontally (Smooths the image horizontally)
- Vertically (Smooths the image vertically)

Smooth using a Mask value

Choose the pixel size of the mask you want MapInfo Pro to use in this field. For example, to create a 3x3 pixel mask value, you would enter a 3 in this field. This would limit the amount of change in the color of the pixels to the three pixels around the basic pixel.

Smooth using a Threshold value

Select a threshold value to indicate which pixels to smooth. Colors are 0 for black and 255 for white (in an 8 bit image). Entering a low number changes the look of your map by smoothing the darker colors and the lighter colors. Choosing a higher number changes the way the lighter colors display.

To set the anti-aliasing options locally during export:

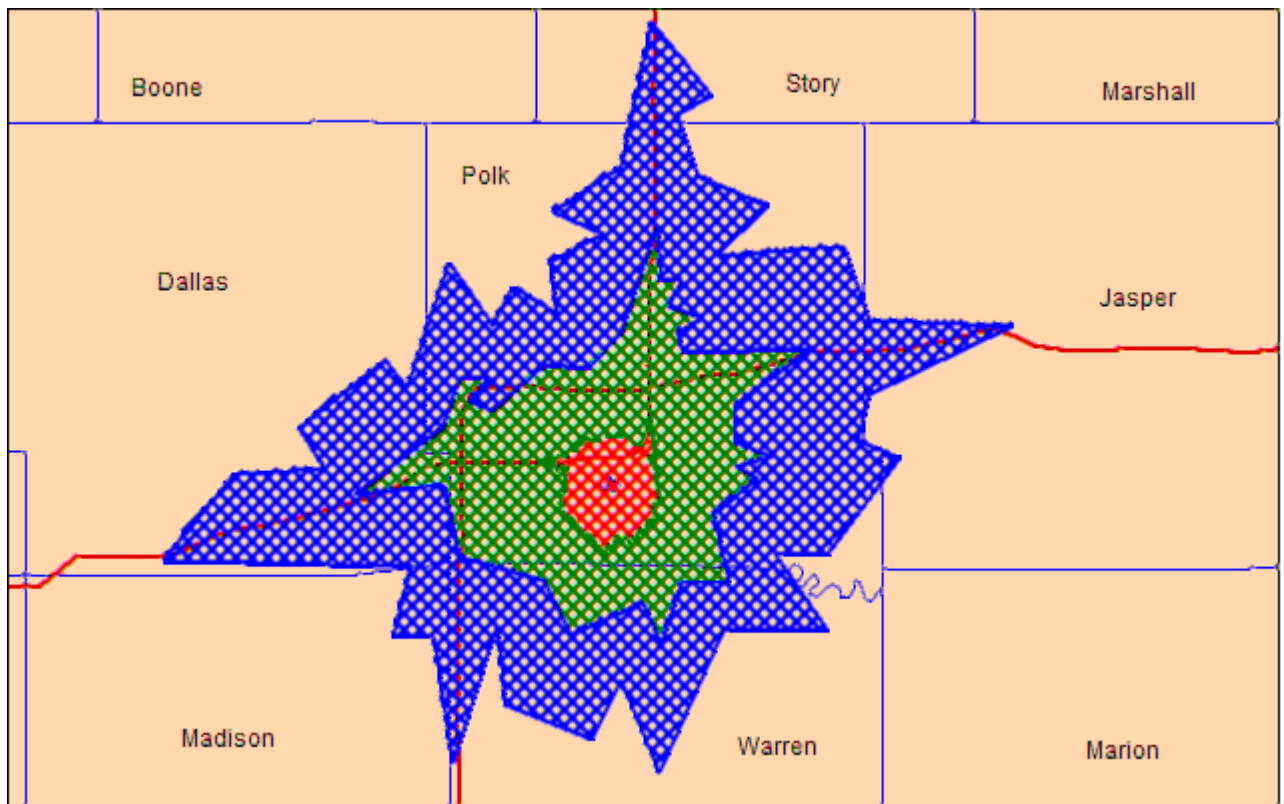
1. When you have completed your work on a window, on the **HOME** tab, in the **File** group, click **Save** to open the **Save Window to File** dialog box.
2. Type the name and indicate the path of the file you are saving in this dialog box. Click **Save** to continue. The **Save Window As** dialog box opens.

If you are exporting an EMF or WMF image, the **Use Anti-Aliasing** check box is disabled.

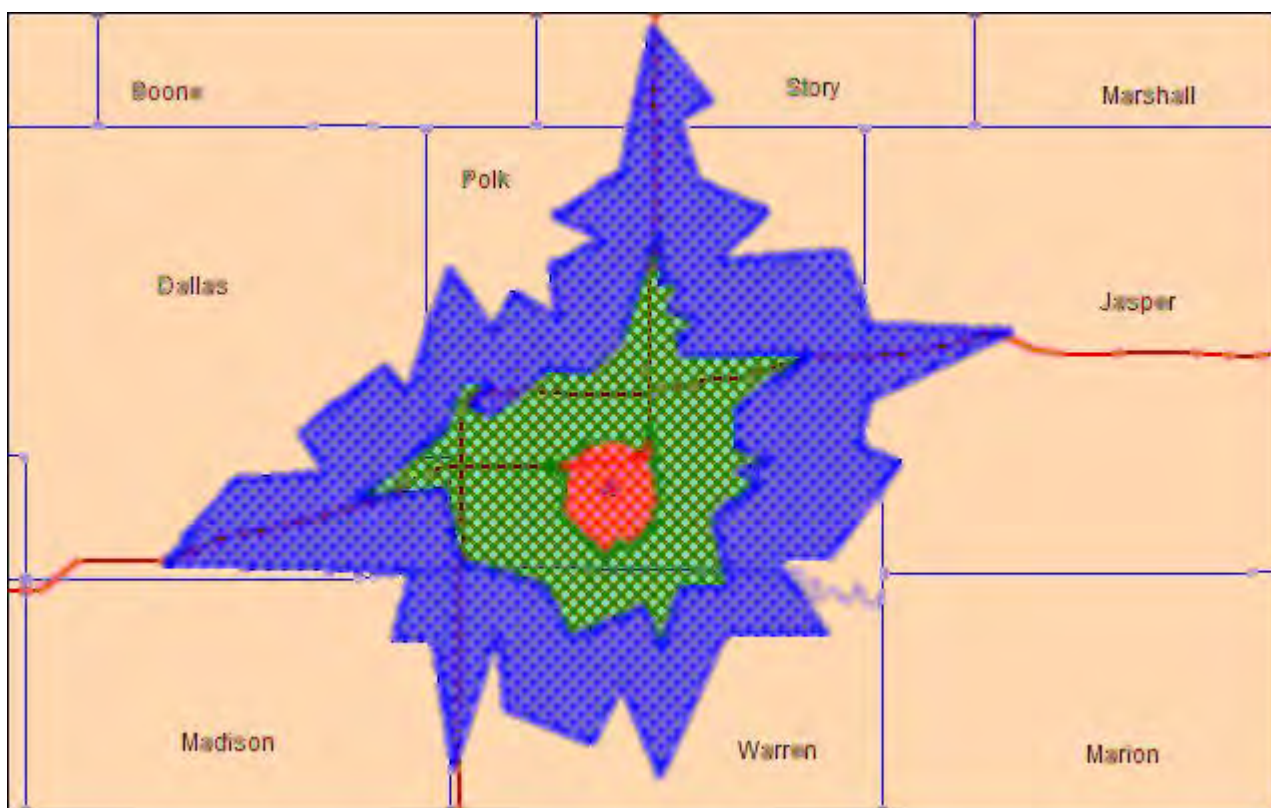
3. Select the **Use Anti-aliasing** check box and do one of the following:
 - Click **Save** to use the anti-aliasing options you selected in the **Output Preferences** dialog box
 - Click **Advanced** and choose new anti-aliasing options for this particular map. Click **OK** to return to the **Save Window As** dialog box. Click **Save** to save these settings and the file.

Note: If you do not select the **Use Anti-aliasing** check box, the anti-aliasing options in the **Advanced Exporting Options** dialog box are disabled.

The next few figures should give you an idea of the types of results you can expect using the different options.



Anti-Aliasing with Filter Vertical and Horizontal, Mask 2, Threshold 100



Anti-Aliasing with Filter Vertical and Horizontal, Mask 5, Threshold 100

Smoothing a Polyline

To smooth a polyline:

1. Select a polyline in an editable layer.
2. On the **SPATIAL** tab, in the **Edit** group, click **Fix/Clean**, and **Smooth Lines**.

The polyline becomes a continuous curved line.

Unsmoothing a Polyline

To unsmooth a polyline:

1. Select a smoothed polyline in an editable layer.
2. On the **SPATIAL** tab, in the **Edit** group, click **Fix/Clean**, and **Unsmooth Lines**.

The polyline is redrawn to its original form.

3 - Working with Data

This section describes how to work with MapInfo data files (TAB files), accesses your data sources, and select and query data.

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Working with MapInfo Tables

After you have brought your data into MapInfo and created .TAB files, you can manage them within MapInfo Pro. You can view any database table in MapInfo Pro, once you have converted it to MapInfo format. Additionally you can add or remove fields, change the order, name, type, width, or index of any field. You can also specify or determine the projection of the table from this dialog box. You can also check if the table is mappable (contains map objects). To make these types of changes, see [Editing a Table's Structure](#).

Keep in mind that you can only view the structure of a spreadsheet or database file that you convert into MapInfo Pro's table structure. See [How Do I Get My Data on the Map?](#) for these instructions.

To view the structure of a table, on the **TABLE** tab, in the **Sort and Filter** group, click the **Table** command list and choose **Modify Structure**. The **View/Modify Table Structure** dialog box displays.

Accessing StreetPro Data

Now that you can display your data, you may want to display it on an existing map that has streets, hospitals, highways, and other landmarks to give your data relevance. Our premier data product, StreetPro contains all of this and more. There are actually two versions of StreetPro, StreetPro Display and StreetPro with Enhanced Address Layer. See which of these products is right for your needs.

StreetPro Display contains 30 layers of county-level display streets, highways and shields, railways, administrative boundaries, point locations, and water features. In addition, we have included several utilities (Autoloader, Shield Manager, Street Append tools) to help make StreetPro easy to work with. You can purchase this product by county, by state, by 6 state packs or the entire United States.

StreetPro with Enhanced Address Layer includes all the layers and tools in StreetPro Display, plus an address layer of streets and address ranges that you can use to more precisely geocode your data.

Adding to a Table

One important operation in maintaining tables is the ability to update the data contained in the table. MapInfo Pro's Update Column feature allows you to:

- Add a temporary column or update an existing column with data from another table
- Update a table
- Place graphic information into visible columns

Update Column command is located on the **TABLE** tab in the **Edit** group.

Updating Information in a Subset of a Table

Use **Update Column** to update information in a subset of a table. For example, you could marquee the southeast of the United States, then use **Update Column** to set the "sales rep" field to the name of your sales representative for the Selection table.

You can update all the rows in a table or a selection of rows. To update a selection of rows you need to select the rows using SQL Select, the **Select** command, the **Boundary Selection** command, or the **Radius Selection** command, and then update the selection.

Adding a Temporary Column using Update Column

If you need to bring data from one table into another, you can use the Update Column command in MapInfo Pro. In fact to bring this data into the table, you can either add a temporary column or you can update an existing column. In both cases, go to the **TABLE** tab and click **Update Column** to bring over the information.

You have tremendous flexibility with how information is imported and what information is transferred. You can perform aggregate functions to transfer averages, minima, maxima, sums, weighted averages, and proportional sums. You can also create expressions to derive additional information from the data.

To add a temporary column:

1. Open at least two tables.
2. On the **TABLE** tab, in the **Edit** group, click **Update Column** to open the **Update Column** dialog box.
3. Choose the table to which the temporary column will be added.
4. Choose the table from which MapInfo Pro will retrieve the update information.
5. Accept to Add a temporary column from the **Column to Update** option.

If necessary, specify the information MapInfo Pro will need to associate the data (join) in the two tables by using their common tabular or graphic data.

6. Choose how to produce the column data by specifying how to calculate the information based on columns and expressions at the Calculate and of boxes.
7. Select the **Browse Results** check box to display the table with its temporary column in browser format.
8. Click **OK**. The temporary column is added based on the specified information.

When you make changes to the data table, the temporary columns update automatically.

To save the table with its new temporary columns, on the **TABLE** tab, in the **Content** group, click **Save**, and **Save Table**. If the temporary columns are added to a table in a workspace, the changes are automatically saved when you save the workspace.

To illustrate the Update Column command, we have created the following example. In this example we have a company which maintains two tables, a table of states (STATES) and a table of customers' order amounts (US_CUSTG). You can use these files and the Update Column command to calculate the sum of your customers' order amounts and report that information by state. Update Column creates a temporary column in the STATES2 table to store the information from the Order_amt table. During the operation MapInfo Pro calculates each customer's order amount with the order amounts of other customers from the same state. A browser of the STATES2 table shows the sum of order amount by state.

You can follow along with similar tables of your own.

Placing Graphic Information into Visible Columns

One use of Update Columns is to place graphic information into visible columns. Tables containing graphic objects (that is, maps) store graphic information that is not visible in Tables. You can get some of that information into columns so that information can be viewed in a Browser window.

To put graphic information into a browsable format:

1. On the **TABLE** tab, in the **Edit** group, click **Update Column** to open the **Update Column** dialog box.

Use this dialog box to place the graphic information, such as area, perimeter, or length, into the temporary columns.

2. On the **TABLE** tab, in the **Edit** group, click **Save**, and **Save Copy As** to open the **Save Copy As** dialog box.

Use this dialog box to save the temporary columns in a new table. The new table will contain all of the original columns, in addition to each of the temporary columns.

If you edit your objects, the information in the visible columns must be updated to reflect the changes you have made.

Calculating Sums using Update Column

To calculate the sum of orders and report the amount using Update Column:

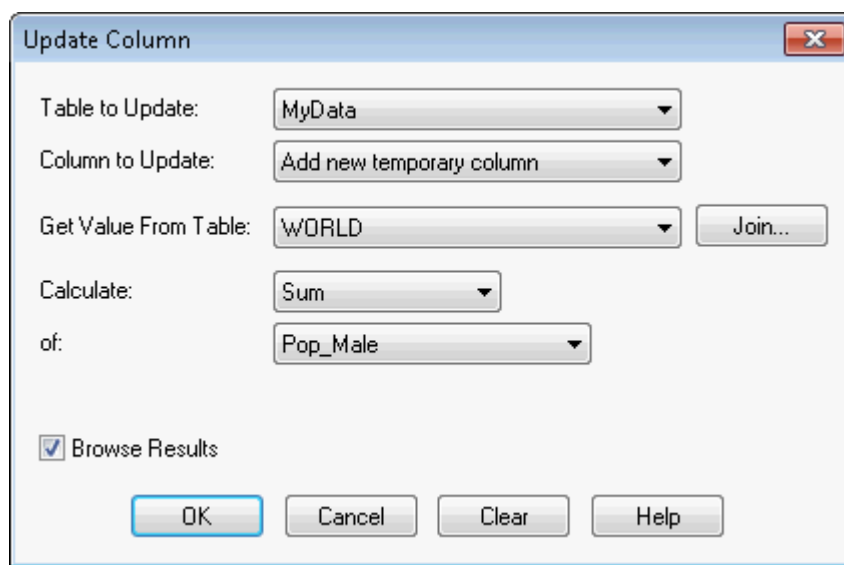
1. On the **TABLE** tab, click **Update Column** and fill in the **Update Column** dialog box:

- **Table to Update** - Select this table to update from this list.
- **Column to Update** - Select this column to update from this list or select **Add new temporary column**.
- **Get Value From Table** - Select the table that contains the update values in this list.

Notice the **Join** button is activated when you select **Add** new temporary column. In this example the Join operation will match columns in each table based on equivalent columns that hold common information such as where State from table STATES2 table matches State from the US_CUSTG table. In other situations you can match information based on common geography.

Note: You can use this dialog box to create a temporary column in the original data source file. To do this, select the same table in both the Table to Update drop-down list and the Get Value From Table drop-down list.

2. On the **TABLE** tab, click **Update Column** and fill in the **Update Column** dialog box:



- **Table to Update** - Select this table to update from this list.
- **Column to Update** - Select this column to update from this list or select **Add new temporary column**.
- **Get Value From Table** - Select the table that contains the update values in this list.

Notice the **Join** button is activated when you select **Add** new temporary column. In this example the Join operation will match columns in each table based on equivalent columns that hold common information such as where State from table STATES2 table matches State from the US_CUSTG table. In other situations you can match information based on common geography.

Note: You can use this dialog box to create a temporary column in the original data source file. To do this, select the same table in both the Table to Update drop-down list and the Get Value From Table drop-down list.

3. At the Calculate list box, choose **Sum** for purposes of this example. You can also select: **Value**, **Avg**, **Count**, **Min**, **Max**, **Sum**, **WtAvg**, **Proportion Sum**, **Proportion Avg**, or **Proportion WtAvg** from this list. (For a discussion of these functions, see [Aggregating Data](#).)

At the **Of list** box, MapInfo Pro automatically defaults to the first numeric field in the table when you choose any function other than Value. You can select another column, as appropriate.

4. Click **OK** to begin the update. MapInfo Pro updates the STATES2 table and reports the order amount by state in a Browser or in the table you selected.

When the order amount of a customer changes, you can simply make the change in the Order_amt table. MapInfo Pro automatically updates the sum of the order amount for that state in the STATES2 table.

5. To save the temporary column, on the **TABLE** tab, click **Save Copy As**.

If saved in a workspace, MapInfo Pro recomputes the column whenever you open the workspace. Also, the **Update Column** dialog box defaults to the last column that was updated and the last

expression that was used for updating the column, whenever you run the command. For additional details about saving a table, see [Saving a Table or a Copy of a Table](#).

Geographic and Descriptive Joins

A join allows you to join two tables. To do this, MapInfo Pro must know how to associate records in the two tables.

For example, assume you are shading STATES by the values in SALES. Obviously, you want all Pennsylvania sales to be associated with Pennsylvania, all Maryland sales to be associated with Maryland, etc. MapInfo Pro has two ways of doing this:

1. From a common descriptive field.
2. Geographically/graphically.

In this case, the most likely descriptive field contains the state name or an abbreviation for the state name. Thus the STATES table might have a field called **Abbr**, containing the abbreviation of the state name, and SALES might have a field called State, that contains the state abbreviation. MapInfo Pro matches the entries in these two fields so that information in the SALES State field is matched to the record having the same entry in the **Abbr** field of STATE, thus matching NY (sales) to NY (state), PA (sales) to PA (state), etc.

However, if both tables contain graphic information, MapInfo Pro can also make a graphic match.

For example, if you are a conservation official and you want to shade a map of COUNTIES according to the number of FIRES that occurred in the last year. Your FIRES database has been geocoded. In this case MapInfo Pro could examine the coordinates of each fire location and determine the county where the fire had occurred. That would allow MapInfo Pro to associate each fire record with the appropriate county.

Specifying a Join Based on Descriptive Criteria

There are two versions of the **Join** dialog box. When both tables can be mapped, the dialog box allows you to choose whether to make the join on a geographic basis or on a non-geographical attributes basis.

When only one table can be mapped, the dialog box only allows you to specify the join in terms of non-geographical attributes.

To specify a join based on descriptive criteria:

1. Open at least two tables.
2. On the **TABLE** tab, in the **Edit** group, click **Update Column** to open the **Update Column** dialog box.

If both tables are mappable, go to [step 4](#).

If only one table is mappable, go to [step 3](#).

3. Choose different tables for the Table to Update and Get Value From Table drop-down lists.

4. Click the **Join** button. The **Specify Join** dialog box displays.
5. Click the radio button next to the Where drop-down list in the **Specify Join** dialog box.
6. Use the Where drop-down list to choose the match field in the source table.
7. Use the Matches drop-down list to choose the match field in the target table.
8. Click **OK**.

Specifying a Join Based on Geographic Criteria

To specify a join based on geographic criteria:

1. Open at least two mappable tables.
2. On the **TABLE** tab, in the **Edit** group, click **Update Column** to open the **Update Column** dialog box.
3. Choose different tables for the Table to Update and Get Value From Table drop-down lists.
4. Click the **Join** button in the **Update Column** dialog box. The **Specify Join** dialog box displays.
5. Click the radio button next to **Where** object from table.
6. In the Where object table from drop-down list, choose either contains or is within, depending on the geographic relationship between objects in the two tables.

Polygons "contain" points, lines, or other polygons. Points, lines, and small polygons are "within" other (larger) polygons.

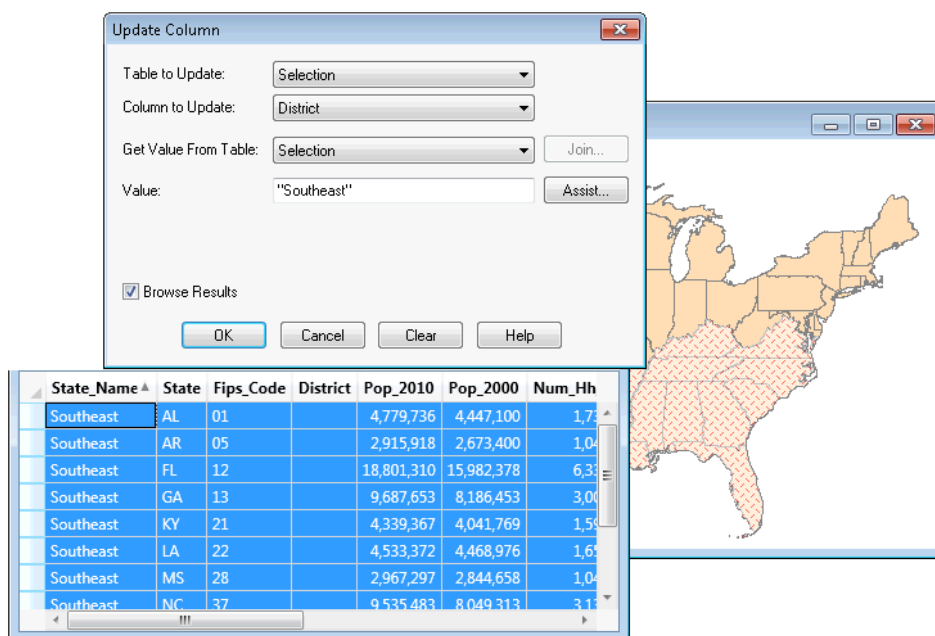
7. Click **OK**.

Updating a Table

For a quick visual way to update your table, select the objects in the Map window and use Update Column to update the table with the new value. This would be useful when you want to update a number of objects with the same value.

To include the District column in the USA table:

1. Create the **District** column (on the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**) in the USA table.
2. In the **Modify Table Structure** dialog box add a field for Districts.
3. Redisplay the USA table in a Map window.
4. Select the appropriate states with the **Select** command (or other selection method).
5. On the **TABLE** tab, click **Update Column** from the **Edit** group and fill in the dialog box as illustrated in the next figure. Be sure to put the value in quotes so MapInfo Pro does not treat it as a new column name.



- Click **OK**. MapInfo Pro creates a query table of the southeastern states with the District column containing the value Southeast.
- Save the table to preserve the new information.

See Also:

[Appending Rows to a Table](#)

[Appending One Table to Another](#)

Appending Rows to a Table

Use the **Append Rows** command to attach the records from one table to another. The two tables should have the same set of columns in the same order.

To append data to another table:

- On the **TABLE** tab, in the **Edit** group, click **Append Rows** to open the **Append Rows to Table** dialog box.
- Specify the table containing the records you want appended.
- Specify the table to which the records will be appended and click **OK**.

If the corresponding columns do not have the same data type, a best fit is done to convert the data to the appropriate type. If the order of the columns is not the same between the two tables, use the Table Structure command to reorder the columns before using **Append Rows**.

Note: If tables are mappable, the bounds of the map in one table must be large enough to allow objects from the other table to fit within it. Otherwise, the objects will be distorted to the

bounds of the Map window. Use the Check/Set CoordSys Bounds tool to alter the map bounds of the table if this occurs.

For a list of available tools and for information about the CoordSys Bounds tool, see *Working with MapInfo Pro Tools* in the MapInfo Pro *Help System*.

Appending One Table to Another

To append one table to another:

1. On the **TABLE** tab, in the **Edit** group, click **Append Rows** to open the **Append Table** dialog box.
2. Choose the table you want to append from. Select a table in the Append Table drop-down list.
3. Choose the table you are appending to. Select a table in the To Table drop-down list.
4. Click **OK**. The status of the append operation displays.
5. Click **Stop** to halt the append process.

When the columns of the two tables are not ordered properly, so that columns with corresponding positions do not have corresponding data, use Modify Structure (From the **TABLE** tab, click **Table** and select **Modify Structure**) to change the order of the columns in one of the tables.

You can use **SQL Select** to reorder the columns of one of the tables and then append the results.

See Also:

[Appending Rows to a Table](#)

Parsing Data from One Column to Multiple Columns

If you have imported data into MapInfo Pro from another format, there is always the chance that the data will not come in exactly the way you want it. In some instances, items that should appear in separate columns may be put together in one column. The following is a series of column updates that parses one column of full names (first, middle, and last) into three parts. It works even if there is no middle name, or if there is only a last name.

To parse data from one column to multiple columns:

1. On the **HOME** tab, click **Open**, select **Table** and open the table to be modified.
2. Add three new columns to your table. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**. Add two character columns of size 15. Call them FIRST and MIDDLE. Then add a character column called LAST of size 30.
3. Put the full name into the column called LAST by choosing the **TABLE** tab, and clicking **Update Column**. Fill in the **Update Column** dialog box.

Update Column

Table to Update: Table1

Column to Update: LAST

Get Value From Table: Table1

Value: your_full_name_column

☒ Browse Results

OK Cancel Clear Help

The column to update is LAST, and we get the Value from the column that has the full name in it. Remember we are only working with one table, so the **Table to Update** and **Get Value From Table** should be the same table. In the following example, the table is TABLE1 and the full name column is your_full_name_column. You should fill in your own values for these two items.

- To parse the first name out of the full name column, choose the **TABLE** tab and click **Update Column**. Fill in the **Update Column** dialog box.

Update Column

Table to Update: Table1

Column to Update: FIRST

Get Value From Table: Table1

Value: left\$(LAST, instr(1, LAST, " "))

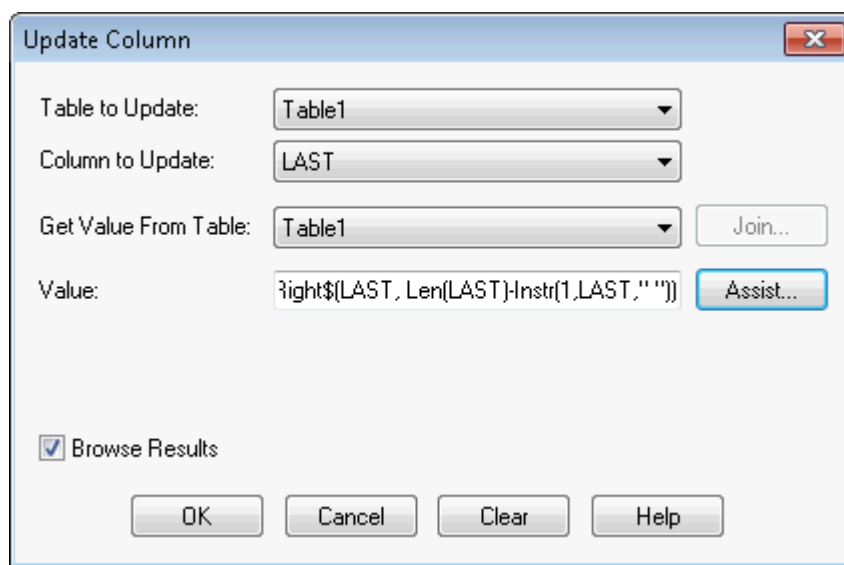
☒ Browse Results

OK Cancel Clear Help

The Column to Update is: FIRST

The Value is: left\$(LAST, instr(1, LAST, " "))

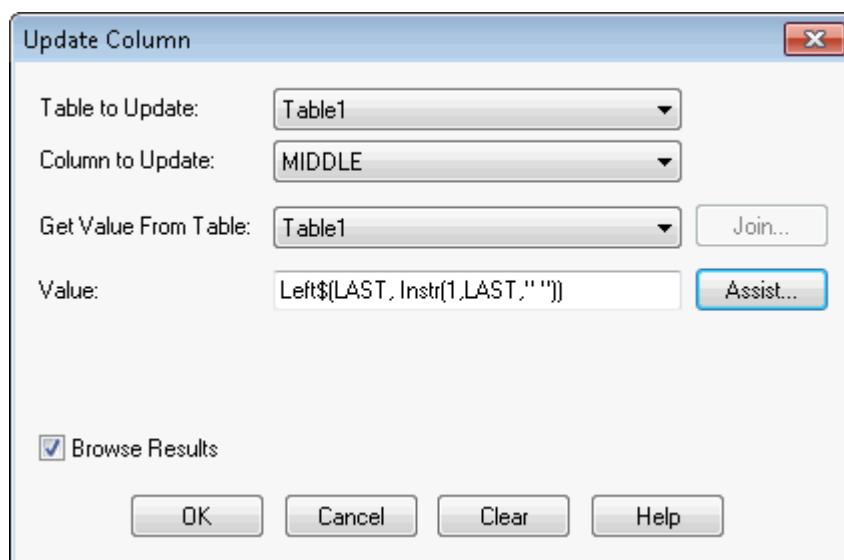
- To parse the last name out of the full name column, on the **TABLE** tab, click **Update Column**. Fill in the **Update Column** dialog box.



The Column to update is: LAST

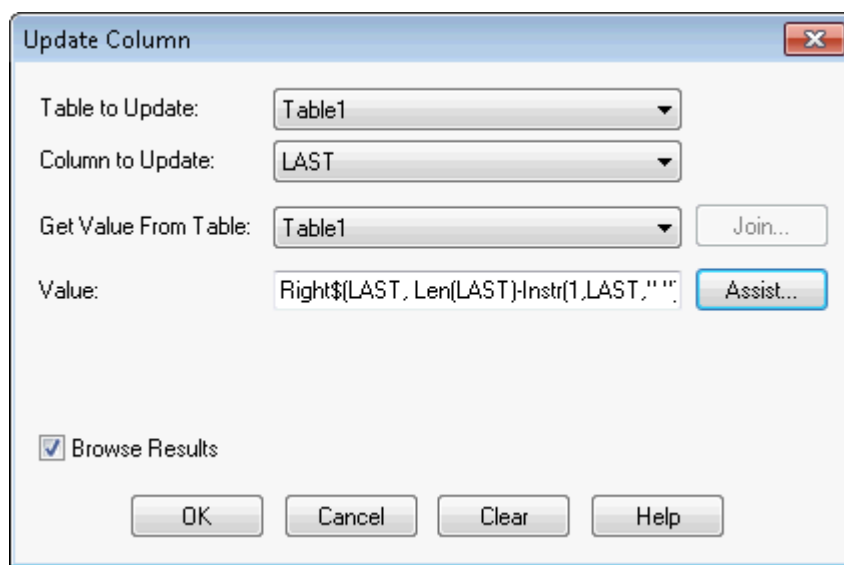
The Value is: Right\$(LAST, Len(LAST)-Instr(1,LAST," ")).

6. To parse the middle name out of the full name column, on the **TABLE** tab, click **Update Column**. Fill in the **Update Column** dialog box.



Update the MIDDLE column with the Value: Left\$(LAST, Instr(1,LAST," "))

7. Then update the LAST column again by returning to the **TABLE** tab, clicking **Update Column**, and filling in the dialog box.



The Value is: `Right$(LAST, Len(LAST)-Instr(1, LAST, " "))`

8. Click **OK** to update the column.

Placing Graphic Information in Visible Columns

Update Column is also useful to put graphic information into columns so that it is visible. Tables that contain map objects store the graphic information about these objects invisibly. Using Update Column, you can bring some of that information into a column so it can be viewed in a Browser. Update Column with `CentroidX(Obj)`, `CentroidY(Obj)` uses the Session Projection Preferences (if set), otherwise it defaults to Longitude/Latitude. For example, you want to display the longitude and latitude coordinates of a table of radio station point locations in a Browser. In this example, you are only working with one table, **RADIOLOC**, but you still use **Update Column** as in the Add Temporary Column example.

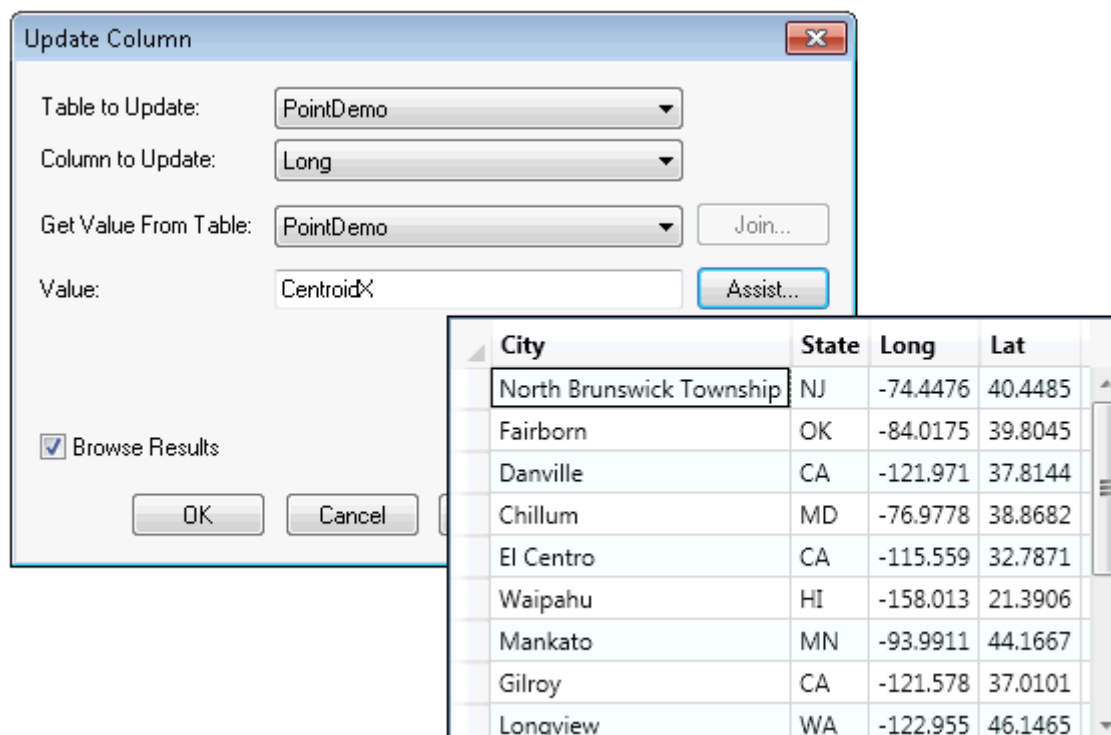
To display the longitude and latitude coordinates of a table in a Browser:

1. View the table structure (on the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Table Structure**) to ensure that there are not already fields that contain longitude and latitude coordinates internal to the table.

Before you can update the table, add two columns (for instance, call them Long and Lat) to contain the coordinates. When you change the structure of the table in this way, the table is removed from any open window. The table is still open and ready for updating.

2. On the **TABLE** tab, in the **Edit** group, click **Update Column** from the **Edit** group and specify **RADIOLOC** as the table to update and as the **Get Value From Table**.
3. Choose **Long** as the Column to Update.
4. In the **Value** box you must specify an expression to retrieve the longitude.

5. Click the **Assist** button to bring up the **Expression** dialog box.
6. From the **Functions** list choose **CentroidX** to return the expression CentroidX(obj).
7. Click **OK** to return to the **Update Column** dialog box. The expression is now in the **Value** box.
8. Click **OK**. MapInfo Pro calculates the information and places a longitude coordinate for each radio station in the **Long** column.



9. Repeat the process to retrieve latitude coordinates using the CentroidY(obj) expression.
10. On the **HOME** tab, click **Save Table** to store the coordinates in the RADIOLOC table.

Note: If you edit the objects, which, in effect, changes the coordinates, you must go back into the columns to make the changes. It will not automatically update.

Mouse Wheel Support for Browser Window

When you are working in the Browser window, you can use the mouse wheel to scroll through the records. Roll the mouse button down to scroll down the list, and roll the mouse button up to scroll up the list. You can still use the **Tab** key to scroll right and the **<Shift+Tab>** keys to scroll left in the Browser window.

For a list of keystrokes to help you navigate in a Browser window, see [Shortcuts for the Browser Window](#).

Adding a Row to a Table

You can add a temporary row to an editable MapInfo table.

To add a new row:

1. On the **TABLE** tab, click the **New Browser** option.
2. Choose an editable table from the drop-down list.
3. Click **OK** to display the table in a Browser window.
4. Choose **Add New Row** from the **Edit** group in the **TABLE** tab (or press **Ctrl+E**). A new row is added to the bottom of the table.
5. Enter data in the new row.

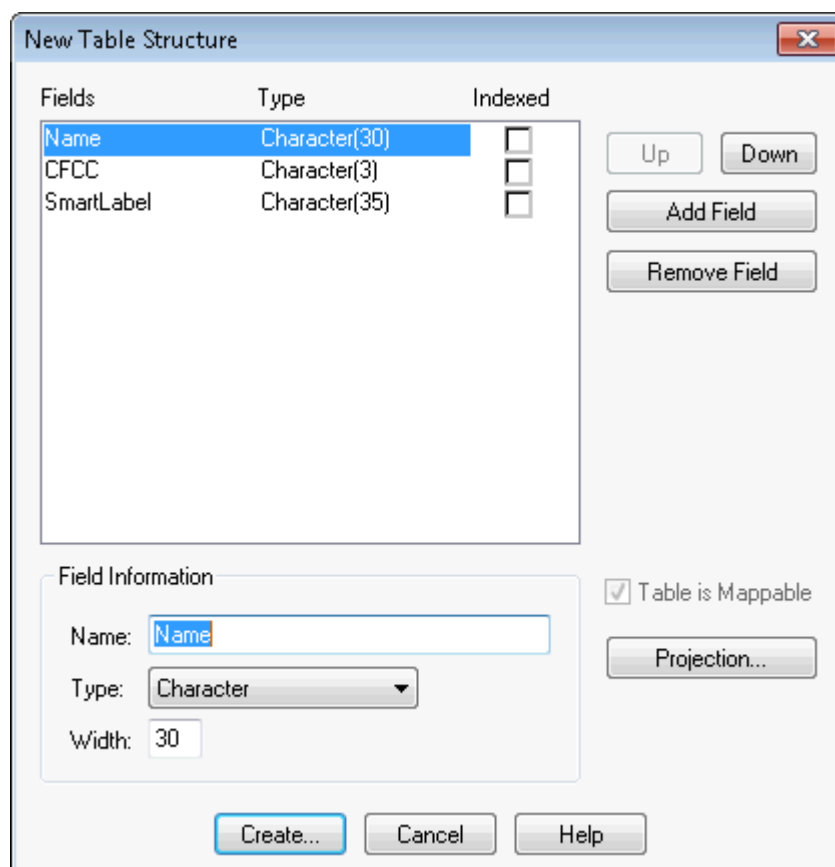
When you are finished adding rows, on the **HOME** tab, in the **File** group, click **Save Table** to save new data.

Creating a New Table

You can bring in data tables from several outside sources: dBASE, Excel, Access, Lotus 1-2-3, shapefiles, Grid, comma delimited, and delimited ASCII. You can also create your own database directly in MapInfo Pro. These databases can be opened and displayed as maps (providing they contain graphic objects) or in a Browser window.

To create a table in MapInfo Pro:

1. On the **TABLE** tab, click **New Table**. The **New Table** dialog box displays.
2. Choose one or more from the following:
 - **Open New Browser** - Click this check box to display the new buffer in a new Browser window only.
 - **Open New Mapper** - Click this check box to display the new buffer in a new Map window.
 - **Add to Current Mapper** - Click this check box to display the new buffer in the current Map window.
3. Do one of the following and click **OK**:
 - To create a new table and new table structure, click **Create New**.
 - To create a new table based on the structure of an existing table, click **Using Table** and select from the list of open tables.
4. Choose **Create**. The **New Table Structure** dialog box displays.



*If you selected **Create New**, this dialog is empty. You can remove a field by highlighting it and clicking the **Remove Field** button.*

5. Choose **Add Field** to begin adding new fields to the database's structure. Give the field a name, type, width, and specify whether the field will be indexed.
6. Continue to add fields until you have the structure you want.
7. Use the **Up** and **Down** buttons to reorder the fields. Keep in mind that the order of fields in this dialog box (top to bottom) will actually display as columns (left to right) in the Browser window.
8. Choose **Create**. The **Create New Table** dialog box displays.
9. Specify a location for the new table in the **Save in** box.
10. Enter a name for the table in the **File Name** box.
11. Specify the file type in the Save as type drop-down list in one of these formats:
 - **MapInfo (*.tab)**
 - **dBASE DBF (*.tab)**
 - **Microsoft Access (*.tab)**
 - **Mapinfo Version 2 (*.tab)**
 - **SQLite Database (*.tab)**
12. Click **Save**. One of these things occur:
 - If you chose the MapInfo Pro format, MapInfo Pro creates your table.

- If you chose dBASE DBF, proceed to **step 13**.
 - If you chose dBASE DBF, the **dBASE DBF Information** dialog box displays, asking you to specify a file character set. Choose the one appropriate for your language and click **OK**.
13. Click **Save** in the **Create New Table** dialog box. MapInfo Pro creates the new table.

Note: Do not use "Districts" as a name for your base tables. MapInfo Pro uses "Districts" internally as a system table when beginning a redistricting session.

Naming a File

MapInfo Pro supports long file names. This allows you to use up to 260 characters when naming your file. In addition, any one name within your directory path can be up to 255 characters. You can insert spaces in the filename and long filenames can have more than one "." in them. When using more than one ".", you must remember to type in the file extension in order to save the file correctly. For example you can name a table as follows: \\state\city.dbf

Opening Multiple Tables

To work with your data, you must first open the file or table that contains the information with which you want to work.

To open the table:

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Table** to display the **Open** dialog box.
2. Choose the drive and directory for the table you want to open.
3. Choose the appropriate table (.tab file). When opening multiple tables, use **Shift**-click to select adjacent tables and **Ctrl**-click to select non-adjacent tables.
4. Click **Open**.

Opening DBF and Shape Files Created with UTF-8 Encoding

MapInfo Pro includes read-only support for DBF files with data stored in UTF-8 encoding. Many Data vendors distribute data in Shapefile format which include DBF files. The attribute data may be in a UTF-8 character set.

To open a DBF or Shape file with UTF-8 encoding:

1. From the **HOME** tab, click **Open**. The **Open** dialog displays.
2. From the **Files of type** list, select **dBASE DBF (*.dbf)** or **Shape** as appropriate
3. From the **Look in** list, select the location of the file to open.
4. Click **Open**. An information dialog displays.
5. From the **File Character Set** list, select **UTF-8**.
6. Click **OK**.

The file opens in a browser or map window, and is marked as read-only.

Display Results for Tables with Data stored in UTF-8 Encoding

UTF-8 can represent every character in the Unicode system. However, MapInfo Pro will only represent characters in your character set or "Codepage" as it is called in Microsoft Windows. A codepage represents all the characters of one or more languages. MapInfo Pro will be able to completely read your UTF-8 data as long as all the characters have a representation in that character set. If the data you are reading has a character that is not in your character set, MapInfo Pro displays it as the underscore (_) character. The following table has some samples of what you might encounter.

System Character Set	Data Stored in UTF-8	Result
Windows Latin 1	Windows Latin 1	All characters. This includes all Western European languages.
Windows Latin2	Windows Latin2	All characters. This includes all Eastern European languages using latin character.
Windows japanese	Windows japanese	All characters
Windows Cyrillic	Windows Cyrillic	All characters
Windows Latin 1	Windows Latin2	Many Latin2 characters also exist in Latin1. Characters unique to Latin2 display as underscores.
WindowsLatin1 or WindowsLatin2	Cyrillic	ASCII characters display. All other characters display as underscores.
Chinese	Japanese	ASCII characters display. All other characters display as underscores.

Data stored in UTF-8 that is entirely in one character set displays correctly on systems set for that character set. UTF-8 data outside the character set displays as underscores. For example, if a UTF-8

dataset has a mixture of Latin1 and Latin2 characters, then the table opens and displays different parts correctly depending on your system.

- The UTF-8 character set is supported only for DBF format (including shapefiles).
- Tables that use UTF-8 encoding have a version of 1000.
- Tables that use UTF-8 character set are read-only.
- To edit a table opened from UTF-8, save it as a MapInfo Native table (.TAB). On the **HOME** tab, in the **File** group, click **Save Copy as**. You can then edit the file like any other table.

Creating a New Table by Combining Objects Using Column

If you want to make a new map of the U.S. based on areas such as Midwest, Pacific Coast, Northeast, etc., you could combine all of the state data and create new objects where some common data value is the key to which the new map object states will belong.

To do this, you could draw a rectangle somewhere on the States map. Select some states around the rectangle and specify them as the target. Select the rectangle and do a split operation. The new objects will be created and each split object will have its same state initials. Then, use **Combine Objects Using Column** and specify the state initials fields as the grouping value. The states will be re-created.

The Combine Objects Using Column feature gives you the option of creating a new table for the newly combined objects:

1. On the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Using Column** to open the **Combine Objects using Column** dialog box.
2. Choose the objects from the table you want to combine.
3. Choose the column you want the objects to be grouped by.
4. Choose **New** in the Store results in table drop-down list.
5. Click the **Next** button to open the **New Table** dialog box.
6. Click the **Create** button to open the **New/Modify Table Structure** dialog box.
7. Click the **Create** button to open the **Create New Table** dialog box.
8. Click **Save** and a new table is created.

Editing a Table's Structure

You can make changes to the structure of your table directly in MapInfo Pro. You can add or remove fields, change the order, name, type, width, or index of any field. You can also specify or determine the projection of the table from this dialog box. You can also check if the table is mappable (contains map objects).

The **Table is Mappable** option in the **Modify Table Structure** dialog box allows you to modify a table so you can map it or, when left cleared, it will ungeocode your table.

To change the structure of the table:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure** to open the **View/Modify Table Structure** dialog box.
2. Click the View/Modify Table drop-down list, a list of available tables displays.
3. Choose the table you want to modify.
4. Click **OK**.

The **Modify Table Structure** dialog box displays for editable tables and allows you to change the structure of a table. The **View Table Structure** dialog box displays for read-only tables and is only for viewing the table's structure.

Note: Keep in mind that you can only view the structure of a file that you bring into MapInfo Pro.

To move a column in the **Modify Table Structure** dialog box, select the column you want to move and drag it to the new position in the list. A small blue arrow shows the position of the column you are dragging.

Copying and Renaming a Table

Because a MapInfo Pro table consists of two or more component files (`STATES.TAB`, `STATES.DAT`, `STATES.MAP`, etc.), all of these files for a particular table must be in the same directory. If you move any of the component files to a different directory, you must move all of them. When you want to back up a table to diskette, you must back up all of the component files.

Because each table has at least two files associated with it, you cannot change one file name without changing all the other associated file names. Otherwise, MapInfo Pro would not know where to find all the files that constitute the table.

To rename a table:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Rename Table** to open the **Rename Table** dialog box.
2. Choose the table to rename and click **OK**.
3. Choose a new name for the table and click **OK**.

When you rename a table using this command, MapInfo Pro also renames all associated files. Keep in mind that renaming a table will affect any workspaces that contain the original table. If you rename a table, you must also edit the workspace file (`.WOR`) in a text editor or word processor to change the name of the table to reflect the new table name. You can also rename the table before you build the workspace. Renaming a raster file only changes the `*.tab` file name. Renaming a grid file changes both the `*.tab` and grid file name.

Deleting a Table

Deleting a table allows you to remove the .TAB file and all component files associated with the table.

To delete a table:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Delete Table**.
2. Choose the table to delete and click **OK**. A message displays to inform you that the table will be permanently deleted and the operation cannot be undone.
3. Click **OK** and MapInfo Pro deletes the table.

Deleting a raster table only deletes the *.tab file.

Deleting a grid file removes both the *.tab and grid file.

Deleting a GeoPackage table deletes the *.tab file and all associated component files. If a GeoPackage has only one table, using this command will delete only the table and associate files, not the GeoPackage file.

Packing Tables

Packing tables allow you to compress tables to take up less disk space. You can choose to pack only tabular data or graphic objects or both. Packing tabular data removes deleted records. When you pack a table or tables, MapInfo Pro requires that you have twice as much free space as the tables take up to handle a copy of the database as a scratch file.

To pack tables:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Advanced Pack** to open the **Advanced Pack** dialog box.
2. Choose table(s) from the Pack Table multi-select list.
3. Click the appropriate radio button to specify the type(s) of data.

Option	Description
Pack Tabular Data	This option removes deleted records, making the table smaller, and increasing processing speed.
Pack Graphic Data	This option packs only graphic information.
Pack Both Types Of Data	Both graphic and textual information are packed.

4. Click **OK**.
5. MapInfo Pro closes all related tables or workspaces, compresses the tables and reopens them again for your use.

Note: Packing a table can corrupt customized labels saved to a workspace. If you are going to be working with customized labels, pack the table before you create the labels.

Advanced Pack is a MapInfo Pro add-in tool that autoloads every time you start MapInfo Pro. If you remove or unload the **Advanced Pack** tool using the Tools Manager, the legacy **Pack Table** command would still be available to you. **Pack Table** only compresses one table at a time and closes the table or related workspaces before compressing. You must reopen the table and associated workspaces manually before continuing.

For more details about Tools, see *Working with MapInfo Pro Tools* in the *MapInfo Pro Productivity Guide*.

Collecting Data into the Table using Update Column

MapInfo Pro provides a number of powerful aggregating functions that allow you to derive new information. These features are available in Update Column when you specify two tables in the **Update Column** dialog box. The aggregate expressions include **Average**, **Count**, **Minimum**, **Maximum**, **Sum**, **Weighted Average**, **Proportion Sum**, **Proportion Average**, and **Proportion Weighted Average**. Each is defined in the next table.

Aggregate Expressions	Description
Average	Calculates the average of the values for all records in a group.
Count	Counts the number of records in a group.
Minimum	Finds the lowest value for all records in a group.
Maximum	Finds the highest value for all records in a group.
Sum	Calculates the sum of the values for all records in a group.
Weighted Average	Gives more weight to one value over another when averaging.

Aggregate Expressions	Description
Proportion Sum	A sum calculation that is adjusted based on how much of one object is within another object.
Proportion Average	An average calculation that is adjusted based on how much of one object is within another object.
Proportion Weighted Average	A weighted average calculation that is adjusted based on how much of one object is within another object.

Note that average, count, min, max, sum, and weighted average operate on data values only. The proportion functions take geographic relationships into account.

For faster performance for proportional calculations, use the Proportional Overlap Tool; see [Using the Tools in the Tools Manager](#).

Note: To find instructions for using the Update Column feature, see [Adding a Temporary Column using Update Column](#).

Example Using Proportion Sum and Proportion Average

To illustrate the proportion sum and proportion average functions, consider this example.

You want to determine what proportion of the population in your county is covered by a flood zone. You have two tables: a Towns table that contains town boundaries and population statistics, and a Flood table that contains a region object (circle in illustration) that represents the area of past flooding.

The flood zone covers three towns. As shown in the following illustration, MapInfo Pro calculates the proportion of the population in those three towns that is within the flood zone and reports the sum in a temporary column in the Flood table. Similarly, MapInfo Pro calculates the proportion average of property values for the same areas.

Proportion sum is best used for raw data (population, housing units, etc.) while proportion average is used for derived data (median income, average housing costs, etc.).

Example Using Proportion Weighted Average

Proportion Weighted Average is similar to proportion average except that you add a weighting factor to the average calculation. That weighting factor is another data column in your table.

For example, you want to find the best location in the area to build a new upscale shopping mall. You believe the mall will draw people from a 20-mile radius. You are considering five potential sites

and you want to place the mall where you can find the optimum combination of population and income.

To do this, create a temporary column in your Mall table with data from your Towns table that contains the proportion of each town's population affected by the potential mall. Use the median income for each town as the weighing factor. In this example MapInfo Pro determines the join automatically to be where the town boundaries intersect the 20-mile buffers around the potential sites.

The best location of the mall will be at the site that returns the highest value of the temporary column, as shown in the Browser in the next figure.

Update Column

Table to Update: Mall

Column to Update: Add new temporary column

Get Value From Table: Towns

Calculate: Proportion WtAvg

of: Population

Weighting Expression: Median_Income

☒ Browse Results

OK Cancel Clear

Specify Join

Join

☐ where County from table Mall

matches County from table Towns

☒ where object from table Towns

☐ intersects object from table Mall

OK Cancel Help

Mall	PropWtAvgOfPopulation
Site1	60,036
Site2	86,661
Site3	90,240
Site4	130,869
Site5	97,211

Browsing a Table

There are times when viewing the tabular data in a table is necessary. In MapInfo Pro, this is called browsing the table.

To browse a table:

1. On the **TABLE** tab, click **New Browser**.
2. Choose the table you wish to browse and click **OK**.

The **Browser** shows the fields of the data table (column headings) and the records of data (rows).

A Browse command item gives you further functionality. With the **Browser** window active, on the **TABLE** tab, click **Pick Fields** from the **Browser Tools** group, to display only the columns of data you want to see. If you wish to show information that is only implicit in the base table, in the **Pick Fields** dialog box, choose Expression from the Fields in Table list. For more on expressions see [Deriving Columns](#), or [Creating Query Expressions](#).

To show or hide the **Browser** window grid, on the **PRO** tab, click **Options**, and **Legend Window**. Enable or disable the **Display Grid by Default** option.

To add new records to the **Browser**:

1. On the **TABLE** tab, click **Add New Row** from the **Edit** group to add a row (or use **Ctrl-E**).
2. Enter text directly into each field. As you type, press **Tab** or **Shift+Tab** to move from field to field.
3. You must remember to save the new information to the base table before exiting the program.

Click the row header, to the left of each row in the **Browser** window, to select a row. If the Map window for the table is open, the record is selected as well. To add records to the selection, **Shift** and drag to select consecutive records, or **CTRL-click** non-consecutive records.

Selecting records creates a subset of the table that you can browse or map just like the full table. More on selecting is found later in [Selecting and Querying Data](#).

Restrictions on MapInfo Files

Table Length Limit

MapInfo tables (.TAB) have a limit of 250 columns and a limit of 254 characters in a column. The longest record that can be created is 63,500 bytes (250 x 254). Tables with record lengths that exceed 4000 bytes, save with a version number of 1200.

MapInfo tables (.TAB) have a limit of 1000 columns and a limit of 254 characters in a column. The longest record that can be created is 63,500 bytes (250 x 254). Tables with record lengths that exceed 4000 bytes, save with a version number of 1200.

Table Names

For Oracle, PostGIS, and SQL Server databases, MapInfo Pro stores information about spatial tables and views in the database in a special table called a Map Catalog (a MAPINFO_MAPCATALOG file). For more details, see [Creating a Map Catalog in the DBMS](#). The table name on a server is limited by the MAPINFO_MAPCATALOG, which only accepts a TABLENAME of no more than 32 characters.

When uploading a table to SQL Server or to PostGIS and the table name is longer than 32 characters, MapInfo Pro displays an error:

Failed to add to the MAPINFO.MAPINFO_MAPCATALOG

The table uploads to the server with the long table name, but an entry is not created in the MAPINFO_MAPCATALOG for the table. You cannot work with this table from MapInfo Pro unless you upload it again with a table name that is no longer than 32 characters.

When uploading a table to Oracle, there is no warning message. The table uploads and the name on the server in the MAPINFO_MAPCATALOG is truncated to 32 characters. You can work with this table from MapInfo Pro.

Column Type and Name Limits

When opening your own data in MapInfo Pro, a table file can only have one geometry column. It cannot have multiple geometry columns.

MapInfo Pro requires a numeric, unique indexed column on a table. Columns of type GUID are not supported.

Column names in MapInfo TAB files cannot start with a number.

For restrictions on MapInfo Enhanced (NativeX) Tables, see [MapInfo Enhanced \(NativeX\) Table Limitations](#)

MapInfo Enhanced (NativeX) Table Limitations

MapInfo Pro uses two native TAB file formats, MapInfo TAB (Native) and MapInfo Extended TAB (NativeX). The NativeX format was created to extend the limits on the original native format: where native TAB files have a 2GB file size limit, nativeX TAB files do not.

NativeX tables may have up to 1000 fields. The following list describes this feature and its limitations:

- You can import ASCII .TXT and .CSV files that have up to 1000 columns.
- Saving a NativeX table as a GeoPackage (GPKG) table limits the number of columns to 999, because MapInfo Pro adds an ID column to GPKG tables.
- In the **Table Structure** dialog, the **Add** button disables after 1000 fields.
- Using a MapBasic **Create Table** statement to create a table approaching 1000 columns at once, especially with long column names, may reach the internal MapBasic command string limit.

Note: The maximum character length of a MapBasic command or a query is 32768 bytes, or less than 16K bytes in double-byte character sets.

- Due to the MapBasic command string length limit, use the **Create Table** statement to make a simple table, then use the **Alter Table** statement within a loop to add more columns up to the maximum limit of 1000.
- MapInfo Enhanced (NativeX) tables and MIF\MID files with more than 250 columns are versioned to 1600 or later.
- When creating a new table and then adding more than 250 columns to it, MapInfo Pro automatically switches the save format to MapInfo Enhanced (NativeX).
- You cannot export NativeX tables with more than 250 columns to DBASE (*.DBF) or Microsoft Access (*.MDB*.ACCDB), because of their file format limitations.
- You cannot export NativeX tables with more than 250 columns to Oracle, SQL Server, or PostGIS DBMS tables. You can export these tables to SQLite format tables.

The maximum number of indexes is 40.

Putting Your Data on the Map

As we saw in [Data - Where MapInfo Pro Begins](#), you can convert your existing data to a format that MapInfo Pro can use to display it on a map. Now you are getting somewhere! But how does MapInfo Pro know where to put the information on a map? That is the subject of this section.

How Do I Get My Data on the Map?

There are three steps to putting your organization's data on a map:

- Creating a MapInfo .TAB file of your data
- Geocoding or creating points for the data
- Displaying your points on a map

Creating a MapInfo .tab File of Your Data

The first step in using your data in MapInfo Pro is to create that .TAB file from your data. This process takes the data you have created (either a spreadsheet or database) and extracts the information into a .TAB file that MapInfo Pro can use. Your data remains in tact as we go through this process. The process that MapInfo Pro uses depends upon the type of format your data is in. You can create a MapInfo table of the following data file format types:

- Microsoft Excel (.XLS or .XLSX)
- Microsoft Access (.MDB or .ACCDB)
- SQLite (.SQLITE)
- d-Base (.DBF)

- Lotus 123 (.WKS, WK1)
- ASCII (.TXT)
- Comma Delimited files (.CSV)
- RDBMS (Oracle, SQL Server, PostgreSQL with PostGIS)
- XML (Web Map Service)
- GeoPackage (.GPKG)
- OGR (.dxf; .csv; .txt; .shp; .geojson; .json; .gml; .kml; .kmz; .sqlite; .gpkg; .xls; .xlsx; .ods)

For database versions that MapInfo Pro supports, see the *MapInfo Pro Install Guide*.

Note: The process for creating a .TAB file from ASCII data is called "registering" instead of creating because we are actually making a series of pointers to the ASCII data. The process is different but your resulting files behave the same way.

Once you have a Mapinfo .TAB file of your data, you need to either geocode or create points for the data. You are then ready to display your data on a map, as described under [Displaying Your Data on the Map](#).

When Do I Geocode vs. Create Points?

There are two processes that MapInfo Pro uses to identify and plot your data on a map.

During *Geocoding*, MapInfo Pro reads data such as street data, postal code data, and other non-coordinate information from your database and matches it against street or postal code information on a MapInfo data table.

During the *Create Points* process, MapInfo Pro reads X and Y coordinate data (such as longitude and latitude data from a Global Positioning System) and plots data using those coordinates. Use the appropriate process to the type of data you have collected.

For more specific instructions on creating points, see:

- For more about the geocoding process, see [Geocoding - Assigning Coordinates to Records](#)
- For more about the create points process, see [Putting Latitude/Longitude Coordinates on a Map](#).

Note: If your data is in non-MapInfo format before you geocode or create points, you must convert it before using either of these processes.

See Also:

[Geocoding Manually](#)

[Geocoding by Address](#)

[Geocoding by Boundary](#)

[Geocoding by US_ZIPS.TAB \(Postal Code Centroid File\)](#)

[Geocoding by Server](#)

Displaying DBMS and Web Service Data

Displaying Your Remote DBMS Data

The process for displaying spatial data from Oracle, SQL Server, or PostGIS is different from the tables we have discussed so far. For more information about accessing remote data, see [Getting Started](#).

Note: For database versions that MapInfo Pro supports, see the *MapInfo Pro Install Guide*.

Displaying and Importing Data from a Web Map Service

A Web Map Service (WMS) is a technology that gives you a source for data over your Intranet or over the Internet. This innovation is based on a specification from the Open GIS Consortium (OGC) and allows you to use raster map images from servers that also comply with the specification. You must specify the coordinate system within your data request to ensure that the images you retrieve "sync up" or register with your other map data.

This specification supports transparent pixel definition for image formats as well. This allows you to use the images you retrieve as overlays and not solely as the bottom layer of your map.

WMS data may not exist for the geography you are looking for. Further, the data that is provided is determined by the WMS server.

Note: You must have a working Internet connection to retrieve or use WMS data.

Displaying your Excel (.XLS or .XLSX) Data

You can create a .TAB file from an Excel file that is up to 64K in size.

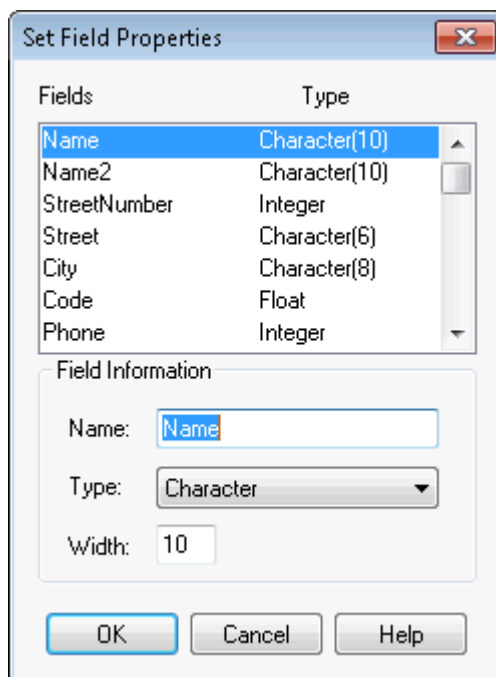
To create a .TAB file from your Excel (.XLS or .XLSX) data:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Files of Type** list select (.XLS or .XLSX), navigate to your data, and click **Open**.
3. Select the worksheet you want in your MapInfo data table. Make sure that this data includes either postal codes or longitude/latitude coordinate values.

The default data range for an Excel file is the entire worksheet.

- If you select the **Use Row Above Selected Range for Column Titles** check box, the default data range begins at A2 (row 2).
 - If you clear the **Use Row Above Selected Range for Column Titles** check box, both the **Named Range** and **Current Value** fields revert to their previous values on the Entire Worksheet.
4. Click **OK** to display the **Set Field Properties** dialog box.

This dialog box allows you to reset the name, type and properties of any field (column) that you import from the Excel table. The top of the **Set Field Properties** window shows the **Fields** (column names) and **Type** (character, date, etc.) from the Excel spreadsheet. When you select one of these fields, the **Field Information** box entries at the bottom allow you to specify the field name, data type, number of characters (for character and decimal fields) or number of decimals (for decimal fields only).



Note: If you click **Cancel**, MapInfo Pro cancels the import operation.

- Click **OK** to convert the data to a MapInfo table (.tab) format. Now that you have converted your data, you can plot your data; see the next section to continue.

You can only read information from these files. When you want to do other tasks, see [Working with Spreadsheets](#).

Default Range Options When Importing Microsoft Excel Files

The default range for data when opening an Excel file is the entire worksheet. However, if the **Use Row Above Selected Range for Column Titles** check box is selected, the default data range will begin at A2 (row 2). In this case, in the Excel Information window, both the **Named Range** and **Current Value** fields will indicate that data starts in row 2.

The starting row is changed from the first to the second only if the current starting row is the top row. Otherwise, no change will be made to the values.

If you clear the **Use Row Above Selected Range for Column Titles**, both the **Named Range** and **Current Value** fields will revert to their previous values on the Entire Worksheet.

Controlling Treatment of Imported Excel Tables

When opening an Excel spreadsheet, you can specify how each column is imported. For example, the user might want a 'Date' column in Excel to be a Text column in MapInfo Pro.

When you import an Excel spreadsheet into MapInfo, a Set Field Properties window allows you to reset the name, type and properties of any field (column) that is imported from the Excel table. The top section of the Set Field Properties window shows the Fields (column names) and Type (character, date, etc.) from the Excel spreadsheet. When you select one of these fields, the bottom part of the window allows you to change the MapInfo field name, data type, number of characters (for character and decimal fields) or number of decimals (for decimal fields only).

If you click **Cancel**, the Excel table importing operation is canceled.

Controlling how MapInfo Pro Handles Mixed Data Type Columns

When working with an Excel 2010 table in MapInfo Pro if there are mixed types of data in one column, such as float, text, date, and time, then MapInfo Pro treats all the data in the column as text. If MapInfo Pro treats the data type of the column as something other than text, then you can correct this by updating a Microsoft ACE (Access Connectivity Engine) registry key.

MapInfo Pro detects when an Excel 2010 table has a column with mixed data types, because of the ACE setting in the registry. This registry key is called `ImportMixedTypes` and is located in the registry under `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Office\14.0\Access Connectivity Engine\Engines\Excel`. It decides how to import mixed data and by default it is set to a text value. A secondary registry key called `TypeGuessRows` determines how many rows to scan for each column before the ACE decides that a column has mixed data types. A value of zero (0) scans all the rows to determine if a column has mixed data types; the default setting is eight (8) to scan eight rows.

To ensure that the data types of all columns are detected correctly, change the `TypeGuessRows` key in the registry to zero (0). Note that scanning all of the rows in a large spreadsheet can be slow. To edit the registry, you will need Administrator privileges. If you do not have the required privileges, then ask your System Administrator to assist you.

CAUTION: This is not a MapInfo-specific setting. Changing the `TypeGuessRows` setting affects all applications that use ACE to open Excel files, such as Microsoft Access.

Note: The column data types can be overridden through the **Set Field Properties** dialog box when opening the spreadsheet in MapInfo Pro.

Before modifying the `TypeGuessRows` key in the registry, make a backup:

1. Close any programs that are running.
2. On the **Start** menu, in the **Search programs and files** field, type **regedit**. Click **OK** to display the Registry Editor window.
3. In the **HKEY_LOCAL_MACHINE** entry, navigate to **Software > Microsoft > Office > 14.0 > Access Connectivity Engine > Engines > Excel**.

4. Highlight the **Excel** folder and then on the **File** menu, click **Export**.
5. In the **Export Registry File** dialog, specify a location and file name to backup to and then click **Save**.
6. Continue to the next set of instructions to set the `TypeGuessRows` key.

To set the `TypeGuessRows` key:

1. Select `TypeGuessRows` and on the **Edit** menu click **Modify** to display the **Edit DWORD Value** dialog box.
2. In the **Value** data field, type **0** (zero) and click **OK**.

This option takes effect the next time you open MapInfo Pro.

Displaying your Access (.MDB or .ACCDB) Data

To convert your Microsoft Access (.MDB or .ACCDB) data into a MapInfo Pro table:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. Choose **Microsoft Access Database** from the **Files of type** menu. The Access databases (.MDB or .ACCDB) for the specified location display.
3. Choose an Access database to open. If security is turned on, you will be prompted to give user and password information to open the database.
4. The **Open Access Table** dialog box displays the tables for the opened database.
5. Choose an Access table or tables to open. The table or tables are opened in MapInfo Pro. (For a table name with a space, such as `Order Details`, can be saved in MapInfo Pro but subsequently will not be visible to MapInfo Pro.)

After you open an Access table in MapInfo Pro for the first time, MapInfo Pro creates a definition for the table and gives it a .TAB extension. This enables you to treat it like any other MapInfo Pro table. For example, to open this file you would now open it like any other MapInfo Pro table.

Note: Even though the table has the .TAB extension in MapInfo Pro, your data is still in your original Access database table and is not a duplicate.

Microsoft Access Table Specifications

A table in Access must have an auto-counter column with a unique index or primary key set on that column. Otherwise, MapInfo Pro will alter the table to fit this requirement.

The Access table being brought into MapInfo Pro must be a flat Access table, for example, the table must not contain fields that point to data in other Access tables.

Memo, OLE, and Replication ID field types from an Access table will not be brought into MapInfo Pro.

Text field length cannot exceed 2047 characters. If the length exceeds 2047 characters, the field is brought in as read-only.

Creating an Access Table in MapInfo Pro

You can create a new Microsoft Access table in an existing Microsoft Access database (.MDB or .ACCDB), or in a new database. After you create an Access table in MapInfo Pro for the first time, MapInfo Pro creates a definition for the table and gives it a .TAB extension. This enables you to treat it like any other MapInfo Pro table.

Note: Even though the table has the .TAB extension in MapInfo Pro, your data is still in your original Access database table and is not a duplicate.

MapInfo Pro is multi-user enabled. MapInfo Pro users and users of other applications can simultaneously view and modify records from a table in an MS Access database, provided that the other applications do not open the database exclusively.

However, attempts to use the following commands (on the **TABLE** tab, in the **Maintenance** group, click **Table**) will fail if another application-including another instance of MapInfo Pro-is using the table:

- **Modify Structure**
- **Pack Table**
- **Delete Table**
- **Rename Table**

Note: Access databases are accessible on read-only media. A table must have a counter-column to be used in a read-only database.

To create an Access table in MapInfo Pro:

1. On the **TABLE** tab, in the **Content** group, click **New Table** to open the **New Table** dialog box.
2. Decide how you want to display the new table and select from the following check boxes. You can choose more than one and MapInfo Pro will add the new windows accordingly.
 - **Open New Browser** - Select this check box to display the new table as a **Browser** window.
 - **Open New Mapper** - Select this check box to display the new table as a **Map** window.
 - **Add to Current Mapper** - Select this check box to add the new table to the current **Map** window.
3. Decide the table structure you want for your new Access table. Select one of the following:
 - **Create New** - Select this button to create a new table structure.
 - **Using Table** - Select this button to create the new table based on the table structure of an existing table. Select the table you want to copy from the drop-down list.
4. After you complete these selections, click **Create**. The **New Table Structure** dialog box displays.

Note: If you selected the **Using Table** button in the previous step, the fields in the table you copied display in the **New Table Structure** list.

5. Do one of the following:
 - If you are adding an entirely new table, click the **Add Field** button and add the fields you want this table to contain. Continue to add fields until your table is complete.
 - If you are copying an existing table, click the **Add Field** button to add fields, or highlight a field you want to remove and click the **Remove Field** as appropriate.
6. When the table structure is complete, click **Create** to create the table. The **Create New Table** dialog box opens.
7. In the **Save in** field, specify the path to use to create the MapInfo Pro table definition (.tab file) of your Access file. The MapInfo Pro .TAB file keeps information about an Access file registered in MapInfo Pro.
8. In the **Save As Type** field choose **Microsoft Access Database** and click **Save** to display the **Save Access Table** dialog box. The default database displays in the dialog box. The default is determined by the name of the .TAB file you entered. The default has the same name as the .TAB file. A database for this file may or may not exist.
 - If the database you specified does not exist, you can use the **Save Access Table** dialog box to specify the version of Microsoft Access you want to use for the database. Choose from the **Version** drop-down list.
 - If a database does exist, the **Save Access Table** dialog box indicates the version of the database. It also lists the tables in the database.
9. To create your table in the default database, use the default file name or enter a new one in the **Enter the name of the new Access table** field.

The default file name is the same name specified in the **Create New Table** dialog box. Click **OK** to create the new table to the default database.

To save this table into another database, proceed to the next step.
10. Click the **Database** button. The **Select Access Database** dialog box displays.
11. In the **Save in** drop-down list, specify the location of the Access database. This is where you will create the table.
12. Click the database you want to create the table in. The name displays in the **File Name** box. To specify a new database, enter the name in the **File Name** box.
13. Click **Save** to open the **Save Access Table** dialog box again.

If you chose an existing database, the name and version display in the dialog box. Any tables already in the database are listed in the **Existing Tables** box.

If you specified a new database, select the database version from the **Version** drop-down list.
14. The file name you chose in the **Create New Table** dialog box displays in the **Enter the name of the new Access table** box. You can use this name or specify a different name. Click **OK**.

MapInfo Pro creates the table as a Microsoft Access table in the database you specified.

Saving a MapInfo Pro Table as an Access Table

To save a MapInfo Pro table as an Access table:

1. On the **TABLE** tab, in the **Content** group, click **Save Table** or **Save Copy As**.
2. If the **Save Copy As** dialog box opens, select the table to save from the list of open tables and click **Save As**.
3. In the **Save in** field, specify the location where you want to save the MapInfo Pro table definition of your Microsoft Access file. The MapInfo Pro table definition is the .TAB file. It is used by MapInfo Pro to keep information about an Access file registered in MapInfo Pro.
4. In the **Save As Type** field choose **Microsoft Access Database**.
5. Click **Save** to open the **Save Access Table** dialog box. The default database displays in the dialog box. The default is determined by the .TAB file you selected. It has the same name as the .TAB file. A database for this file may or may not exist.
 - If the database you specified does not exist, the **Save Access Table** dialog box enables you to specify the version of Microsoft Access you want to use for the database. Choose from the **Version** drop-down list.
 - If a database does exist, the **Save Access Table** dialog box indicates the version of the database. It also lists the tables in the database.
6. To save your table, use the default file name or enter a new one in the **Enter the name of the new Access table** box. The default file name is the same name specified in the **Save Copy As** dialog box. Click **OK** to save the new table in the default database.

To save your table to a database other than the default, go to step 6.

7. Click the **Database** button to open the **Select Access Database** dialog box.
8. In the **Save in** list, specify the location of the Access database.
9. Click the database you want to save the table in. The name displays in the **File Name** box. To specify a new database, enter the name in the **File Name** box.
10. Choose **Save** to open the **Save Access Table** dialog box again.
 - If you chose an existing database, the name and version display in the dialog box. Any tables already in the database are listed in the **Existing Tables** box.
 - If you specified a new database, select the database version from the **Version** drop-down list.
11. If you want to use a different file name, enter the name in the **Enter the name of the new Access table** box, and click **OK**. MapInfo Pro saves the table as you specified.

Saving an Access Table as Another Access Table

This option is used to save an Access table to a different database. The process is similar to saving a native MapInfo Pro table. Use the **Save Copy of Table As** dialog box to specify the database path and name, then use the **Save Access Table** dialog box to specify the name of the new table.

Limitations of Working Directly with Access Tables

The following limitations apply when working directly with Access tables:

- There is no decimal data type support. If you modify the table structure of an Access table in MapInfo Pro and change a FLOAT type to a DECIMAL, the type changes to FLOAT.
- The MapBasic Pack Table statement saves a copy of the original Microsoft Access table without the columns that MapInfo Pro does not support. If a Microsoft Access table has a MEMO, OLE, or LONG BINARY type column, it is lost during a pack.
- Compact your database. Each time a table is renamed, you use up disk space. The space used up is the space the original table was taking up. MapInfo Pro renames the table when the structure is altered and when the rename statement is issued. A Microsoft Access database may be compacted using the ODBC Administrator or Access itself. To compact an Access database using the ODBC Administrator, see the ODBC Administrator's *Help System*. To compact an Access database using Access, see Access's *Help System*.
- Access recognizes Time in a Date/Time field but MapInfo Pro only recognizes Dates. Therefore, MapInfo Pro translates Time values to 12/30/1899.
- For more specific instructions on creating points, see [Putting Latitude/Longitude Coordinates on a Map](#).

Displaying your SQLite Data

MapInfo Pro supports SQLite databases through OSGeo FDO Data Access Technology, so that you can work with spatial data stored in SQLite database files. This means that:

- you can display your existing SQLite data on a map in MapInfo Pro;
- you can save your MapInfo tables to your existing SQLite database to take advantage of the capabilities provided by a transactional SQL database engine;
- you can create a new SQLite database from MapInfo Pro;
- you can share spatial data with other applications, such as Autodesk products: AutoCAD Map 3D, Civil 3D, and Autodesk Infrastructure Modeler.

To start working with your data stored in a SQLite database, see [Opening SQLite Tables](#).

FDO (Feature Data Objects) is an interface for storing, retrieving, updating, and analyzing spatial data. MapInfo Pro installs an FDO Provider for SQLite (spatial), so that you can work with SQLite database files. The OSGeo FDO Data Access Technology stores geometry data to a SQLite database as FGF (Feature Geometry Format) objects. For more information about FDO, see <http://fdo.osgeo.org>.

For information on how MapInfo objects map to FGF objects for SQLite database connections, see [Mapping FGF Objects in a SQLite Database to MapInfo Objects](#).

MapInfo Pro works with data created in Autodesk products, such as AutoCAD Map 3D, Civil 3D, and Infrastructure Modeler, that has been stored in SQLite database format. You can view this data in

MapInfo Pro, save changes made to the data, and then continue to work on the data in the Autodesk products.

Note that there are some limitations reading and writing text layers created in AutoCAD Map 3D, which are outlined under [Sharing Data with Autodesk's AutoCAD Map 3D](#).

For background information:

- about SQLite, see <http://www.sqlite.org>
- about FDO, see <http://fdo.osgeo.org>

Opening SQLite Tables

MapInfo Pro lets you select which tables in a SQLite database to open, and gives you the option to set display styles, and column and row filters for the tables.

MapInfo Pro works with existing SQLite databases and it lets you create new SQLite databases. You can open a table in a SQLite database and save your edits, and you can save your new or existing MapInfo tables to a SQLite Database (*.sqlite).

To open one or more tables in a SQLite database:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table**.
2. In the **Open** dialog box, from the **Files of type** list, select **SQLite Database (*.sqlite)**.
3. From the **Look in** list, select the folder location of the database that you want to access.
4. From the files list, select the database to open.

To select more than one database file in the **Open** dialog box, press the **Ctrl** or **Shift** key while selecting files.

5. Click **Open**. The **Select One or More Tables to Open** dialog box opens.
6. In the **Database Tables** list, select a table to open by adding a check mark beside the table name.

You can select one or more tables. Only the tables that have a check mark beside them will open.

7. Optionally, select how you want the data to display on the map by selecting (highlighting) the table name and clicking **Style**.

This opens the **Change Table Object Style** dialog box where you can specify the display style for geometry (spatial object types), such as symbols, lines, and regions in the table. The custom styles that you set only apply to the table that you highlighted (whether it has a check mark beside it or not).

To select more than one table, press **Ctrl** while selecting table names. Your style choices are made to all of the tables that you select (that are highlighted in the **Database Tables** list).

8. From the **View** list, select how you want to open the tables.

Select **New Mapper** or **Current Mapper** to open them in a **Map** window, or **Browser** to open them in a **Browser** window to see the table contents.

9. Click **OK**.

The table, or tables, from your selection open in MapInfo Pro.

If you choose to open more than one SQLite database (.sqlite file) in the **Open** dialog box, then each database opens a **Select One or More Tables to Open** dialog box. Repeat the previous steps for each database.

For additional information, see:

- [Applying Custom Options when Opening Database Tables](#)
- [Changing the Folder Location of the MapInfo TAB File for a Database Table](#)

Mapping FDO (SQLite) Coordinate Systems to MapInfo Coordinate Systems

If MapInfo Pro has an issue identifying a coordinate system when it opens a table in a SQLite database, then it opens the **Choose Projection** dialog box. In this dialog box, you would associate a coordinate system with the table. MapInfo Pro then saves this information to the TAB file for the table and reads it every time you open the table.

For very experienced users who understand how to work with MapBasic strings and coordinate systems, there is an advanced customization option. When MapInfo Pro opens a SQLite table, it converts the SQLite coordinate system definition into a MapBasic `CoordSys` (coordinate system) string. MapInfo Pro installs with a file called MapInfoCoordinateSystemSet.xml where you can customize the translations from SQLite Well Known Text (WKT) coordinate system definitions to MapBasic `CoordSys` (coordinate system) strings and back.

Saving Your Data to a SQLite Database

You can save your MapInfo tables to a new or existing SQLite Database (*.sqlite).

Saving your Table to a New SQLite Database

Before you begin, you must have a MapInfo table open in either a **Map** or **Browser** window.

To save your data to a new SQLite database:

1. On the **HOME** tab, in the **File** group, click **Save Table** or **Save Copy As**.
2. If the **Save Copy As** dialog box opens, select the table to save from the list of open tables and click **Save As**.
3. In the **Save Copy of Table As** dialog box, select **SQLite Database (*.tab)** from the **Save as type** list. Make the following optional selections for the SQLite table that you will create for your data:
 - From the **Save in** list, select the location to save the new SQLite table to.
 - In the **File name** box, type a name for the new SQLite table, or keep the default name.

Click **Save**.

4. In **Select SQLite Database File** dialog box, make the following optional selections for the SQLite database that you will create:
 - From the **Save in** list, select the location to save the new SQLite database to. You can specify a different location for the SQLite database than what was specified for the SQLite table.
 - In the **File name** box, type a name for the new SQLite database, or keep the default name.
 - Select the **Create MapCatalog Table** check box if you want this SQLite database to have a Map Catalog. To decide if you want a Map Catalog, see [Using a MapInfo Map Catalog with a SQLite Database](#).

Click **Save**.

MapInfo Pro saves the SQLite table and SQLite database and opens a connection to the new database.


To work with this new SQLite table, on the **HOME** tab, in the **File** group, on the **Open** list, click **Table**. In the **Open** dialog box, select from the **File of type** drop-down list. The new SQLite database is in this list of available file types and database connections. The SQLite database name is prefaced with FDO, so the database MyDatabase.sqlite is FDO: MyDatabase.sqlite in the list. In the **Select one or More tables to Open** dialog box, check the table name in the list and then click **OK**. For details, see [Opening SQLite Tables](#).

If you chose not to create a Map Catalog for your table, you can do so at a later time as described under [Manually Creating a MapInfo_MapCatalog](#).

Adding your Table to an Existing SQLite Database

Before you begin, you must have a MapInfo table open in either a **Map** or **Browser** window.

To add tables to an existing SQLite database:

1. On the **HOME** tab, in the **File** group, click **Save copy As**.
2. If the **Save Copy As** dialog box opens, select the table to save from the list of open tables and click **Save As**.
3. In the **Save Copy of Table As** dialog box, select a SQLite database connection from the **Save as type** list. If you do not see the SQLite database connection in this list:
 - a. On the **HOME** tab, in the **File** group, in the **Open** list, click **Database Table** .
 - b. In the **Open DBMS Connection** dialog, select **FDO (SQLite)** from the **Connection Type** drop-down list, and then click **New**.
 - c. In the **Select SQLite Database File** dialog box, select the location of the SQLite database from the **Look in** list. Select the SQLite database name and then click **Open**.

The **Save Copy of Table As** dialog box refreshes the **Save as type** list with the SQLite database name.

4. Make the following optional selections for the SQLite table that you will create for your data:

- From the **Save in** list, select the location to save the new SQLite table to. It does not have to be the same location as the SQLite database that you are saving to.
- In the **File name** box, type a name for the new SQLite table, or keep the default name.

Click **Save**.

5. In the **Save As** dialog box, make the following optional selections for the MapInfo TAB file that will save for this SQLite table. The MapInfo TAB file will store metadata for the table, such as the table type and path to the SQLite database that the table is stored in.

- From the **Save in** list, select the location to save the TAB file to. We recommend keeping the default location, so that it is easy to find your tables.
- In the **File name** box, type a name for the new SQLite table. We recommend keeping the default name, so that you will know which TAB file belongs to which SQLite table.

Click **Save**.

MapInfo Pro saves the new SQLite table to the SQLite database.

To work with this SQLite table, on the **HOME** tab, in the **File** group, click **Open**, and **Database Table**. From the **File of type** drop-down list, select the SQLite database name (such as FDO: MyDatabase.sqlite). In the **Select one or More tables to Open** dialog box, check the table name in the list and then click **OK**. For details, see [Opening SQLite Tables](#).

Setting Live or Linked Access when Opening SQLite Tables

When opening a SQLite database table, as described under [Opening SQLite Tables](#), you can select the **Live** or **Linked** options in the **Select One or More Tables to Open** dialog box. By default, the table opens with live access with caching turned on, so that you access it directly from its source location with the additional speed that caching provides. To change how you access an already open table, you must close it and open it again.

For more information, see [Setting Live or Linked Access when Opening Database Tables](#).

Opening SQLite Tables Using Column and Row Filters

You can apply column and row filters on a SQLite database table before opening it in MapInfo Pro. Filters let you choose which columns and rows to fetch from the data source. You would do this to reduce the amount of information that you will work with and reduce the time it takes to fetch and save the data.

To apply column and row filters on a SQLite table when opening it:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. From the **Files of type** list, select **SQLite Database (*.sqlite)**.
3. From the **Look in** list, select the folder location of the SQLite database that you want to access.
4. From the files list, select the SQLite database to open.
5. Click **Open** to display the **Select One or More Tables to Open** dialog box.

6. In the **Database Tables** list, select one or more tables to open.
7. Click **Options** to open the **Open DBMS Table Options** dialog box.
8. Select **Standard Mode** and then click **Column Filters**.

The **Column Picker** dialog box opens.

9. Choose which columns to fetch from the table and then click **OK**.

For information about setting column filters, see [Setting a Column Filter](#).

10. Select **Row Filter** to open the **Row Picker** dialog box.
11. Choose which rows to fetch from the table and then click **OK**.

For information about setting row filters, see [Setting a Row Filter](#).

12. If working with large data files, larger than 2GB, then under **MapInfo TAB File** select **MapInfo Extended** from the **Format** list. You can also select the character set of the data file from the **Charset** list.

Note: The default **Format** and **Charset** settings are software preferences, see [Setting Your Language Preferences](#).

13. Click **OK** to close the **Open DBMS Table Options** dialog box.
14. From the **View** list, select how you want to open the tables.

Select **New Mapper** or **Current Mapper** to open them in a Map window, or **Browser** to open them in a Browser window to see the table contents.

15. Click **OK**.

The table opens in MapInfo Pro with only the columns and rows that you selected to fetch.

To create your own table filter in standard SQL syntax, see [Creating Your Own Table Filter](#).

Mapping FGF Objects in a SQLite Database to MapInfo Objects

The OSGeo FDO Data Access Technology stores geometry data to a SQLite database as FGF (Feature Geometry Format) objects. This section lists the object mappings between FGF (Feature Geometry Format) objects in a SQLite database to MapInfo objects. This information is helpful when creating object data that you plan to share with other applications, because it will help you understand how an object will be handled in another application.

The mappings between FGF object types and MapInfo Object types are:

FGF Object	MapInfo Object
FGF_Geom_None	P_NULL

FGF Object	MapInfo Object
FGF_Geom_Point	P_POINT
FGF_Geom_MultiPoint	P_MPOINT
FGF_Geom_LineString	P_PLINE
FGF_Geom_MultiLineString	P_PLINE with multiple parts
FGF_Geom_Polygon	P_REGION with zero or more holes
FGF_Geom_MultiPolygon	P_REGION with multiple parts, each with zero or more holes
FGF_Geom_MultiGeometry	P_COLLECTION
FGF_Geom_CurveString	P_PLINE
FGF_Geom_MultiCurveString	P_PLINE with multiple parts
FGF_Geom_CurvePolygon	P_REGION
FGF_Geom_MultiCurvePolygon	P_REGION with multiple parts

The mappings between MapInfo object types and FGF object types are:

MapInfo Object	FGF Object
P_POINT	FGF_Geom_Point
P_LINE	FGF_Geom_LineString

MapInfo Object	FGF Object
P_ARC	FGF_Geom_LineString
P_PLINE	FGF_Geom_LineString or FGF_Geom_MultiLineString if multiple parts
P_REGION	FGF_Geom_Polygon - One exterior polygon. If it has multiple parts then each part is defined in a ring. FGF_Geom_MultiPolygon - More than one exterior polygon. If each exterior polygon has multiple parts then each part is defined in a ring
P_RECT	FGF_Geom_Polygon
P_ROUNDRECT	FGF_Geom_Polygon
P_ELLIPSE	FGF_Geom_Polygon
P_MPOINT	FGF_Geom_MultiPoint
P_COLLECTION	FGF_Geom_MultiGeometry

Unsupported MapInfo objects are:

- P_NULL
- P_TEXT
- P_WINDOWPORT
- P_PIECHART
- P_BARCHART

When creating arcs, ellipses, or rounded rectangles in MapInfo Pro and then saving them back to a SQLite table, you may be asked to convert them to supported FGF object types. The MapInfo objects convert from arc to polyline, ellipse to polygon, and rounded rectangle to polygon.

Using a MapInfo Map Catalog with a SQLite Database

MapInfo Pro opens SQLite database tables as mappable without requiring a MapInfo Map Catalog. With other types of databases, such as Oracle or SQL Server, MapInfo Pro stores information about spatial tables and views in the database in a special table. The table file is called `MAPINFO_MAPCATALOG` (the Map Catalog). MapInfo Pro does not need to do this with a SQLite database.

The only reason to create a Map Catalog with SQLite tables would be to store default information, such as view, style, and per row style. If you choose to create a Map Catalog, then it must be named `MAPINFO_MAPCATALOG` (all uppercase).


For instructions on how to create a Map Catalog, see [Manually Creating a MapInfo_MapCatalog](#).

Opening a Map Catalog Stored in a SQLite Database

MapInfo Pro treats the Map Catalog as a system table. To open a Map Catalog in MapInfo Pro, you must select to view system tables when opening a SQLite database.

To open a Map Catalog in a SQLite database:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. From the **Files of type** list, select **SQLite Database (*.sqlite)**.
3. From the **Look in** list, select the folder location of the SQLite database that you want to access.
4. From the files list, select the SQLite database to open.
5. Click **Open** to display the **Select One or More Tables to Open** dialog box.
6. Click **Filter Tables** to open the **Filter Tables** dialog box.
7. Select the **System Tables** check box and then click **OK**.
8. In the **Database Tables** list, select one or more tables to open.
9. From the **View** list, select how you want to open the tables.

Select **New Mapper** or **Current Mapper** to open them in a **Map** window, or  to open them in a **Browser** window to see the table contents.

10. Click **OK**.

How to Process Map Bounds for SQLite Database Tables Faster

MapInfo Pro calculates the map boundary for spatial data tables before displaying table data on a map. This calculation can be slow for large tables. Advanced users may want to improve table processing times by having MapInfo Pro use the FDO coordinate system information for map bounds instead of MapInfo Pro performing the calculation.

MapInfo Pro saves a .TAB file the first time it opens a SQLite database table and stores default display settings and database connection settings to the .TAB file. MapInfo Pro then reads the TAB file every time it opens the SQLite table. The TAB file can be modified to specify whether to read map bounds from the FDO coordinate system information or from a Map Catalog that you create for

your SQLite database. By default, these TAB files are saved to the %userprofile%\My Documents folder. The default location is:

```
C:\Users\<username>\My Documents
```

To have MapInfo Pro use the FDO coordinate system information for the map bounds for a SQLite table, open the corresponding TAB file in a text editor. Add `UseCoordSysBounds=TRUE` to the end of the following connection string using a semicolon (;) as a separator:

```
"\DATA LINK\ConnectionString" = "File=C:\Program
Files\MapInfo\Data\SQLite\databasename.sqlite;PROVIDER=OSGeo.SQLite;UseFdo
Metadata=TRUE;UseCoordSysBounds=TRUE"
```

How to Override Using the Map Catalog

By default, MapInfo Pro uses a Map Catalog for the map bounds for a SQLite table if it is present in the database. To override this default, add `UseMapCatalog=FALSE` to the end of the following connection string using a semicolon (;) as a separator:

```
"\DATA LINK\ConnectionString" = "File=C:\Program
Files\MapInfo\Data\SQLite\databasename.sqlite;PROVIDER=OSGeo.SQLite;UseFdo
Metadata=TRUE;UseMapCatalog=FALSE"
```

For information on how to create a Map Catalog for your SQLite database, see [Manually Creating a MapInfo_MapCatalog](#).

Working with SQLite Tables

Some Operations Require a Map Catalog

MapInfo Pro opens SQLite database tables as mappable without requiring a MapInfo Map Catalog. With other types of databases, such as Oracle or SQL Server, MapInfo Pro stores information about spatial tables and views in the database in a special table called a Map Catalog (a MAPINFO_MAPCATALOG file). MapInfo Pro does not need to do this with a SQLite database.

However, the following operations in MapInfo Pro require the presence of a Map Catalog and generate an error when working with tables in a SQLite database that do not have a Map Catalog:

- Picking a table in the **Make Table Mappable** dialog box, which only lists tables that do not have a geometry column in the SQLite table.
- Picking a table in the **Change DBMS Style** dialog box.
- Using the SERVER CREATE MAP and the SERVER CREATE STYLE MapBasic statements (these fail with an error message and error code 1730).

These operations generate the following error message when the SQLite database does not have a Map Catalog:

The MAPCATALOG on the specified connection is Read Only.

Handling Conversion of UTF-16 SQLite Source Data to ANSI MapInfo Pro Table Data

The FDO (Feature Data Objects) SQLite source data is converted from Unicode (WideChar) to the current default ANSI code page. Depending upon the conversion, it is possible that a table column may have data which cannot be represented in the target code page. If so, any non-convertible characters will be represented by the character '_' in MapInfo Pro.

When a non-convertible data found in the table column, the column is flagged as Read Only.

To prevent data loss, no change to data in the flagged column will be written back to the data store. Since the entire column is flagged as Read Only, all updates to data in this column will be disabled including data which was not converted.

If you execute an **UPDATE** or **INSERT** statement which includes this flagged column, it will return errors and the changes will be rolled back.

In MapInfo Pro, this behavior will be enabled by default. To override this default and enable update of the data store table, you must add **IgnoreUnconvertedCharUpdates=FALSE** to the FDO SQLite connection string, using a semicolon (;) as a separator.

For example:

```
"\DATA LINK\ConnectionString" =
"File=C:\ProgramFiles\MapInfo\Data\SQLite\databasename.sqlite; PROVIDER=OS
Geo.SQLite; UseFdoMetadata=TRUE; IgnoreUnconvertedCharUpdates=FALSE"
```

Display of SQLite Column Types in MapInfo Pro

When loading Date, Time, and DateTime column types from SQLite, MapInfo Pro displays them as DateTime fields:

- The Date column in SQLite displays with the correct date and with a default Time value within MapInfo Pro (for example, "05/12/2012 12:00:00.000 AM").
- The Time column in SQLite displays with the correct time and a default Date value within MapInfo Pro (for example, "-1/-1/-001 12:40:45.166 PM").
- The DateTime column displays the correct date and time (for example, example: "05/12/2012 12:42:54.770 PM").

When saving a DateTime field in MapInfo Pro back to a SQLite table, the DateTime value saves as a DateTime object (with values for both date and time) in the SQLite table. Values that contain an invalid date (such as -1/-1/-001) save with only the time portion of the value.

Displaying your Comma Delimited CSV Data

You can work with any ASCII file in MapInfo Pro, it must be delimited using a space, tab, comma, or another special character that separates one field from another. Before opening a delimited ASCII file, you must know the delimiter in use and whether or not to use the file's first line as column headings. You can check this by opening the file in any text editor, such as NotePad.

If you are working with a CSV file, it must be comma delimited to open it in MapInfo Pro.

If you want to place the point data in your CSV file on to a map, then follow these instructions to open a CSV file in MapInfo Pro and then proceed to [Putting Latitude/Longitude Coordinates on a Map](#).

Opening Comma Delimited CSV Files in MapInfo Pro

You can open .csv files using the **Table** command.

To open a comma delimited file:

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Open** dialog box, from the **Files of type** box, select **Comma delimited CSV (.csv)**.
3. Navigate to the folder that contains the file you want to open and click it to select it.
4. If you wish to edit your table in MapInfo Pro, then select the **Create copy in MapInfo format for read/write** check box. This makes a copy of the original file in MapInfo Pro's TAB format and opens the copy to make edits to it.

If you do not select this check box, then MapInfo Pro opens the original CSV file and you cannot make edits to it.

Note: When modifying the original file, changes are not made to the copy that MapInfo Pro opens. To see changes, you must repeat these steps to open the original file again. If you make changes to the copy, you will not see them in the original file.

5. Click **Open**.
6. In the **Comma Delimited CSV Information** dialog box, select the **File Character Set** for this file from the drop-down list and then select the **Use First Line for Column Titles** check box if applicable.

Note: The **Delimiter** option buttons in this dialog box are disabled intentionally because commas are the only expected delimiters in this file format.

7. Click **OK** to open the file.

The file opens in a Browser window. MapInfo Pro creates a .TAB file in the same location and using the same name as the original .csv file.

If you did not select the **Create copy in MapInfo format for read/write** check box, then this .TAB file references the .csv file and its data. If you did select this check box, then the TAB file contains the data from the .csv file and your edits save to the TAB file.

Exporting to Comma Delimited CSV Format

When you export a table to a comma delimited (CSV) format (on the **TABLE** tab, in the **Content** group, click **Export**), a **Comma Delimited CSV Information** dialog box displays. In this dialog box, you can select a new delimiter, choose the file character set, and choose to use the first column in the file for column headings. When you have made your selections, click **OK**.

Note: Your column type must be set to **Decimal** with specified precision (number of digits in the number). Other data formats, such as Float, cause your data to truncate and generates an error message that displays after processing the table.

See also:

[Exporting to Comma Delimited CSV Format](#)

Displaying your dBase Data

When you convert your data to a MapInfo Pro table, you do not in any way change the original data. MapInfo Pro simply creates a conversion table (.tab) of your data.

To open your dBase (.DBF) data into a MapInfo Pro table:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Files of Type** list, select the format (.DBF), navigate to your data, and click **Open**.
3. Select the appropriate character set for your MapInfo data table. **Windows U.S. & Western Europe (ANSI)** is the default option.
4. Click **OK** to convert your selected data to a MapInfo table (.tab) format.
5. On the **HOME** tab, click **Save Copy As** to make an editable copy of your table. Then, on the **HOME** tab, click **Close Table** and close the original table. Finally open the editable copy.

Saving Data in DBF File Format

To save your table in MapInfo Pro file format or DBF file format:

1. Do one of the following:
 - *If you have only one table open*, on the **HOME** tab, in the **File** group, click **Save Copy As** to open the **Save Copy of Table As** dialog box.
 - *If you have several tables open*, on the **HOME** tab, in the **File** group, click **Save Copy As** to open the **Save Copy As** dialog box. Choose a table from the drop-down list. Click **Save** to open the **Save Copy of Table As** dialog box.

2. Type the name of your new table in the **File Name** box of the dialog box.
3. Choose **MapInfo** or **dBASE DBF** from the **Save As Type** drop-down list.
4. Click **Save**; your file is saved in the specified format.

Displaying your Lotus 1-2-3 Data

To open your Lotus (.WKS, WK1) data into a MapInfo Pro:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Files of Type** list, select the format (**.WK1**, **.WKS**, **.WK3**, **.WK4**), navigate to your data, and click **Open**.
3. Choose the worksheet you want to convert to a MapInfo data table.

Note: If there are column headings above each column in this worksheet, select the **Use Row Above Selected Range for Column Titles** check box. Then, select **Other** from the drop-down box and specify the cell range of the data you want to include in the MapInfo Pro table.

4. Click **OK** to convert your data to MapInfo Pro table format.

Displaying your ESRI Shapefile Data

To open a shapefile in MapInfo Pro:

1. On the **HOME** tab, in the click **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. Select **ESRI shapefile** in the **Files of type** drop-down list.
3. Navigate to the file's directory and click it to open it.
4. Click **Open** to display the **Please specify a TAB filename** dialog box, which saves the shapefile into a format that MapInfo Pro can read. The file has the same name as the file you selected but has a .TAB extension.
5. Click **Save** to open the **Shapefile Information** dialog box.
6. Select the character set appropriate for this file from the **File Character Set** drop-down list. The default option is **Windows U.S. & Western Europe (ANSI)**, but make your selection based on your local settings.
7. Select the appropriate projection for this file. The **Projection** field shows the following:
 - If the Shapefile's native projection is found and it matches an entry in the `MAPINFOW.PRJ` file, the projection's name displays in the **Projection** field.
 - If a native projection is found but it is not in the `MAPINFOW.PRJ` file, a message displays in this field: **Not found in projection file** and the name of the native projection displays.

- If a native projection is not found, the name of the currently selected table projection preference displays in this field.

Continue with one of the following actions.

- If the application does not detect the Shapefile's native projection, or there is no matching supported projection in the `MAPINFOW.PRJ` file, click **Projection** to select one and click **OK**.
- If the application detects a supported projection, MapInfo Pro selects the **Use Projection in Source File** radio button and the **Projection** button is disabled. Do one of the following:
 - To use the detected projection, leave **Use Projection in Source file** selected and continue to the next step.
 - To choose a new projection, click **Choose Projection** and click the **Projection** button to select a supported projection. In the **Choose Projection** dialog box, the source projection is highlighted. Select the projection you want and click **OK**.

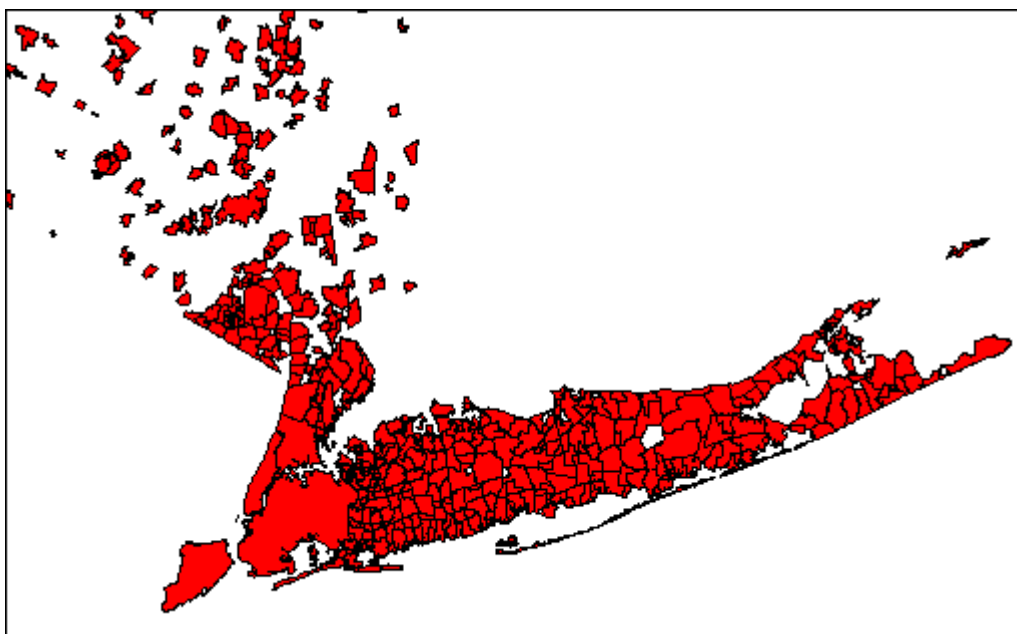
Note: If you substitute the Shapefile's native projection with a new one, the application does not reproject the Shapefile's objects and data using the new projection. Substituting the Shapefile's projection in this way may produce unexpected results.

8. Select the style and cache options for this file.

- **Style** - Select any line or region style overrides that are necessary for this image by clicking the **Style** button. When you select this option, the appropriate style options dialog box displays.
- **Save Object Cache** - Select this check box to save the *.MAP file to hard drive. If you choose not to save the object cache, you will have to recreate the *.MAP file the next time you open the shapefile file. However, if you are going to save the shapefile as a *.tab file, you do not have to select the check box.

9. Click **OK** to create the .TAB file and display the Shapefile.

Note: If after you open the shapefile in MapInfo Pro, you edit the file in ESRI ArcView and save the file, the contents of the *.MAP and *.DAT files are recreated to retain these edits even if you selected **Save Object Cache** before.



Working with Shapefiles Containing M and Z Values

You can open ESRI shapefiles containing M and Z values as read-only files. MapInfo Pro discards M and Z values when you save these files as MapInfo .TAB files or if you copy them to a new Map window. If you attempt to save a file with M and/or Z values in them, the following message displays.



The new table created will not contain M/Z data from the original table.

Click **Continue** to create the table without the M and Z values in it or click **Cancel** to abandon the save process.

Note: The Universal Translator discards the M and Z values when translating from shapefiles to .TAB files, MIF files and MID files to MapInfo .TAB and MIF\MID files.

You can label the PointZ or PointM layers only using these custom label expressions to show Z or M values at each point. However, you cannot save these values to a .TAB file.

To label M and Z values of a shapefile:

1. Open a shapefile containing M and Z values.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
3. Click the **Automatic Labels**  icon for the M or Z layer.
4. Click the **Layer Properties**  button to display the **Layer Properties** dialog box.
5. Select the **Label Display** tab.
6. From the **Label with** list, select **Expression** to open the **Expression** dialog box.

You can only set a Label with expression on a single layer. After selecting multiple layers in the **Layer** list, the **Label with** list disables and shows a message that says **Mixed**.

7. Type the following:
 - for PointM layers: `ObjectGeography(obj, 9)`
 - for PointZ layers: `ObjectGeography(obj, 8)`
8. Click **OK** to complete the expression.
9. Click **OK** to return to the **Layers** window.

Currently we do not support native map files with Z and M values in them so you cannot save shapefiles with these values in them to native MapInfo tables.

Note: If you use `ExtractNodes()` function on a shapefile that contains Z or M values, the resulting object returned from the function will not have any Z or M values associated with it. No prompt displays to warn you of the loss of Z or M values.

You can use M and Z values to create a thematic map using a layer expression. In the next example, a PointZ-based shapefile can be used to creating a Grid thematic map using the layer expression `ObjectGeography(obj, 8)` instead of a field in the table in Step 2 of 3. This interpolates the grid based on the Z value contained for each point in the layer. If the Point objects contain M values, use the expression `ObjectGeography(obj, 9)`.

Displaying your GeoPackage Data

GeoPackage (GPKG) is an open, standards based, platform independent, portable and self describing compact format for transferring geospatial information. MapInfo Pro supports opening and working with GeoPackage (.gpkg) format files.

MapInfo Pro now supports the GeoPackage specification version 1.2 along with non-mappable GeoPackage tables. For more details, see <https://www.geopackage.org/spec120/index.html>.

For background information about GeoPackage, see <http://www.geopackage.org>.

Opening GeoPackage Tables

A GeoPackage can have multiple number of tables inside it. MapInfo Pro lets you select which tables in a GeoPackage to open.

Steps to access GeoPackage tables:

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Open** dialog box, from the **Files of type** list, select **GeoPackage (*.gpkg)**.
3. From the **Look in** list, select the folder location of the GeoPackage that you want to access.
4. From the list of files, select the GeoPackage to open.

5. Click **Open** to open the **Select One or More Tables to Open** dialog box.
6. In **Select One or More Tables to Open** dialog box, select the tables within the GeoPackage that you want to open.
7. Optionally, you can change the style using the **Style** command, or can also set a different destination path for saving the tables by using the **Options** command. You can also open the tables in read only mode by selecting **Read-only** under the **Common Options**.
8. Click **OK** to open the selected tables.

MapInfo Pro will create TAB files in the destination location for each of the tables that you have selected to open from the GeoPackage. Any update made to the tables are saved over these new TAB files.

For saving a table to a GeoPackage, see [Saving Tables to a GeoPackage](#).

Saving Tables to a GeoPackage

You can save your MapInfo tables to a new or an existing GeoPackage (*.gpkg).

Steps to save a table to a GeoPackage:

1. On the **HOME** tab, in the **File** group, click **Save Copy As**.
2. In the **Save Copy of Table As** dialog box, select **GeoPackage (*.tab)** from the **Save as type** list. Make the following optional selections for the GeoPackage table:
 - From the **Save in** list, select the location to save the new GeoPackage table to.
 - In the **File name** box, type a name for the new GeoPackage table.
3. Click **Save**.
4. In the **Select GeoPackage File** dialog box, make the following optional selections for the GeoPackage:
 - From the **Save in** list, select the location to save the new GeoPackage to.
 - In the **File name** box, type a name for the new GeoPackage, or keep the default name.

If you want to save the table to an existing GeoPackage, find the location of the GeoPackage from the **Save in** list and select the GeoPackage file.

5. Click **Save**.

For steps to access a GeoPackage table, see [Opening GeoPackage Tables](#).

Saving a MapInfo Table Having No Metadata

If a MapInfo Native or NativeX table that does not have any metadata content in the TAB file is saved to a GeoPackage, MapInfo Pro will treat them as Read-Only.

This issue should not be encountered very often as most TAB files typically do have metadata entries within them. For being able to have write access to such tables, follow the steps below:

1. Open the TAB file in a text editor.

2. Search for: "\IsReadOnly" = "TRUE"
3. Either remove this, or change it to: "\IsReadOnly" = "FALSE"

Saving a Non-Earth Table to a GeoPackage

When saving a Non-Earth table to a GeoPackage, MapInfo Pro will prompt you to specify the Non-Earth coordinate system (CoordSys) and specific bounds to use. The information will then be stored in the TAB file.

You can save a Non-Earth table to a GeoPackage by using either of the options below:

- Using the **Save Copy As** command in MapInfo Pro.
- Using the MapBasic **Commit Table** statement, where you must specify the **CoordSys** clause with specific bounds. You can issue this statement from the **MapBasic** window in MapInfo Pro.

Note: Before saving the table, obtain the **CoordSys** clause information for the Non-Earth table by using the MapBasic **TableInfo()** function. For this, type `Print TableInfo (tablename, 29)` in the **MapBasic** window.

Deleting GeoPackage Tables

Currently, MapInfo Pro only supports deleting one open Geopackage table at a time from the same GeoPackage (GPKG) file.

To delete multiple tables from a single GPKG file, open and delete each table in turn. If you delete multiple open tables, then each of the tables is unavailable for use by MapInfo Pro, but the table data remains in the GPKG file.

You can delete an open GeoPackage table by using the **Delete Table** command on the **TABLE** tab in MapInfo Pro. Deleting a GeoPackage table deletes the TAB file and all associated component files. If a GeoPackage has only one table, using this command will delete only the table and associate files, not the GeoPackage file.

For more information, see [Deleting a Table](#).

Handling of GeoPackage Files

GeoPackage Files with Character Fields of Width Zero or Greater than 254

When opening a GeoPackage table, MapInfo Pro searches for character fields in the table with either a width of zero (0) or that exceed 254. MapInfo Pro then sets those table columns to "read-only" in order to prevent truncation of data.

Text objects in a GeoPackage Table

MapInfo Pro replaces text objects with null (empty) geometries when saving a copy of a table to the GeoPackage (GPKG) format. If you add text objects while editing a GeoPackage table and then save the table, MapInfo Pro displays a "Text object is not supported" message.

Time Data Type Fields in GeoPackage Tables

MapInfo Pro does not support the **Time** data type for GeoPackage tables, because the standard global GeoPackage specification does not support this data type. For a list of supported GeoPackage data types, see www.geopackage.org/spec/#table_column_data_types.

When saving a Native MapInfo (TAB) table with **Time** fields to a GeoPackage table, the **Time** fields are automatically converted to large integer values. These values may range from zero (0) for 12:00:00 AM or 00:00:00.000 to 235959999 for 11:59:59.999 PM or 23:59:59.999. Therefore, you might prefer to convert any **Time** field to **DateTime** (or **Char**) prior to saving the Native table to GeoPackage.

Naming Convention of GeoPackage Tables

As per the standard global GeoPackage specification, the name of a GeoPackage table created by MapInfo Pro is in lower case. For reference, see www.geopackage.org/spec/#_base.

GeoPackage files created by other software may not always follow this specification. If you are using the **Register Table** statement in MapBasic to open a GeoPackage table created by another product, you will need to pass the table name in the correct case. Otherwise, MapInfo Pro returns an error.

Reading Z and M values from GeoPackage Tables

MapInfo Pro supports only reading of Z and M values from GeoPackage files. If a GeoPackage table is opened that has Z or M values, MapInfo Pro will set it to "read-only" in order to protect the values within the data from being overwritten by MapInfo Pro. GeoPackage tables also support use of Multipoint and Collection objects which may have Z or M values.

Coordinate System Support for GeoPackage

When opening a table from a GeoPackage, MapInfo Pro will look into the table metadata for the projection to be used. MapInfo Pro will search for an SRSID in the metadata. SRSID stands for Spatial Reference System Identifier, which defines the projection or the coordinate system for the table (for example: 0 for undefined Geographic, or -1 for undefined Cartesian).

If there is no SRSID for the selected table, MapInfo Pro will prompt you for the projection to use for the table. The selected projection will then be written into the TAB file metadata as a coordinate system or **CoordSys** clause, so that MapInfo Pro can use them in future sessions without having to prompt for the projection again.

If there is no projection information written as a CoordSys clause in the table metadata, MapInfo Pro uses the FME engine from Safe Software Inc. to convert a table's WKT representation, as stored in

the GeoPackage Spatial Reference System (gpkg_spatial_ref_sys) table, to a Coordsys clause. WKT stands for Well Known Text, a text markup language for representing GeoPackage Spatial Reference System (gpkg_spatial_ref_sys).

When opening a GeoPackage table, if the WKT is unavailable, or if it cannot be converted into a CoordSys clause, then MapInfo Pro will prompt for the projection.

Similarly, when saving a MapInfo table as a GeoPackage table, MapInfo Pro also uses FME to convert the MapInfo CoordSys to WKT, and a new entry is added to the GeoPackage Spatial Reference System table.

Note: If a WKT string is mapped to a CoordSys in the MapInfoCoordinateSystemSet.xml, then this string is used rather than the FME engine for conversion.

Note: When saving a MapInfo table to a GeoPackage, if it could not generate a valid WKT for the CoordSys, the table creation will fail.

About Indexes for GeoPackage Tables

A GeoPackage table can be registered by using the MapBasic **Register Table** Statement. You can issue this statement from the **MapBasic** window in MapInfo Pro.

When a GeoPackage table is registered, MapInfo Pro does not write any index or field definition to the associated TAB file. MapInfo Pro does not create indexes on GeoPackage tables by default, because these indexes can get out of synch with the index in the GeoPackage file. This is why the **Modify Table Structure** dialog box has the **Index** check box grayed out for GeoPackage tables.

To create indexes for fields within the GeoPackage table, use the **Create Index** statement. After creating indexes, the field definitions and indexes are written to the TAB file. You can remove the index from the GeoPackage table by using the **Drop Index** statement.

MapInfo Pro Tools, Table Structure, and GeoPackage Tables

Some MapBasic tools (such as Coordinate Extractor) create new columns in open MapInfo Native (TAB) tables. You cannot alter the table structure of open GeoPackage tables in MapInfo Pro, so you cannot create new columns on these tables. Make sure any columns you need to update are in the table before working with it in MapInfo Pro.

There are tools available to alter the structures of GeoPackage tables outside of MapInfo Pro, such as www.sqliteexpert.com). If you alter the structure of a GeoPackage table, then you must reopen the GeoPackage file (*.gpkg) in MapInfo Pro to re-generate a new MapInfo table that is aware of the new table structure.

Warning: Use a tool to alter a GeoPackage table at your own risk.

Creating Driving Regions with GeoPackage Tables

GeoPackage tables usually contain only one type of geometry. When creating a GeoPackage table, it can store multiple geometry types. However, if a table is created with a single geometry type, other geometry types cannot be added to it.

When creating driving regions, you can store results in either a new or existing table. If the input GeoPackage table contains only points or lines, an error occurs saving the drive region results to an existing table. Save the results to a new table to avoid this error.

Displaying Your OGR Data

The OGR Simple Features Library is a **C++ Open Source library (and command-line tools)** providing read (and sometimes write) access to a variety of vector file formats including ESRI Shapefiles, and MapInfo mid/mif and TAB formats.

Supported File Types

For a complete list of supported file types, see <https://gdal.org/drivers/vector/index.html>

Most notable is the support for *.dxf; *.csv; *.txt; *.shp; *.geojson; *.json; *.gml; *.kml; *.kmz; *.sqlite; *.gpkg; *.xls; *.xlsx; *.ods; file types.

OGR Table Properties

- Table version 2100
- Custom table metadata tags
 - "\OGR\DatabasePath" -> Path to dataset relative to .tab
 - "\OGR\TableName" -> Name of table in dataset.
 - "\OGR\Driver" -> Driver used to open table.
 - "\OGR\ConvertUnsupportedObjects" -> Convert un-supported objects.
 - "\OGR\OpenOptions" -> Driver open options
 - "\OGR\LayerCreationOptions" -> Layer creation options for OGR driver.
 - "\OGR\DriverCreationOptions" -> Driver creation options for OGR driver.
 - "\OGR\NoFileTable" -> OGR table with this metadata links to a URL based dataset. Having this token will treat the DatabasePath as a URL. This tag is not added by MapInfo Pro and user need to add on their own.
- Some OGR table do not support inbuilt styles therefore we have to use global table styles.
- OGR tables do not always have sequential data; there may be empty rows, rows that start after one (1), and gaps in row IDs. This must be taken into consideration when using MapBasic operations to fetch data from OGR tables. Do not perform operations on OGR tables using rowid.

- Some OGR format like GML, DXF, GeoJson, TopoJson, CSV etc are slow when used directly. For these formats it's advisable to convert the table into MapInfo Table first.
- For OGR formats which are sequential, its recommended to turn on caching of objects.
- When converting OGR table into Native/NativeX commit table statement will always run in background.
- OGR table does not support create Map, drop Map, changing the table structure.
- In case OGR table contains points in a column and user want to create points out of that column the either use the OGR options or a VRT table as described here (<https://gdal.org/drivers/vector/vrt.html>)
- TableInfo(TAB_INFO_DOMINANT_OBJECT_TYPE) for some OGR table will return TAB_UNKNOWN_OBJECTS even in case of Mappable table. Like in case of CSV OGR table.
- GDAL OGR does not support UTF-16 character encoding.
- Formats like GML and DXF will always be saved in a MapInfo Table when opening via the UI, to overcome the issues in GDAL.

Registering OGR File Type

You can register an OGR file type using the **Table command**.

Steps to register OGR file types:

1. On the **Home** tab, in the **File** group, from the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Open** dialog box, from the **Files of type** list, select **Vector Files (OGR)**.
3. Alternatively, select Show **All OGR formats...** from the **Files of type** list to display all available OGR file formats in case **Vector Files (OGR)** does not list the desired OGR file extensions.

Note: If you click **Show All OGR formats...**, the **Files of type** combo-box list expands to show all OGR formats. This setting will persist till you re-start MapInfo Pro.

4. Select an OGR format.
5. From the **Look in** list, select the folder location of the file that you want to access and then select the OGR file(s) to open.

Note: You can open multiple files in one operation. Some file types support more than one **Layer** per file. Files will be grouped by extension and then the **Open Options** dialogs will be presented for each group of similar files.

6. Click **Open**. MapInfo Pro will use the specific driver on the selected file and will open the selected driver's **Vector File (OGR) Open Options** dialog.

Note: Some formats like GeoPackage, CSV, shapefile, etc. are also available natively in MapInfo Pro. Selecting the OGR specific driver for these formats will open the files using OGR driver only.

7. Click **OK** to open the **Select One or More Tables to Open** dialog box.

8. In **Select One or More Tables to Open** dialog box, select the tables that you want to open. You can also:
 - a. Change/set the style and coordinate system using the **Style** and **Coordinate System** commands.
 - b. Set a different destination path for saving the tables or open the tables in read-only mode by selecting **Read-only** in the **Options** command.
 - c. Use an object **Cache** to improve performance (on by default) and an option to Import the selected files by saving a copy of each table in MapInfo format instead of accessing the file directly.

Note: If you use the option to create a copy, a background task with each layer will be added to the task manager.

9. Click **OK** to open the selected tables.

You can also register an OGR file type using MapBasic. For details see, **Register Table statement** in the *MapBasic Reference Guide*.

Registering and Displaying your ASCII Data

When you are working with ASCII data in MapInfo Pro, you do not actually create the table as you would in other file formats MapInfo Pro supports. MapInfo Pro registers your ASCII table by creating a MapInfo (.tab) file that points to the fields in the original file.

Note: Registering your data using MapInfo does not change the original data in any way.

If your delimited ASCII file has an extension other than .TXT (such as .ASC, .CSV, or .DAT, etc.), rename a copy of the file to `FILENAME.TXT` before you begin.

To register your ASCII (.TXT) data:

1. Open the data file using Wordpad or Notepad (on the **Start** menu, click **Programs**, and click **Accessories**) or another text editor. See whether you have column headings and what delimiter (character that separates each piece of data from the next) is used in the data file.
2. In MapInfo Pro, on the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
3. In the **Files of Type** list, select the format (.TXT), navigate to your data, and click **Open**.
4. Specify a tab delimiter or type the other delimiter in the field provided.
5. Choose the character set your file is using from the **File Character Set** drop-down list.
Select the **Use First Line for Column Titles** check box if you have column headings.
6. Click **OK** to register your data in MapInfo Pro.

7. On the **HOME** tab, in the **File** group, click **Save Table** or **Save Copy As** to make an editable copy of your table. Then, on the **HOME** tab, in the **File** group, click **Close Table** and close the original table. Finally open the editable copy. You can only read information from these files.

Importing and Displaying GML File Data

You can import **OSGB MasterMap GML Files** into MapInfo Pro. Each layer in the GML file is imported into a separate .TAB file. We provide support for some of the Topography features (OSGB version 2.0), Topographic Area, Lines and Points, Cartographic Symbols and Boundary Lines. Currently, we maintain support for these features and add support for Cartographic Text and Departed Features.

Currently, we support the OSGB recommended styles by mapping the style definitions to existing MapInfo Pro styles. Where it is not possible to render complicated fill patterns, we use the simple dot screen that the OSGB recommended to us. You cannot change the OSGB style mapping to MapInfo styles.

To import GML data into a .TAB file:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Import** to open the **Import File** dialog box. Choose **OS MasterMap (*.gml)** from the **Files of type** drop-down list and navigate to its location.
2. Select a **GML file** to import. Click **Open**. The **GML Import** dialog box displays.
3. Click the **Select GML Layer to Import** drop-down list to display the layer options.

Note: When you select the **DepartedFeature** layer, MapInfo Pro imports only the changed features of the selected layer.

4. Do one of the following:
 - Select the layer in the list you want to import.
 - Select the **All Layers** option to import all of the layers and convert them to individual .TAB files.

For more about these layers and feature types and how MapInfo Pro handles the Topographic Layer, see [Understanding MapInfo Pro's Use of the Topography Layer](#).

5. Choose the style you would like to use to display the GML file. Choose one of the following:
 - Click **Use GML Style** to display the selected file using the OSGB GML styles
 - Click **Use MapInfo Current Style** to display the selected file using your currently established styles. MapInfo Pro uses the current styles established in the **Region Styles** dialog box.
6. After you have made these selections, click **OK**. One of these dialog boxes opens:
 - If you selected one layer in step 4, the **Import to Table** dialog box opens. Choose the directory and file name you want for this file and click **Save**. MapInfo Pro saves the file to this directory. Go to step 7 to continue.

- If you selected **All Layers** in step 4, the **Choose Directory** dialog box opens. Select the directory you want MapInfo Pro to place the new .TAB files in and click **OK**. A status box opens showing the progress as each layer is converted and saved into a separate .TAB file.

To open the GML files that are .TAB files, on the **HOME** tab, in the **File** group, on the **Open** list, click **Table**, and navigate to the directory you specified.

Importing and Displaying GML 2.1 Files

You can import GML 2.1 files into MapInfo Pro directly. To import successfully, the XML must contain a reference to a valid schema that MapInfo Pro can read. For example, the schema location could be a path relative to the XML file:

```
xsi:schemaLocation="http://www.mapinfo.com/wfs_XX .\mi_usa.xsd"
```

Or, it could be a URI:

```
xsi:schemaLocation="http://www.lm.se/xml/namespace/abc  
http://www2.xxx.se/xml/schewan/abc.xsd"
```

To import GML 2.1 files:

1. From the **Table** tab, click **Import**. The **Import File** dialog box opens.
2. From the Files of type drop-down list, select **Geographic Markup Language 2.1**.
3. Navigate to the directory in which your GML2 file is saved and select the file.
4. Click **Open** to display the **GML Import** dialog box.

Here you can select either **All Layers** (if more than one exists), or a specific layer that you want to import from the GML file.

Note: If projection information is not stored within the GML file(s), MapInfo Pro prompts you for a projection to use.

5. Select the GML layer (or **All layers**) you want to display from the drop-down list and click **OK**. The **Import into Table** dialog box opens.
6. Do one of the following:
 - Choose a name for the new .TAB file
 - Accept the default naming convention for this new .TAB file.
7. Select the file type to save to: native **MapInfo (*.tab)** format, or nativeX **MapInfo Extended (*.tab)** format. Use the extended format for data that is larger than 2GB or when the table has more than 250 columns.
8. Click **Save** to import the file.

You can use the file you saved in your map and layout. Metadata for this file is also available by opening a **Browser** window on this file.

Opening MapInfo Pro Grid Files

To open MapInfo Pro Grid Files:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. Choose **Grid Image** (*.grd, *.mig), from the **Files of Type** list box.
3. Click the file you want to open and click the **Open** button.

Note: There are grid files in the introductory data provided on the MapInfo Pro data DVD.

Importing Graphic Files

To import a graphic file:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Import** to open the **Import File** dialog box.

Specify the location, name, and format of the file you want to import.

2. Click **Open** to open the **Import into Table** dialog box.
3. Specify the name and new table format for the table you are creating.

Note: File formats are native **MapInfo (*.tab)** and nativeX **MapInfo Extended (*.tab)**.
Use the extended format for data that is larger than 2GB.

4. Click **Save**.

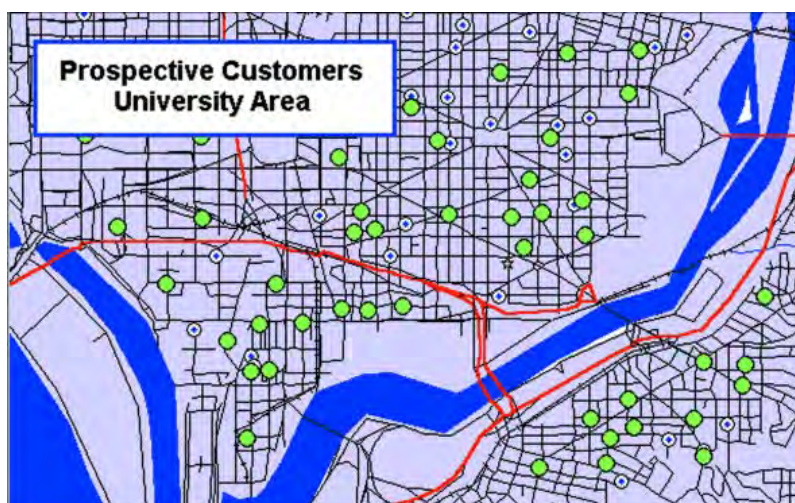
The file is imported into the file you named with the specified format.

Geocoding - Assigning Coordinates to Records

To display your data on a map, you must first assign X and Y coordinates to each record. One way that MapInfo Pro assigns these coordinates is by matching geographic information in your database table to geographic information in another table (referred to as a *search table*) that already has X and Y coordinates associated with it.

For example, you want to assign X and Y coordinates to a customer record whose address is 127 Winston Ave. MapInfo Pro reads that address and looks for a matching address in the search table, such as a StreetPro table. (This search table already has X and Y coordinates associated with its records.)

When MapInfo Pro matches 127 Winston Ave in your table to 127 Winston Ave in the search table, it assigns the corresponding X and Y coordinates to your record. The geocoded point becomes part of your database. You can then view these points by displaying your table in a Map window.



What Do I Need to Know Before Geocoding?

It is important to know your data and what you want to use it for before you select a method of geocoding. Ask yourself these questions:

What kind of geographic information do I have in my database?

Do you have street addresses, towns, cities, postal codes, states, countries? Do you have potentially ambiguous information? For example, if you have a database of customer street addresses, will you have 125 Main Street in Smithtown and a 125 Main Street in Nassau? If so, you may have to refine your search using town boundaries or postal codes.

What kind of maps do I have to work with?

You will need computerized maps that are at the level of detail that match your data. For example, if you want to geocode a database of customers in specific counties by street address, you will need maps of the desired counties that go to street level. A map of the United States that only goes to a county level would not work for you. You can purchase the appropriate maps for your geocoding application from MapInfo Pro or your reseller.

How geographically accurate does the placement of my data have to be?

Taking into account the first two questions, you must decide how accurate the geocoding must be. If you are trying to pinpoint the locations of cable wires, crime scenes, or fire hydrants, a high degree of accuracy is needed. In this case, you should geocode your data to street level.

If, however, you are going to use your data to thematically shade postal code boundaries, town boundaries, county boundaries, state boundaries, or country boundaries, you may not need a high degree of accuracy.

In this case, geocoding against boundary files such as `USZIPBDY.TAB`, which we provide, would be sufficient for your needs. Since this file does not include point postal codes (postal codes assigned to a single building or company), the hit rate may not be as good as when you geocode by street.

Understanding the Geocoding Process

To assign X and Y coordinates to the records in your table, choose Geocode from the **Create** group on the **SPATIAL** tab. MapInfo Pro displays the **Geocode** dialog box, where you enter the following information:

- The name of your table for which you want to assign X and Y coordinates.
- The column in *your table* that contains the geographic information that will be used for matching.
- The name of the *search table* containing the geographic information that will be used for matching.
- The search table column containing the geographic information for matching:

The dialog box also offers you the option of geocoding your data in two modes: *automatically* or *interactively*. When you geocode a table automatically, MapInfo Pro geocodes exact matches only and ignores all other records. It is the faster method, since MapInfo Pro requires no user interaction once the geocoding process begins. When you geocode a table interactively, MapInfo Pro pauses when it fails to match a record and lets you select from a list of close matches.

Note: We recommend that you geocode your table automatically first and then go back and geocode interactively to match the remaining records.

Not Getting Geocoding? Try this Example...

The objective of geocoding is to place data from your database accurately on a map. Let us call your data the *source* table. You can think of the geographical coordinates on a map as a *target* table.

To geocode a record:

- MapInfo has to match an address in the source table with a location on the target table

Most of the problems in geocoding occur in trying to take the address data in the source file and match it to addresses in the target tables.

For more about the automatic and interactive geocoding modes, see [Modes of Geocoding](#).

Modes of Geocoding

MapInfo Pro has two geocoding modes: automatic and interactive. The process of matching target addresses with source addresses is the same in both modes.

Automatic mode matches addresses based on the choices in the **Geocode** dialog box.

When Geocoding is in automatic mode, only exact matches are geocoded. When some of your data fails to match exactly (due, perhaps, to typographical errors), you need to geocode in Interactive mode to match the near misses by hand. It is generally best to do two passes through your table,

with the first pass set on Automatic and the second pass set on Interactive. This approach takes less processing time.

Interactive mode stops at each address that does not meet the geocode parameters and permits you to assist in the matching process. When you geocode interactively, you are not changing the data. You are merely redirecting MapInfo Pro to look for different information.

In most cases, the best geocoding strategy is to geocode in automatic mode and then geocode in interactive mode to deal with the records MapInfo Pro was unable to handle automatically.

Manual mode. Automatic and interactive geocoding work well for databases with "clean" data. Sometimes, however, you know where a point should be on the map, but the location data does not allow for a match. Manual geocoding is the process of placing your data records on the map by clicking its location on the map. This method works best when you have a small table which contains data that you are very familiar with.

Geocoding Automatically

For this example, we use the `US_ZIPS.TAB` as a search file. This is a file that is included with MapInfo Pro which contains the ZIP Code points for every postal code in the U.S. If your data includes zip codes, this might be an effective way for you to geocode your data. Automatic geocoding is the default mode.

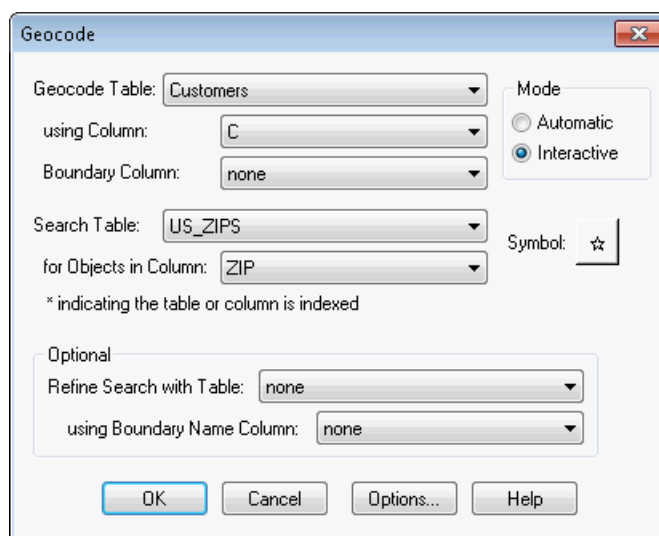
Note: Make sure you have created a .TAB file for your data before beginning the geocoding process. For more about this process, see [How Do I Get My Data on the Map?](#)

To geocode using the `US_ZIPS.TAB` file:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table**, and navigate to the `US_ZIPS.TAB` file. This data is can be installed from the MapInfo Pro DVD.

You can use a wide variety of tables to geocode against. Use a street map when you are geocoding to addresses.

2. On the **SPATIAL** tab, in the **Create** group, click **Geocode**, and complete the dialog box.



- **Geocode Table:** Select your target table from this list.
- **using Column:** Identify the column your data is in. (In this example, postal codes are in column C of the Customers table.)
- **Search Tables:** Select the source table name in this list. (In this case `US_ZIPS.TAB`.)
- **For Objects in Column:** Select the column name in the search table which is to be searched for a match. (In this case postal codes are in the column ZIP of the search table.)

3. Set every other entry to **None** and click **OK** to geocode the data.

See the following additional geocoding options as well:

- [Geocoding Manually](#)
- [Geocoding by Address](#)
- [Geocoding by Boundary](#)
- [Geocoding by US_ZIPS.TAB \(Postal Code Centroid File\)](#)
- [Geocoding by Server](#)

Geocoding Interactively

For example, your data record reads Cherryville St. When you geocode interactively, you find that the data record should read Cherry Vale St. You select Cherry Vale St from the list of alternatives. Although MapInfo Pro assigns X and Y coordinates from Cherry Vale St to that record, you have not altered the record in any way. To change the spelling in your database, you must edit the record in a Browser window.

When you choose Interactive Geocoding, MapInfo Pro displays a dialog box that allows you to manually match each address it is unable to match.

To manually pick the match:

1. Click a value in the drop-down list (for example, "ADELE CT"), and click **OK** to match the target table's field value ("ADELE CT." - note the period).

2. Retype the target table's field value in the column name box at the top of the dialog box (type "CT" over "CT.") and click **OK** to retry the match.


To skip geocoding a record, click **Ignore** to skip this record.

To cancel geocoding altogether, click **Cancel** to stop geocoding at this point.

Use the **Up** and **Down** buttons to move around in the list of source addresses.

Geocoding Manually

To geocode a table manually:

1. Open the table with the reference map in it.
2. Open your table and add it to the current **Map** window.
3. Make the layer in your table that you want to geocode from editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Editable**  icon beside the layer name to turn **On** editing.
4. On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Browser** from the list, to open a **Browser** window. In the **Browser Table** dialog, select your table to geocode it.
5. Right click on the **Browser** window tab (which is referred to as the document tab) and select **New Vertical Tab Group** to display your **Map** and **Browser** windows side-by-side.
6. Scroll through the **Browser** window to find the record that you would like to geocode. Click in the box to the left of the row to select the record.
7. Click on the **Map** window to make it active.
8. On the **SPATIAL** tab, in the **Create** group, on the **Insert** list, click **Symbol** from the list.
9. Click the map where you want the point placed for the selected record.
10. On the **HOME** tab, click **Save**. The selected record is geocoded. Repeat steps 7-10 for each record you would like to manually geocode.

See Also:

Geocoding Interactively

Methods of Geocoding

In addition to geocoding automatically and manually, you have choices in how precise you want the geocoded record to be. Let us look at the variety of ways you can geocode your table.

Geocoding by Address

Street addresses typically consist of two or three components:

- Street number
- Street name
- Apartment, Suite, Floor, Room number or some other piece of information. Many addresses do not have this component

MapInfo Pro has one procedure for dealing with the street number and another procedure for dealing with the street name. MapInfo Pro deals with the third component, if present, as though it were a part of the street name.

When you geocode your table with street addresses, MapInfo Pro matches the addresses in your table to the street names and address ranges in a street table, such as StreetPro (our premier streets data product) and assigns X and Y coordinates to your records. When you display your records, MapInfo Pro will spot the record at the location of the record's address. MapInfo Pro places the record on the proper side of the street, offsets it from the side of the street to the specified distance, and insets it from the end of the street the specified percentage of the line. The **Options** dialog box controls these parameters.

Geocoding by Boundary

In computer mapping, the term boundary is used to designate enclosed regions or areas such as countries, cities, and postal codes. When you geocode your table with boundaries, MapInfo Pro matches the boundary name in your table with the boundary name in the search table. MapInfo Pro assigns the boundary centroid X and Y coordinates to your data records. The *centroid* of a boundary is its approximate center point.

For example, you have a table of wholesale outlet stores. You want to assign X and Y coordinates to each record according to county. MapInfo Pro reads the county name from your table, matches it with the county name in the search table, and assigns the county centroid coordinates to each of your records. The outlet locations will display at the county centroid in a Map window.

Geocoding by US_ZIPS.TAB (Postal Code Centroid File)

US_ZIPS.TAB is a point file that is included with the base MapInfo Pro package. The file consists of postal code centroid points for every postal code in the United States. This file can be used to geocode any database that includes postal code information. This file includes postal codes that are assigned to individual buildings or companies.

You can use any of the above methods to geocode your records, or you can use a combination of address and boundary geocoding to increase the potential for a successful match.

Geocoding by Server

If you have access to a geocoding server such as MapMarker, Envinsa or Global Geocoding Server, you can geocode using a more extensive data set. See [Geocoding Using a Geocoding Server](#) for details.

Precisely also offers a cloud based Geocoding service for MapInfo Pro customers. Sign up now to activate the Precisely Global Geocoding service, and get an account with free limited number of geocodes per month. Go to the **Pro** tab, click **Geocoding**, and click **Sign Up Now**. See [Using the Precisely Global Geocoding Server](#) for details.

Refining Your Geocoding Search

When geocoding, you might refer to objects whose names are used for other objects that do not interest you (for example, a city name that is common to two or more states). To eliminate this

problem, refine your search by selecting another column (from, typically, another table). To further refine the search, specify the state for each city, rather than just the city name.

If your area of interest is not unique enough for MapInfo Pro to automatically determine the position or location, you will need to refine your geocode search by specifying a particular boundary that contains your area of interest. This will provide MapInfo Pro with geographic locations on where to position your points.

Finding an Exact Street Match

When MapInfo Pro geocodes, it attempts to find an exact match between source and target street names. That means that the addresses must be the same, character for character. However, matching is not case sensitive; upper and lower case letters are successfully matched with one another. MapInfo Pro does not get an exact match in many cases and uses a file of abbreviation equivalences to improve its "hit rate". Once you understand the various ways in which a match can fail, you are in a better position to understand what you can do to improve things.

The next table illustrates exact matching. The first column contains a street name from a target table and the second column contains the corresponding street name from a source table. The third column says why they do not match. The fourth column indicates whether the particular problem is one which can be corrected through using the abbreviation file. This table assumes that the addresses are the contents of a single column in a table. While the street number would often be in the same column, we do not indicate street numbers here because they are handled differently than street names.

Target Address	Source Address	Comment	Correctable with Abbreviation File?
LaSal St	LaSalle St	"LaSal" is the wrong spelling.	No
La Salle St	LaSalle St	"La Salle" is the wrong spelling.	No
LaSalle Ave	LaSalle St	"Ave" does not match "St".	No
LaSalle Street	LaSalle St	"Street" does not match "St".	Yes
LaSalle Ave	LaSalle Av	"Ave" does not match "Av".	Yes

Target Address	Source Address	Comment	Correctable with Abbreviation File?
LaSalle St.	LaSalle St	The target address has a period after "St". That period is not in the source and causes the match to fail.	Yes
LaSalle	LaSalle St	"St" is missing from target.	No
LaSalle St	LaSalle	Target has "St" and source does not.	No
LaSalle St North	LaSalle St	Target has "North," which is not in source.	No
LaSalle St North	LaSalle St N	Target has "North" instead of "N".	Yes
North LaSalle St	N LaSalle St	Target has "North" instead of "N".	Yes
North LaSalle St	LaSalle St	Target has "North," which is not in source.	No
LaSalle St Apt 3	LaSalle St	Target has an apartment number which does not match anything in the source.	Yes
Tenth St	10th St	"Tenth" and "10th" do not match.	Yes
10th Av	Tenth Av	"10th" and "Tenth" do not match.	Yes
Saint John's Lane	St John's Lane	"Saint" and "St" do not match.	Yes

MapInfo Pro's matching process is not case-sensitive; it does not care whether a letter is upper case or lower case. This means that MapInfo Pro treats the following as the same: Main, MAIN, main, main.

MapInfo Pro has a file called the Abbreviations File (MAPINFOW.ABB), which you can use to record acceptable alternate spellings for abbreviations. For example Av for Ave. or BL for Blvd. etc. Using this file increases your hit rate because there are more acceptable spellings for the same abbreviations.

Placing Geocoded Points

When you are geocoding to street level (by address), you can specify certain aspects of the resulting points' position in relationship to the street. You can specify the offset of the point from the side of the street, and the inset of the point from the end of the street.

Street Offset

The street offset is the distance the geocoded point is set from the side of the street.

To set this distance:

1. On the **SPATIAL** tab, in the **Create** group, click **Geocode** to open the **Geocode** dialog box.
2. Fill in the table and column information for the dialog box.
3. Click **Options** to open the **Geocode Options** dialog box.
4. In the **Offset Address Location** group, specify a distance and distance unit.

If you choose 12 meters, the point will be offset 12 meters back from the side of the street. You can specify any distance from 0-32,767 and a wide variety of units including meters, miles, yards, U.S. Survey feet.

5. You can also specify a street inset, or click **OK** to return to the **Geocode** dialog box.

Street Inset

The street inset is the distance a geocoded point is set from the end of the street. You can specify a distance, or an inset can be a percentage of the length of the street. To avoid skewing the position of inset points, MapInfo Pro performs a proportional calculation that insets the points located at either end of the street the specified percentage or distance, but that decreases the inset as point locations approach the center. Points located at the center of the street remain in their original position.

To set the street inset:

1. With the **Geocode Options** dialog box still open, choose how you want to specify the street inset in the **Inset Address Location** group: as a percentage of the length of the street, or as a distance.
2. Specify one of the following radio buttons:
 - **Percentage** - Specify a percentage (0-50) to calculate the street inset.
 - **Distance** - Specify a distance (0-32,767) and distance unit.

3. Click **OK** to return to the **Geocode** dialog box.
4. Double-check your geocoding settings, and click **OK** to geocode the table.

MapInfo Pro uses the last inset and offset settings you specified as the default settings for your next session.

If you specify a street offset of a given distance and set the street inset to zero, you may get unexpected, albeit correct, display results. Points located at the end of adjoining or intersecting streets might overlap each other. On your screen, they will look like they are located on the wrong street. If you specify a street inset, the problem will correct itself.

Controlling How Much to Inset and Offset a Point when Geocoding

To control how much to inset or offset a point:

1. Open at least one mappable table. This table serves as the source of geographic information in the geocoding operation (a street map with addresses indexed).
2. Index this source table on the field you use for geocoding. For more information on indexing see [Creating a New Table](#).
3. The following options allow you to index your table and make it mappable:

On the **TABLE** tab, in the **Content** group, click **New Table**.

On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**.

4. Open the table to be geocoded. You want to create point objects for this table and it must be different from the source table.
5. On the **SPATIAL** tab, in the **Create** group, click **Geocode** to open the **Geocode** dialog box.
6. Specify the appropriate geocoding options.
7. Click the **Options** button to open the **Geocode Options** dialog box.
8. Choose the desired inset and offset specifications in the **Offset Address Location** and **Inset Address Location** fields.
9. Click **OK** to return to the **Geocode** dialog box.
10. Click **OK** to geocode your table.

Matching Street Names

MapInfo Pro begins by comparing the street address in the target table with the street addresses in the source table. When it finds an exact match, it may be finished or it may have to deal with region information, such as town, county, or postal code area.

When MapInfo Pro cannot match the street name for a particular row, it applies the abbreviation file to the target address. This file consists of pairs of items, such as "STREET ST" and "AVE AV". When MapInfo Pro finds "STREET" in a target address, it changes it into "ST"; similarly it changes "AVE" to "AV". MapInfo Pro does not actually change your data in the target table. It substitutes abbreviations only for the purpose of making matches. The substitution is only effective during the matching process. The address in your table remains the same. It does not write the correct address form back to your table.

Once MapInfo Pro has made an abbreviation substitution it attempts to match the resulting street name against the street names in the source table. When it fails to find an exact match at this point it:

- In Automatic mode, it moves to the next row
- In Interactive mode, it presents you with the closest matches and you pick the best match. MapInfo Pro then moves on to the next row.

At this point MapInfo Pro will have done the best it can at identifying street names. The next step is to deal with address numbers for those addresses where it has matched a name.

Matching Address Numbers

Given that MapInfo Pro has identified a street, it has to deal with street numbers. MapInfo Pro stores address ranges with each street segment. MapInfo Pro takes the street number from the target address and compares it to the ranges for each segment in the source table. For example, assume that we are trying to match "343 LaSalle St". MapInfo stores the beginning and ending address for each segment, differentiating between left and right sides of the street, as follows:

Name	FromLeft	ToLeft	FromRight	ToRight
LaSalle St	269	331	268	330
LaSalle St	333	375	332	374
LaSalle St	377	401	376	400

To match "343 LaSalle St" MapInfo Pro would scan the address ranges until it finds the one where "343" goes. Since 343 is between 333 and 375, the application locates this address on that street segment (the middle one in the table). Once MapInfo Pro has matched an address number to a street segment it moves to the next row. When it fails to match a target street number to an address range on the appropriate street it:

- In Automatic mode, it moves to the next row
- In Interactive mode, it presents you with the closest matches and you pick the best match. MapInfo Pro then moves on to the next row.

At this point MapInfo Pro has done the best it can at locating address numbers. Note that one of the options (on the **Geocode Options** dialog box) is to automatically pick the closest address range in cases where there is no exact match-Use The Closest Address Number. For example, you might have "412" as an address number, but no range which includes that number. However, there is a range which goes from 346 to 400. Since that is the range closest to 412, that is where MapInfo Pro

will geocode 412 if you have chosen this particular option. The next step is to deal with addresses which have been located on more than one street.

Matching to Region

When MapInfo Pro is geocoding it checks to see how many occurrences of the target address exist. If there is more than one, MapInfo Pro must decide which source address to use. If the user's target table has a column with region data, MapInfo Pro can refine geocoding within a boundary.

For example, assume that you are geocoding a database of records in Cook county, Illinois. The address in the database reads 200 Washington St. Within the county of Cook, there are eight towns. Four of these towns have a Washington St. Three of the four have a 200 Washington St. MapInfo Pro must now place the target address in the appropriate town. MapInfo Pro uses region information to do this. MapInfo Pro now matches a region designation for the target address against the region designator for the source addresses.

When you originally set up your geocoding operation, you had an opportunity to specify a region (boundary) to use in refining your geocoding operation. This dialog box displays when you choose Refine Search with Table and using Boundary Name Column.

If you specified a postal code table you enter the postal code and MapInfo Pro returns possible matches.

You could use any one of several different region types, including county name, town name, and postal code. Since almost all addresses contain postal codes, this is the most reliable way to refine your search. When you set MapInfo Pro to use postal codes to refine its address matching, MapInfo Pro will match the postal code of the target address against the postal code of the various matching source addresses. When it finds the correct match, it is finished with the geocoding process. MapInfo Pro can now get coordinate information from the source table and use it to place a point object into the target table.

However, once MapInfo Pro has completed this process, many addresses may be unmatched. You can match each one of them individually by geocoding in interactive mode. However, if you are working with a large database, you want to do as little of this as possible. There are other ways of improving MapInfo Pro's geocoding performance.

In the **Geocode Options** dialog box, you can specify that MapInfo Pro automatically pick a different boundary, providing there is only one, from the one you specify (Use A Match Found In A Different Boundary). You might have had MapInfo Pro geocode addresses to Northtown. One particular address, "223 Locust Ct." is not in Northtown, but it is in Westville, and no place else. In this case, MapInfo Pro would geocode "223 Locust Ct." to Westville. However, if MapInfo Pro had found a "223 Locust Ct." in Westville and another one in Center Valley, it would not geocode the address to either town. It would leave "223 Locust Ct." ungeocoded.

After Geocoding

This section includes some tasks that will be useful in handling records after you have geocoded your table.

Finding and Examining Ungeocoded Records

Once you have completed a geocoding session, you might want to find all the ungeocoded records and examine them to see what the problems are. On the **TABLE** tab, in the **Selection** group, click **SQL Select** to do this.

When you do not have a column for result codes, you should select all records that meet this condition:

```
not obj
```

Obj (or object) is a keyword MapInfo Pro uses to refer to a graphic object. Records that have been geocoded have an object, and therefore fail to meet this condition. Records that have not been geocoded meet the condition.

When you have specified a result code, select all records meeting this condition:

```
result_code < 0
```

Extracting Longitude and Latitude from a Geocoded Table

To extract the longitude and latitude coordinates from a geocoded table, you can either create a new table containing the latitude and longitude for each of the points in your original table, or use the Update command to put the longitude and latitude into the original table. The original table must be geocoded for these processes to function correctly.

Extracting Longitude and Latitude into a New Table

In this example we will create a new table, called **CUSCOORD**, that contains the latitude and longitude for each of the points in the original table, **AUS_CUST**.

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** and choose **Browser** in the **Preferred View** drop-down list.
2. On the **HOME** tab, in the **Selection** group, click **SQL Select** and fill in the **SQL Select** dialog box.

*Any columns from the **AUS_CUST** table that you would like to appear in the **CUSCOORD** table should be listed in the **Select Columns** box; then add the `centroidX(obj)` and `centroidY(obj)` functions to this list.*

3. Click **OK** to execute the query.
4. On the **HOME** tab, in the **File** group, click **Save Copy As** and save the resulting **CUSCOORD** table.

Original Table:

Lname	Fname	Terr	Company	City	State	Postcode	Order_amt
Urdahl	Mike	E	Goldman & Company	Camden	NSW	2570	13,880
Olsen	Kevin		Cherman Company	Singleton	NSW	6175	13,780
Berger	S D		Mercedes & Co	Kingston	TAS	4114	16,980
Parker	Al William		SC Homewares	Gympie	QLD	4570	7,600
Taylor	Brian		Dept of Roads	Singleton	NSW	6175	6,240
Wang	Darrel J		Data Terminal Services Ltd	Horsham	VIC	3400	16,880
Berry	Ed		Camden Electronics	Camden	NSW	2570	4,280
Hunsaker	R J		Southern Electrics	Gawler	SA	7315	10,320
Swanson	Mike	S	Kingston Academy	Kingston	TAS	4114	8,420
Patton	Hugo	N	Gympie College	Gympie	QLD	4570	8,220
Tracy	Rob	S	Goldman & Company	Horsham	VIC	3400	13,260
Boileau Jr	Marcia	C	Wilson Snyder Pumps	Gawler	SA	7315	14,500
Caton	Joseph	C	A Touch of Glass	Port Pirie	SA	5540	13,640
Williams	Jason	E	VI Software Development	Singleton	NSW	6175	9,000
Genekens	Robert	S	All West Computer	Portland	VIC	3305	2,240

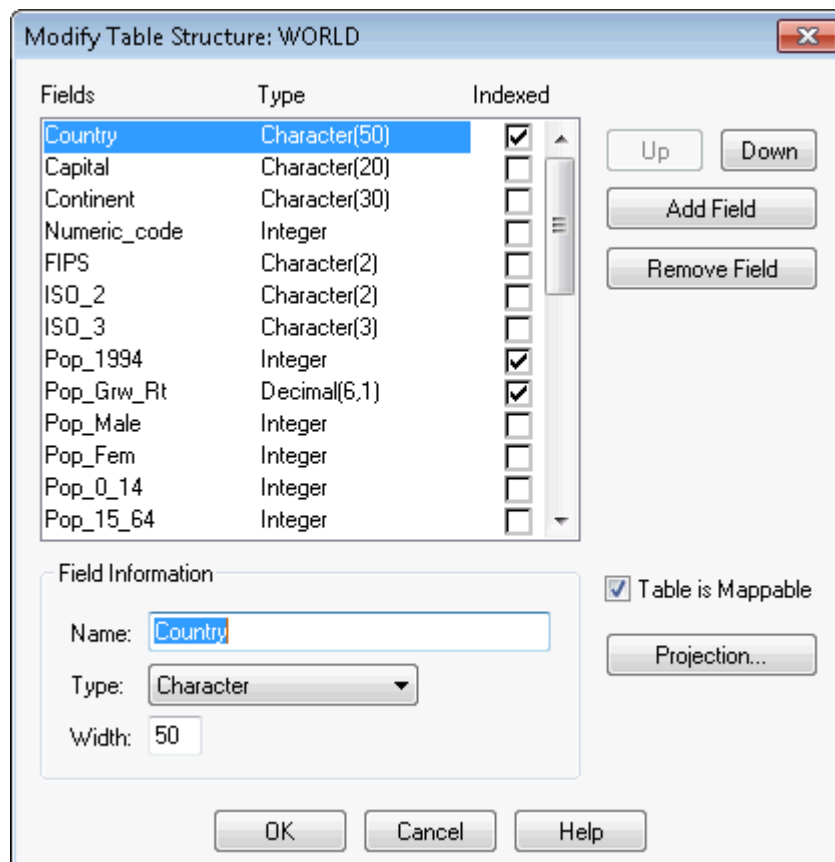
Resulting Table:

Company	Longitude	Latitude
Goldman & Company	150.683	-34.1232
Cherman Company	151.168	-32.5661
Mercedes & Co	147.308	-42.9791
SC Homewares	152.659	-26.1894
Dept of Roads	151.158	-32.6771
Data Terminal Services Ltd	142.199	-34.7147
Camden Electronics	150.641	-34.0136
Southern Electrics	138.744	-34.5997
Kingston Academy	147.232	-42.9382
Gympie College	152.575	-26.2108
Goldman & Company	142.115	-36.6212
Wilson Snyder Pumps	138.767	-34.6718
A Touch of Glass	138.001	-33.1868
VI Software Development	150.913	-32.6077
All West Computer	141.601	-38.3453

Extracting Longitude and Latitude into the Original Table

The following process will let you update your original table with the latitude and longitude coordinates.

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**.
2. To add two new columns to your table, click **Add Field** and name the columns. They should be defined as decimal (13,6). For this example, the columns are called `Xcoord` and `Ycoord`.

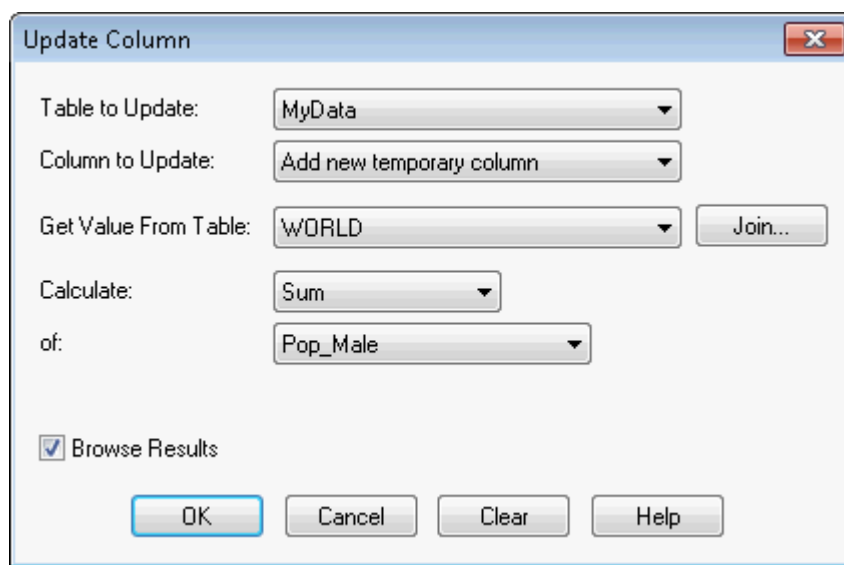


3. After adding the columns, click **OK**. When you return to your main MapInfo Pro window, the file will not be displayed. To redisplay your table, on the **TABLE** tab, in the **Content** group, click **New Browser**.
4. On the **TABLE** tab, in the **Edit** group, click **Update Column**. Specify your table and your column to update.

In the next example, we are updating the `Xcoord` column. The **Get Value from Table** portion of the dialog box will be the same table as specified in the **Table to Update** box. In the **Value** portion of the dialog box, you can type in `Centroidx(obj)` or you can click the **Assist** button to display the **Expression** dialog box.

Click **Functions** and choose **Centroidx** from the list and click **OK**.

5. Fill in the **Update Column** dialog box and click **OK**.



- Repeat step 3 to update the `Ycoord` column. Substitute `Centroidy(obj)` instead of `Centroidx(obj)`.

Extracting a Table in a Projection Other than Longitude/Latitude

MapInfo Pro maps have two attributes that affect the coordinates of objects within the map; these are the coordinate system of the map and the coordinate settings of the Map window. To correctly extract the x and y coordinates of a projected earth map, both the Map window and the map's internal coordinates must reflect the same coordinate system. In MapBasic, the `SET MAP` statement sets the coordinate system for the **Map** window, while the `COORDSYS` clause sets the internal coordinates.

To extract coordinates from a projected map in the native coordinate system of the table:

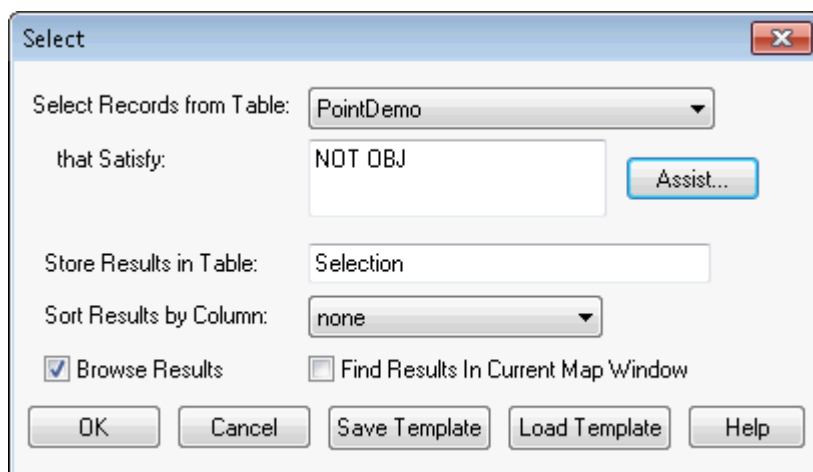
- Display a map of the geographic area that you are working in.
- On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic** from the list, to open the **MapBasic** window.
- Type: `SET COORDSYS TABLE TABLENAME`. `TABLENAME` is the table that you are extracting coordinates from.
- Press **Enter**. This sets the internal MapBasic coordinate system equal to the table given.
- Update the x, y values with the `CentroidX` and `CentroidY` functions.

Selecting Records Not Geocoded

Your geocoded table may have records that did not geocode, or you may have added new data to your table that have yet to be geocoded. There is a simple selection that can be performed to get a Browser list of the records not geocoded.

- Open your table if it is not open already, and click the launcher button on the **SPATIAL** tab (the button is located in the lower right corner, beside the word **SPATIAL**).

2. Fill in the **Select** dialog box. The expression used is `NOT OBJ`. This selects all of the records that are not objects, for example, not geocoded. Click **OK**.



Locating Newly Geocoded Points

One of the most satisfying results of geocoding is seeing your points displayed correctly on the map. Depending on the settings of your map, newly geocoded points may or may not be visible immediately.


Follow these steps to attempt to locate newly geocoded points on the map.

1. Make sure that the Map window is active by clicking the title bar.
2. Open the Layers window (On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list).

Make sure that the table you geocoded is listed in the Layer list. If it is not, then click the **Add** button and add that layer.

3. In the Layers window move the geocoded table to the top, just below the Cosmetic layer, to ensure that the points are not obscured by any other layer.
4. Make sure that the geocoded layer is set to visible. Check the **Visible On/Off** check box.

If your points are still not visible, proceed to step 6.

5. Right-click on the **Map** window and then click **View Entire Layer**. Select your table and click **OK**. This should put all of the points from your table in view. You may see that your points are on the map, but are not in the location you expected them to be. If they seem misplaced, see [Ungeocoding Selected Records](#).
6. If your points still do not display, in the Layers list, right-click on the layer containing your geocoded points, and click the **Layer Properties**  button. The **Layer Properties** dialog opens.
7. On the **Layer Display** tab, select the **Style Override** check box and choose a symbol style that will stand out on your map. Click **OK** and then exit the **Layers** window.

After following these steps, if you have not found the points that you geocoded, try to select all of the ungeocoded records as described in the section *Selecting Points Not Geocoded*.

Result Codes

When you are using the result code option (in **Geocode Options** dialog box) MapInfo Pro will generate a code for each record. These codes indicate the steps MapInfo Pro took to geocode the record, whether or not the geocoding was successful, and whether or not the match was exact. You can use return codes to diagnose MapInfo Pro's geocoding performance. It will help you spot "false positives" resulting from using various geocoding options and to analyze why some records have not been geocoded.

Ungeocoding a Table

Ungeocoding is the process of removing objects that have been attached to data records. There are times when it will be necessary to ungeocode an entire table or selected records in a table. For example, you have geocoded a database of customers using `US_ZIPS.TAB`. Later, you want to geocode the database again, using street addresses instead of postal code centroids since the geocoding will be more precise. MapInfo Pro allows you to delete all graphic objects associated with this table. You can then geocode your database again, using more specific coordinates. Ungeocoding only selected records from your table is useful when the location information changes for a relatively small number of records, such as address changes in a geocoded list of customers.

To ungeocode and remove one or more of the objects in a table:

1. Make the table you are working with the editable layer of the active **Map** window.
2. Select the object or objects.
3. Click the **Map** window to make it active.
4. On the **SPATIAL** tab, in the **Clipboard** group, click **Cut**.

To ungeocode an entire table:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure** to open the **Modify Table Structure** dialog box.
2. Clear the **Table Is Mappable** check box. Click **OK**.

CAUTION: This action will remove all graphic objects from your table. This action cannot be undone. If you are unsure of losing your points, save a copy of the table first.

3. A warning dialog box appears. If you are sure about removing all the objects, click **OK**.

All graphic objects have been removed from your table.

Make sure that you do not ungeocode your source tables. Unless you have created a backup of that table, you will no longer be able to display that table as a map or use it for geocoding.

Ungeocoding Selected Records

To ungeocode and remove one or more of the objects in a table:

1. Make the table you are working with the editable layer of the active **Map** window.

2. Select the object or objects.
3. On the **SPATIAL** tab, in the **Clipboard** group, click **Cut**.

Resolving Geocoding Issues

MapInfo Pro can rarely assign X and Y coordinates to all of your records on the first try, especially when geocoding to street level. It is not uncommon to have a geocoding hit rate of under 50% on your first attempt. The information in your database may not exactly match the information in the search table. MapInfo Pro-based maps are updated regularly, but may not include the most recent changes (for example, new subdivisions or postal code boundaries).

And there can be other problems. The abbreviations that you use in your table may not match the abbreviations that MapInfo Pro recognizes. For example, the records in your table may use abbreviations like Circ. for Circle and Pl. for Plaza. MapInfo Pro only recognizes Circle or Cir for Circle and Plaza or Plz for Plaza. When it cannot match an abbreviation, it does not geocode the record.

That is why MapInfo Pro gives you the option of geocoding your database interactively. There are a number of methods for geocoding records that do not have an exact match. The following is a list of potential geocoding pitfalls and how to avoid or rectify them.

Resolving Spelling Errors in Your Data Records

Keep in mind that MapInfo Pro looks for exact matches. If the information in your database does not exactly match the information in the search table, MapInfo Pro ignores that record during an automatic geocoding pass. Lasalle St and La Salle St are not exact matches nor are Main St and Maine St.

If you go through the geocoding process again using the interactive mode, MapInfo Pro will give you a list of close alternatives. Choose the closest match by scrolling through the list with the **Up** and **Down** buttons. You can also choose **Ignore** if the correct alternative is not listed.

MapInfo Pro generates its list of close alternatives alphabetically. For example, if MapInfo Pro cannot find Booker St in its database, it will generate a list of alternatives that are close to Booker St alphabetically (Bookman St, Brooker Ave, Brooks St). However, if the spelling error occurs in the first letter of the address (Booker St should really be Zooker St), you will either have to use the Up and Down keys to scroll to the correct spelling or enter the correct spelling directly.

Correcting Spelling Errors in Street Names

When your target table has an address name spelled differently than the source table, MapInfo Pro cannot make a match. There are three possibilities to consider:

- Geocode interactively

When you are geocoding interactively, MapInfo Pro displays a dialog box that lists close alternatives.

Use the **Up** and **Down** keys to scroll through the list and choose a street.

- Edit the target table

When you think there are too many errors in your target table, you can edit the target table before geocoding it. MapInfo Pro's **Update Column** command is useful for editing tables. However, it is possible that the street is spelled incorrectly in the source table. If so, edit the street name in the source table

Resolving Alternate Street Names, Street Name has Changed

Since a street name may change, your map will reflect the old name and so it will not match addresses which employ the new name. You can edit the map to reflect the name change, but then it will not reflect addresses using the old name. You want to be able to match addresses using both the old and new names.

You can deal with the problem by adding another row to the file of street names, as follows:

1. Open the *filename.tab* file - the street name file of your street map (not the segment file).
2. Find the row with the street name you want an alternate for and note its MI_REFNUM value.
3. Add a new row with the alternate name AND the same MI_REFNUM as the primary name.
4. Save and close the file.

MapInfo Pro will now recognize both names in addresses being geocoded.

Resolving Incorrect Address Numbers in Your Data Records

If your record has an address number that does not match the one in the table you are matching against, MapInfo Pro skips the address during automatic geocoding and gives you a list of known address ranges during interactive geocoding. Select the closest address range from the list or press Ignore to skip the record. Depending on the precision with which you want your records to spot on the map, choosing a close address range is probably fine.

You can also have MapInfo Pro select the closest address from the list automatically. Select **Options** in the **Geocode** dialog box. MapInfo Pro gives you the option of assigning the closest address number when an exact match cannot be found.

Choosing the closest address does not change the address in your table. MapInfo Pro only uses the coordinates from that address to spot your record at that location.

Working with the Abbreviations File

If you geocode automatically and find that you have an extremely low hit rate, your database of street addresses may use abbreviations that MapInfo Pro does not recognize. For example, all of your records might use Str as the abbreviation for Street. MapInfo Pro, on the other hand, uses the abbreviation St for Street. Another example: Your database contains addresses that spell out the street numbers (127 Fourteenth St) while MapInfo Pro's table uses the numbers (127 14th St).

Instead of editing all your records, a potentially time-consuming task, you can change which abbreviations are recognized. There is an abbreviation file (MAPINFOW.ABB) that you can modify so that MapInfo Pro will recognize your abbreviations.

Adding to the Abbreviation File

You can add a new item to the abbreviation file by adding a new row. The order in which you add rows is not significant, except in those cases where you expect one substitution pair to compensate for the effects of another. The number of spaces between the first and second items in a row is not significant either.

The abbreviation file is a simple ASCII file - MAPINFOW.ABB. You can edit it in any text editor or word processor. Open the file and make your additions, adding keywords as necessary.

Solving Problems with Abbreviations and Substitutions

Your target table may contain address components which MapInfo Pro cannot handle with its abbreviation file. For example:

Ave.	Does not recognize the period.
Suite	Does not recognize this at all.
WK	Does not recognize this at all.
#	Does not recognize this at all.

You can deal with this problem in two ways:

- Edit addresses in your target table so that it contains items MapInfo Pro can handle.
- or
- Edit MapInfo Pro's abbreviation file so that it can deal with your addresses.

In many cases, the second alternative is easier. MapInfo Pro's abbreviation file consists of pairs of items. The second item in each line is the abbreviation for the first. In working with street files MapInfo Pro searches through the address file to match an item in a target address with the first element in one of the pairs in the abbreviation file. When it finds a match it replaces the matching items with the proper abbreviation.

MapInfo Pro supplies this abbreviation file:

```
!Version Version 9.5
FIRST 1ST
SECOND 2ND
THIRD 3RD
FOURTH 4TH
FIFTH 5TH
SIXTH 6TH
SEVENTH 7TH
EIGHTH 8TH
NINTH 9TH
TENTH 10TH
NORTH N
SOUTH S
EAST E
WEST W
ALLEY AL
AVENUE AVE
AV AVE
BOULEVARD BLVD
BRIDGE BR
CIRCLE CIR
COURT CT
DRIVE DR
EXTENSION EXT
HIGHWAY HWY
INTERSTATE I
LANE LN
MOUNT MT
PARK PK
PARKWAY PKWY
PLACE PL
PLAZA PLZ
POINT PT
RAILROAD RR
ROAD RD
ROUTE RT
SAINT ST
SQUARE SQ
STREET ST
STR ST
TERRACE TER
!EOLNOSPACE
/
;
#
!EOLSPACE
FLOOR
SUITE
"P.O. BOX"
!NOSPACE
.
```



```

\"
\!
\\
!SPACE
"STATE HIGHWAY"STHWY"
"N ST"NORTH ST"
"S ST"SOUTH ST"
"E ST"EAST ST"
"W ST"WEST ST"
"N AV"NORTH AV"
"S AV"SOUTH AV"
"E AV"EAST AV"
"W AV"WEST AV"

```

You can make additions to this file to take care of various problems. Most importantly, you can make several different kinds of additions. MapInfo Pro recognizes four classes of substitution items and it interprets these classes differently. Each class is preceded by the keyword used to identify it in the abbreviation file:

Substitution Class	Keyword
Space-delimited simple substitution	!SPACE
Simple truncation	!EOLNOSPACE
Space-delimited truncation	!EOLSPACE
Simple substitution	!NOSPACE

In order for MapInfo Pro to know how to interpret a line, or set of lines, in the abbreviation file, you have to precede the line with the keyword which indicates the appropriate interpretation strategy.

When all of the entries in the abbreviation file use the default interpretation, there is no need to precede any of them with a keyword. When there is no keyword at the beginning of the abbreviation file, MapInfo Pro will treat the initial entries as requiring the default interpretation. Once you add other types of substitution pairs, however, you have to start adding keywords.

When an Input Address Finds More than One Location

Sometimes your table may contain records that have the same address, but lie in different towns. If you only geocode by street address, MapInfo Pro cannot differentiate among the records to give each one unique coordinates.

To solve this problem, MapInfo Pro allows you to geocode against a boundary in addition to the street address to find the correct match.

For example, you want to geocode your database of records in Cook County, Illinois. One address in the database reads 200 Washington St. Within the county of Cook, there are eight towns. Four of these towns have a Washington St. Three of the four towns have a 200 Washington St.

By telling MapInfo Pro to search against the street table **and** a boundary table, there is a much better chance of finding a correct match. MapInfo Pro can then differentiate between 200 Washington St in Chicago and 200 Washington St in Urbana.

To refine a search, select the column in your table that contains boundary information (TOWN, CITY, POSTALCODE). Next, select a MapInfo Pro table that also contains that boundary information you need. If you purchased your county street map from MapInfo Pro, two of the files included are *FILENAMES.TAB* (where filename is the state and county abbreviation), which contains the street information, and *FILENAMEMC.TAB*, which contains the town boundaries (minor civil divisions) for that county and *FILENAMECB.TAB* (city boundaries). Use these files to refine your search.

When refining your search, it is sometimes better to use postal codes rather than town boundaries. Town boundaries tend to fluctuate more than postal code boundaries. Furthermore, town boundaries are subject to regional interpretation.

If refining the search with a boundary is still not enough, you can search in additional boundaries for the match. Choose the **Options** button in the **Geocode** dialog box to bring up the **Geocoding Options** dialog box. Select the item that is labeled Use a match found in a different boundary.

Note: Keep in mind that even though postal codes are more effective for geocoding than town boundaries, you cannot use the *US_ZIPS.TAB* file to refine your search because it is a point file. Searches can only be refined using boundaries. Use *USZIPBDY.TAB* for this purpose.

Solving Problems of Space-Delimited Simple Substitutions

Space-delimited simple substitution is MapInfo Pro's default. What that means is this: MapInfo Pro compares spaced-delimited tokens in target addresses with the rows in the address file. A space-delimited token is a string of characters with a space before and a space after. For example, MapInfo Pro will replace "Ave" with "Av" in "Park Ave" but it will not change "Avery Blvd" to "Avry Blvd." Both street names contain the string "Ave". But that string is bordered by spaces only in "Park Ave", not in "Avery Blvd." In "Avery Blvd", "Ave" is followed by "r", not by a space.

All of the entries in the abbreviation file will receive this default interpretation. You can add other items to receive the same treatment. For example, you might want to add the pair "WK WALK" so that MapInfo Pro knows to interpret "WK" in a target address as though it were "WALK". Similarly, you might want to add a pair such as: "CIRCLE CIR".

Use the keyword "!SPACE" to indicate space-delimited simple substitution. Entries following "!SPACE" are given the default interpretation (this allows you to arrange the ABB file contents in some other order). When MapInfo Pro encounters another keyword, it switches to the indicated interpretation strategy.

Resolving Simple Truncations and Simple Substitutions

In simple truncation, MapInfo Pro finds an item in the address and simply ignores it and everything after it. These items do not have to be space-delimited. This strategy is useful for dealing with addresses such as:

123 Appian Way, Mail Stop 829

7305 Van Zandt # 23

In the first case, you want MapInfo Pro to ignore the comma and everything after it. In the second case you want MapInfo Pro to ignore the number sign and everything after it. To deal with such cases add the following to your abbreviation file:

```
!EOLNOSPACE
,
#
```

"!EOLNOSPACE" is the keyword indicating that the following items are to be treated as cases of simple truncation. After that we have one line with a comma and one with a number sign. Whenever MapInfo Pro encounters a comma or a number sign in an address it will ignore it and everything after it.

123 Appian Way

7305 Van Zandt

Resolving Space-Delimited Truncations

In space-delimited truncation MapInfo Pro looks for items which are space delimited and eliminates those items and everything following. For example:

73 Appian Way Suite 829

3033 Van Zandt Room 202

To deal with such cases add the following to your abbreviation file:

```
!EOLSPACE
SUITE
ROOM
```

"!EOLSPACE" is the keyword indicating that the following items are to be treated as cases of simple truncation. After that we have one line with "Suite" and one with a "ROOM". Whenever MapInfo Pro encounters those tokens it will truncate the address. The examples become:

73 Appian Way

3033 Van Zandt

Resolving Simple Substitutions

MapInfo Pro uses simple substitution to remove items from an address and otherwise does nothing. Use it to deal with:

433 Van-Rensselaer

91 St Albans'

To strip out the hyphen and the apostrophe. Make the following entries in the abbreviation file:

```
!NOSPACE
-
'
```

"NOSPACE" is the keyword calling for simple substitution, and the hyphen and apostrophe on the following lines are the tokens to be removed. The examples become:

369 VanRensselaer

91 St Albans

Handling Legitimate Spaces

There are cases where you want to indicate a substitution in which the searched for string contains spaces. You can use double quotes in such cases. Place a double quote:

- at the beginning of the line
and
- between the searched for string and the substitution
and
- at the end of the line

For example, you might want to substitute "STHWY" for "State Highway". To do that, use the following line:

```
"State Highway"STHWY"
```

This provides a solution to a subtle problem, that of street names which match items in the abbreviation file. For example, "North St" and "Park Av" both have initial strings which match terms in the abbreviation file. Consequently, MapInfo Pro will substitute "N" for "North" to yield "N St" and "Pk" for "Park" to yield "Pk Av." You could add the following lines to the Abbreviation file to rectify these substitutions:

```
"N ST"North ST"
"PK AV"PARK AV"
```

Note that these lines have to come *after* the entries which substitute "N" for "North" and "PK" for "Park". If they came before, they would have no effect. Thus:

```

...
...
NORTH  N
...
...
PARK   PK
...
...
"N ST"NORTH ST"
"PK AV"PARK AV"
...
...
```

When MapInfo Pro encounters NORTH N it will turn NORTH ST into N ST. When it encounters "N ST"NORTH ST" it will then turn N ST into NORTH ST. PARK AV is treated similarly.

Handling Special Characters

MapInfo Pro uses the exclamation point (!), the double quote (") and the backslash (\) as special characters. These characters tell MapInfo Pro how to treat strings which follow them, but are not themselves ordinarily treated as characters in substitution strings. The exclamation point tells MapInfo Pro that the string should not be interpreted as an abbreviation. The double quote tells MapInfo Pro that spaces in the string are legitimate. And the backslash tells MapInfo Pro to treat a special character as an ordinary character.

When you want to use any of these in a line where they are to be treated as simple characters, precede them by a backslash. Thus:

```

\!
\"
\\
```

Resolving Incorrect Address Ranges

When a target record has an address which is not in any of the ranges in the source table, MapInfo Pro will not be able to match it. Such an address might fall into a gap in range numbers or it might be beyond the ends of the ranges. There are three possibilities for handling this problem:

- You can enable the option to Use The Closest Address Number in the **Geocode Options** dialog box. MapInfo Pro will then geocode unmatched address numbers to the closest existing range, placing the record at the center of that range.
- or
- You can deal with such cases in Interactive mode. MapInfo Pro will give you a list of known address ranges. Select the closest address range from the list or click Ignore to ignore the record.

or

- It is possible that the address is for a street segment that was added after your source map was made. In that case, you may want to edit the source map so that it reflects the full range of addresses for that street.

Geocoding Post Office Boxes

StreetPro tables do not contain Post Office boxes. When your database contains Post Office boxes, you will not be able to geocode them to a StreetPro table. You have to geocode these records in a different way.

For example, if you know that a table contains many addresses with Post Office boxes, you could first select all the rows containing Post Office boxes and geocode those rows to postal code. Then you can geocode the remaining records to street address.

To find all the addresses containing Post Office Box numbers you need to have some way of identifying them. One plausible indicator is the word "box". Use MapInfo Pro's InString\$ function to select all records containing the substring " Box ". Note the spaces on either side of "box". By telling MapInfo Pro that we want those spaces, we make sure we will not include, for example, addresses on Boxwood Street. Using either Select or SQL Select, you want all records which meet this test:

```
InString$(1,ADDRESS," Box ")>0
```

The number "1" tells MapInfo Pro to search address entries starting with the first character. "ADDRESS" is the column containing the street address. " BOX " is the substring MapInfo Pro is searching for. When MapInfo Pro finds " BOX " in an address, it returns a number indicating the position of the first character of " BOX " in the address. It follows that, for any record where the value of Instring\$ is greater than zero, that address contains " Box ".

You can now geocode this Selection to postal code. That will take care of those records. Then you can geocode the whole database to addresses. Since those with Post Office boxes have already been geocoded, MapInfo Pro will skip over them.

Correcting Inaccurate Town Names

The last geocoding step is to determine in which region to place a matched street address. MapInfo Pro only takes this step if you have so specified when you set up the geocoding process. It is common to use town or city name as the refining boundary. This causes problems because people often do not use the town name which the Census Bureau assigns to their address. Since almost all electronic maps of the United States are based on Census Bureau maps, this will cause problems.

For example, the address "50 Wolf Rd., Albany, NY" is actually in the town of Colonie. Thus the address town name in the target address will not match the appropriate town in the source file against which it is being geocoded.

One way to deal with this problem is to enable the Try Searching In A Different Boundary option on the **Geocode Options** dialog box. When this option is enabled, MapInfo Pro will geocode an address

to whatever boundary the address is in, providing that address is in only one boundary. When the address is in more than one boundary, the geocoding will fail.

Another way to deal with this problem is to use the postal code as the refining boundary, rather than the town or city name.

Resolving Geocoding Errors Using Result Codes

Specify a numeric field (**Geocode Options** dialog box) in which MapInfo Pro will write a code indicating which steps were taken to geocode the record or why the record did not match. These codes can be very useful in catching "false positive" matches and in improving the "hit" rate by diagnosing problems and correcting them.

The return code is a three-digit number, with each digit indicating a particular aspect of the geocoding operation.

MapInfo Pro "scores" each record on each aspect and adds the three numbers together to get the result code for that record. For example, a result code of 122 means:

- The address was found in one other boundary: 100
- The exact address range was not found: 20
- Abbreviation file substitutions were made: 2

These tables indicate the significance of each element in the code.

<0	Not matched
0	Not tried
1	Exact match
>1	Inexact match

The return codes have been designed so that non-matches will have a negative value and matches will have a positive value. A record which has not been tried will have a return code of zero.

1	Exact match found
2	Abbreviation file applied

3 (-)	Exact match not found
4 (-)	No street specified
5	User picked a name from the list

Codes indicating how MapInfo Pro has treated street names appear in the one's place of the result code.

00	Exact address range and side of street found
10	Address range found, but could not determine side of street
20 (+/-)	Address range not found, but within minimum and maximum ranges
30 (+/-)	Address range not found, but beyond minimum and maximum ranges
40 (+/-)	Address range not specified, but matched to minimum range
50 (-)	Streets do not intersect
60 (-)	Signifies the row has no object
70	User picked an address from the list

Codes indicating how MapInfo Pro has treated address ranges appear in the ten's place of the result code.

Refining-Boundary Codes

100 (+/-)	Address range found in only one boundary other than specified boundary
200 (-)	Address range found in more than one boundary other than specified boundary
300 (+/-)	No boundary specified, but found in only one
400 (-)	No boundary specified, and found in more than one
500	Exact street address found more than once in the specified boundary
600	User picked a boundary from the list
1000000 (+/-)	User typed something new

Codes indicating how MapInfo Pro has treated refining boundaries appear in the hundred's place of the result code.

Once you have result codes, you need to find out how your records were handled. You can use the following SQL Select statement to find out which result codes appeared in your table and how many records were returned with each code value:

Select columns	Result_Code, count(*)
from tables	SomeData
group by columns	Result_Code

The resulting query table will have a row for each different three-digit result code and a count of how many records had that code. You can then use Select or SQL Select to select all the records with a

particular code. You can then browse these various selections and determine how to handle each class of records.

Examples of Geocoding Result Codes

675 User pick street name, address range, and boundary.

101 Exact match found in exactly one boundary other than boundary specified.

Putting Latitude/Longitude Coordinates on a Map

You may have a file that already contains X and Y coordinates, but not the point objects themselves that you want to display in MapInfo Pro. While the geographic information exists in the table, MapInfo Pro needs to create points to represent these coordinates before displaying them in a Map window. The **Create Points** command under the **SPATIAL** tab allows you to create points for each record in your database that has X-Y coordinate information.

Note: MapInfo Pro uses the coordinate fields in your table to create point objects. Records that already have graphic objects associated with them will be skipped during the Create Points operation.

For example, you have a table showing transmitter tower locations that was created by recording coordinates using a global positioning system. You want to display the locations on a map in MapInfo Pro. The table already has X and Y coordinate information but MapInfo Pro cannot display this information until you create points for that coordinate data that MapInfo Pro can read.

Creating Points

To create points:

1. Open the table for which you want to create points.
2. On the **SPATIAL** tab, in the **Create** group, click **Create Points** to open the **Create Points** dialog box.
3. Choose the appropriate table from the drop-down list.
4. Select the columns in which the X and Y coordinates display from the Get X and Y coordinate information lists.

Note: If you select the same table for the X and Y coordinates, a warning message displays, prompting you to make a change. Click **OK** and change the selections in these drop-downs. By default the **Get X Coordinates from column** searches for columns in the table with a name similar to Longitude\Long\Lon\Easting\East\XCoord\X. The **Get Y Coordinates from column** searches for columns in the table with a name similar to Latitude\Lat\Northing\North\YCoord\Y.

5. The Multiply X and Y coordinates by options allow the user to place a multiplier on the coordinate columns if necessary. To specify a projection other than longitude/latitude or the default Table Projection preference, choose projection. In some cases you will need to specify a negative multiplier depending on the locations quadrant. For locations in North America the X coordinate is negative. In Africa and Australia, the Y coordinate is negative. For locations in and around South America both coordinates are negative.
6. Select the appropriate check boxes:
 - **Display non-numeric data** - Select this check box if the data you want to create points for is in text fields in the original table. MapInfo Pro can attempt to convert the text values to numbers. If the values are not numbers, MapInfo Pro cannot create an object for that record. This check box is automatically selected and disabled when the table you have selected does not contain two numeric fields.
 - **Overwrite existing points** - Select this check box to replace the existing objects in the current map with points based on the data contained in this table.
7. Click **OK**. MapInfo Pro updates the table to create point objects.
8. To display the table, either:
 - On the **MAP** tab, in the **Content** group, click **Map** to open the table in a new Map window.
 - On the **MAP** tab, in the **Content** group, click **Add Layer** to add the table to an existing map.

Creating Points from an Excel or Lotus Table

There are extra steps to the create points process when your data is in Excel or Lotus 1-2-3 format.

To create points for an Excel or Lotus table:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Files of type** drop-down list, choose the type of table that you want to open, **Excel** or **Lotus**, and select a file from the list. Click **Open**.
3. Specify the portion of the worksheet you wish to access. You may use a named range or choose **Other** from the drop-down list and specify the rows and columns to include.
4. If your worksheet uses the first row for column names, select the **Use Row Above** box. Click **OK**. Remember to use the drop-down box to modify the range accordingly, such as "A1" to "AZ".

You now have a **Browser** view of your worksheet in MapInfo Pro. This table is currently a read-only table and cannot be edited in MapInfo Pro.

Note: Make sure that your coordinate information is in decimal degrees (if longitude/latitude) and not in degrees, minutes, seconds. If your coordinates are in degrees, minutes, seconds format, see [Converting Degree/Minute/Second Coordinates into Decimal Degrees](#). If it is a different coordinate system, it must be in numeric columns.

MapInfo Pro can use your numeric data even if it is in a non-numeric column. Many times, numeric columns containing coordinate information are brought in as character columns because the first row is used as a header.

5. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure** to open the **Modify Table Structure** dialog box. This dialog lists each field name and type.
 - If the coordinate fields are decimal, integer or float, click **OK** and go to step 10.
 - If your coordinate fields are listed as character, go to step 6.
6. On the **HOME** tab, in the **File** group, click **Save Copy As**.
Give your table a new name, for example, `SAMPLES2.TAB`.
Click **Save**. A copy of your worksheet is saved.
7. On the **TABLE** tab, in the **Content** group, click **Close** and close the worksheet that was opened.
8. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table**.
Choose the new table that you saved, for example, `SAMPLES2.TAB`.
Click **Open**. An editable copy of your original worksheet displays.
9. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure** to open the **Modify Table Structure** dialog box.
Select your coordinate columns and change the type to **Float**.
Click **OK**.
10. You will be asked to verify the changes. Click **OK**.
Your **Browser** closes, indicating that the changes have been made.
11. Next, determine whether your points are in longitude/latitude or in another projection. Follow the instructions in the next section for each of these cases. If you are unsure of what projection your coordinates are in, contact the source of the data.

Creating Points from Longitude/Latitude Data

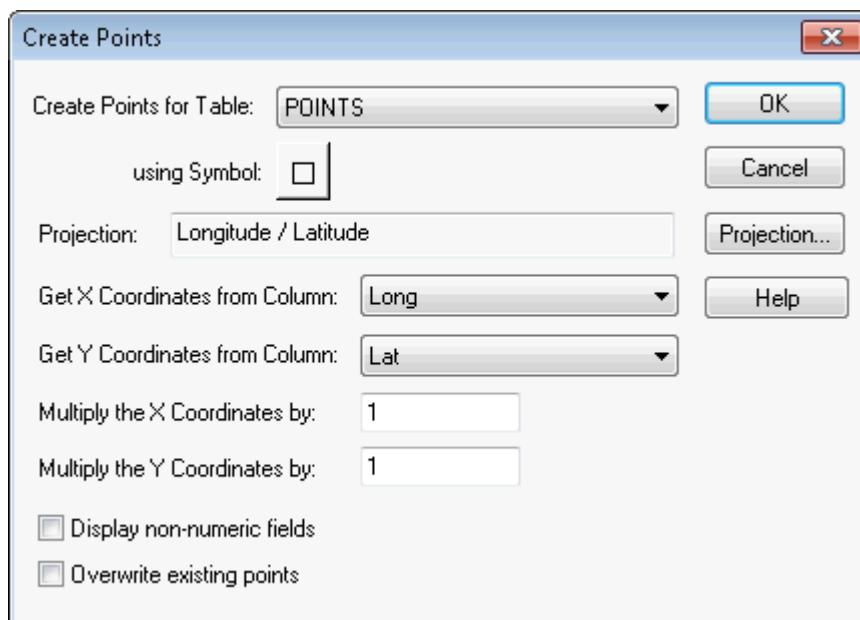
If your point information is in longitude/latitude, do the following:

1. Examine the browser for your data to determine which columns contain the latitude coordinate (Y), and the longitude coordinate (X).

Name	Lat	Long
ABC Corp	36.7846	98.0963
Acme Products	39.6152	97.5423
Fine Imports	37.2647	98.9864

2. Determine the multiplier for the X and Y columns based on the quadrant of the Earth in which the points fall. For example, if the points are expected to fall in Kansas, the X value is expected to be between -102 and -94. In the above browser, the data for X (Lon) is close to +98. The multiplier should be -1 to create the points correctly. The Y (Lat) values are in the correct range and require a multiplier of +1 (+1 will not change the value).

- On the **SPATIAL** tab in the Create group, click **Create Points**. The **Create Points** dialog box displays.



- Insert the proper values in the Get X coordinates, Get Y Coordinates boxes, and the Multiply X and Multiply Y boxes. Click **OK**.

Note: By default the **Get X Coordinates from column** searches for columns in the table with a name similar to Longitude\Long\Lon\Easting\East\XCoord\X. The **Get Y Coordinates from column** searches for columns in the table with a name similar to Latitude\Lat\Northing\North\YCoord\Y.

Creating Points in a Projection

To create points using a projection, do the following:

- Examine the browser for your data to determine which columns contain the Y and X coordinates. In this example, the easting (x) and northing (y) values are in US State Plane Coordinate System (1927) Mass Mainland Zone.

Lon	Lat
-78,079.99	-110,617.83
13,024,425.57	1,326,534.36
-3,784,228.76	722,223.68
-7,048,397.4	-3,044,106.41

- On the **SPATIAL** tab, click **Create Points** to display the **Create Points** dialog box.
- Click the **Projection** button and choose the projection category and member.

Note: The Projection box displays the projection used for creating points.

4. Click **OK**.

Dispersing Points Located in the Same Place

Depending on how you have geocoded your table, you may have several points that are placed at the same location, making it difficult to tell if you are viewing one point or many. For example, if you geocode a table of students by census tract, and view the results on your map, it appears that there is one dot at the center of each tract when there actually may be several there. To see all of your data, you may want to disperse the points over a small area. There are three methods for dispersing points: the Disperse Points tool (a tool that comes with MapInfo Pro), equal dispersion, and dispersion to the right.

Dispersing Points using the Equal Point Dispersion Method

The equal dispersion method disperses points at equal distances from the center.

1. First, select all of the points that have the same location. This can be done with either the **Radius Selection** or the **Marquee Selection** command. On the **MAP** tab, in the **Selection** group, click on a command in the selection list.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic** from the list, to open the **MapBasic** window.
3. Click in the MapBasic window, type `RANDOMIZE`, and press **Enter**.
4. Type the code below and press **Enter**:

```
UPDATE SELECTION SET OBJ = CREATEPOINT(CENTROIDX(OBJ) +
(0.01) / (COS(CENTROIDY(OBJ) * .01745))) * (RND(1) - .5), CENTROIDY(OBJ)
+
0.01 * (RND(1) - .5))
```

Dispersing Points using the Dispersion to the Right Method

The dispersion to the right method disperses points to the right of the point.

1. First, select all of the points that have the same location. This can be done with either the **Radius Selection**, or **Marquee Selection** command. On the **MAP** tab, in the **Selection** group, click on a command in the selection list.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic** from the list, to open the **MapBasic** window.
3. Click in the MapBasic window, type `RANDOMIZE`, and press **Enter**.

4. Type the following and press **Enter**. The table will be automatically updated.

```
UPDATE SELECTION SET OBJ = CREATEPOINT(CENTROIDX(OBJ) + 0.01 * RND(1) ,
CENTROIDY(OBJ) )
```

5. If the new **Map** window has not distributed the points satisfactorily, on the **SPATIAL** tab, in the **Clipboard** group, click **Undo** to restore the objects to their original positions.
6. To disperse points for the entire table, substitute your tablename in the above examples wherever it says **SELECTION**.

Note: The dispersal weight, in the equation of the update statement above, is a number that regulates the object's new X and Y coordinates. In the above example, the dispersal weight is 0.01 degrees (longitude and latitude). The maximum X or Y distance (in miles) that the point is dispersed is equal to (69 * the dispersal weight). The dispersal weight is adjustable - the larger the weight, the greater the dispersal distance. In the example above, the dispersal weight is about right for dispersing points on a county-wide or state-wide basis, but not for a street-level dispersal. If you find that your objects are not being dispersed enough or are dispersed too much, increase or decrease the weight.

Creating Points for Intersections

Many people working with street files are often interested in information that is located at intersections. For some, their only concern is the intersections. In MapInfo Pro you can geocode to intersections in your street file with the Geocode command, but it would be easier to work with a table that contained only intersections. For example, a municipality is interested in tracking the types of traffic control devices at each street intersection. It would be beneficial for them to make an entire layer that contains the intersection of every street.

To create points for every intersection in your table:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table**, and open your street file.
2. Make two copies of the street file and give each copy a new name by clicking **Save Copy As** on the **HOME** tab.
3. Repeat Step 2 and save the file under a different name.
4. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table**, and open the two files that you created.
5. On the **HOME** tab, in the **Selection** group, click **SQL Select**, and fill in the following SQL Select statement. This query matches the two street files against each other where the streets intersect and are not the same named street.

- **Select Columns:** Streets1.StreetName + "&&" + Streets2.StreetName
- **from Tables:** Streets1, Streets2
- **where Condition:** Streets1.obj Intersects Streets2.obj And Streets1.StreetName <> Streets2.StreetName
- **into Table Named:** Intersect
- Select the **Browse Results** check box.

- Select the **Find Results In Current Map Window** check box.
6. On the **HOME** tab, in the **File** group, click **Save Copy As**, and save the resulting table.
 7. Open the newest table and ungeocode it.
 8. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**. Clear the **Table Is Mappable** check box.
 9. Geocode the unmapped table to one of the copies of the street file. You may have duplicate points at the same location if a street intersects another of the same name more than once.

You can review directions for extracting longitude and latitude from a geocoded table [Extracting Latitude and Longitude into a New Table](#). For more about querying and selecting data, see [Selecting and Querying Data](#).

Geocoding Data using a Server

Using the MapMarker, Envinsa, Precisely Global Geocoder, and Global Geocoder Web Services, you have more choices for geocoding. For example, you can choose to geocode your records by street address or by postal code centroid, or by geographic centroids. If you have geocoded some records and some did not geocode successfully, you can set fallback conditions to locate those records. If you geocode and there are no results, poor results, or multiple equal close results, the geocoding server can present you with interactive options so you can select among possible matches or change your input. Further, these web services allow you to set multiple matching conditions when more than one record matches the records you are geocoding and set offsets for placing points right in the geocode properties.

For companies and organizations that use MapMarker, Envinsa or Global Geocoder servers as a geocoding engine, you can now take advantage of the geocoding servers available to your whole enterprise. If your organization makes this server available on your intranet or over the Internet, you can use our geocoding web services from within MapInfo Pro to perform more sophisticated and accurate data geocoding. If you use Precisely Global Geocoder, you can access the geocoding server from Precisely that you can use to geocode your data with high precision.

MapMarker is a powerful geocoding product that assigns coordinates to an address based on how well it matches entries in an Address Dictionary. The precision of the match can vary. For each address you geocode, you may get back a single perfect, street-level match, a list of street-level match candidates from which you choose the best match, or a less precise postal code centroid match, where the point would be located near the center of the postal code area. In the case of a ZIP + 4 centroid match, the location of the point corresponds to the address which is closest to the mid-address of the ZIP + 4 address range. You must have MapMarker 4.0 core to use this web service.

Envinsa provides a wider range of web services than MapMarker and can even provide access to earlier versions of MapMarker. Envinsa can determine these values from a street address or postal code. Envinsa servers require more security than MapMarker, so you will need a user name and password to access them. Keep in mind that the services that are available on an Envinsa server depends on what was installed.

Precisely Global Geocoder is a cloud based geocoding server from Precisely Sign-up for the service now and get a free limited number of geocoding credits per month. See [Using the Precisely Global Geocoding Server](#) for details.

Global Geocoder is available when you add a new Geocoding server to the server list. The Global Geocoder Interface implementation connects MapInfo Pro with Global Geocoding making it easier for you to consume our geocoding assets. To geocode data from anywhere, choose to work with the **Global Geocoder**. This is a generic interface created by Precisely through which any or all of our country geocoders can be installed and accessed.

To use MapInfo Pro with a geocoding server, you need MapMarker Java Server 4.0 or later or Envinsa 4.0 or later or a Global Geocoding server. MapInfo Pro supports any geography that is supported by Envinsa currently. Envinsa supports MapMarker Java Server V2, V3, and V4. Keep in mind that any Envinsa server only supports the data that is installed.

Before you can access a MapMarker or Envinsa geocoding service, you need to connect MapInfo Pro to its server. This process gives MapInfo Pro all the information it needs to access the geocoding service. You need to enter this information only once per service.

- To geocode a single address using a geocoding service, see [Geocoding a Single Address using a Geocoding Service](#).
- To set up a geocoding server and its preferences, see [Setting up a Geocoding Server](#) and [Setting the Geocoding Server Preferences](#).

Displaying Your Data on the Map

Once you have converted your data and geocoded or created points for it, you are ready to display the results.

To display your data in a new **Map** window:

1. On the **MAP** tab, in the **Content** group, click **Map** and select the tables you want in your map. The order in which you select these tables determines the order they display.
2. Click **OK** to display your data on the map you selected.
3. To change the symbol used to display your data, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
4. Click the **Style Override** switch for the layer with your data in it and select new display options.

To display your data on an existing **Map** window:

1. Open the .TAB files or .WOR files you want to plot your converted data onto.
2. Open the .TAB files or .WOR files you just created and in the **Preferred View** drop-down box select the **Current Mapper** option.
3. Click **Open**.

Now that your data is there to see, make it say something to your audience. The whole world of MapInfo Pro functionality is open to you. For details on analyzing your data, see [Creating Thematic Maps](#) or see [Drawing and Editing Objects](#) for more about customizing your map.

Using Universal Data Directly

You can open AutoCAD, Microstation Design, ESRI ArcSDE, Personal Geodatabase and Google Earth KML data directly to avoid having to translate it separately and work with copies of the data in .TAB format. This functionality ensures that you will have more flexibility when working with your data.

Precisely and Safe Software, a third-party partner, have worked together to provide this direct way to open and display universal data in MapInfo Pro using a utility called the Feature Manipulation Engine (FME). The FME opens a variety of Universal Data formats including:

- Autodesk AutoCAD (*.DWG, *.DXF)
- Bentley MicroStation Design (V7) (*.FC1, *.DGN, *.POS)
- Bentley MicroStation Design (V8) (*.FC1, *.DGN, *.POS)
- ESRI ArcInfo Export (*.E00)
- ESRI Geodatabase (File Geodb API) (*.GDB)
- ESRI Geodatabase (Personal Geodb) (*.MDB)
- ESRI Legacy ArcSDE
- ESRI Shapefile (*.SHZ, *.SHP)
- GML (Geography Markup Language) (*.GML, *.GZ, *.XML)
- Google KML (*.KML, *.KMZ)
- OS MasterMap Database
- OS VectorMap District
- OS VectorMap Local
- Spatial Data Transfer Standard (SDTS) (*.CATD, *.DDF)
- Vector Product Format (VPF) Coverage (*.FT)

Using the Universal Data feature of MapInfo Pro, you can open different types of data stored in a variety of locations and:

- Combine data from multiple sources into a single output.
- Run and join data from incompatible systems
- Extend the use of legacy systems
- Exchange data between CAD-based systems and GIS systems
- Perform quality assurance tests on spatial data

Additionally, if you have the FME Suite, which is available from Safe Software, you can use this feature to open almost 150 formats within MapInfo Pro.

Note: You cannot open a SQL Server table through Universal Data. If you open an existing table or workspace that references a SQL Server database, then an error message displays. If you purchased FME separately from [Safe Software](#) and it supports SQL Server, then tables

using SQL server open in MapInfo Pro. For more information, see [Working with the FME Suite](#).

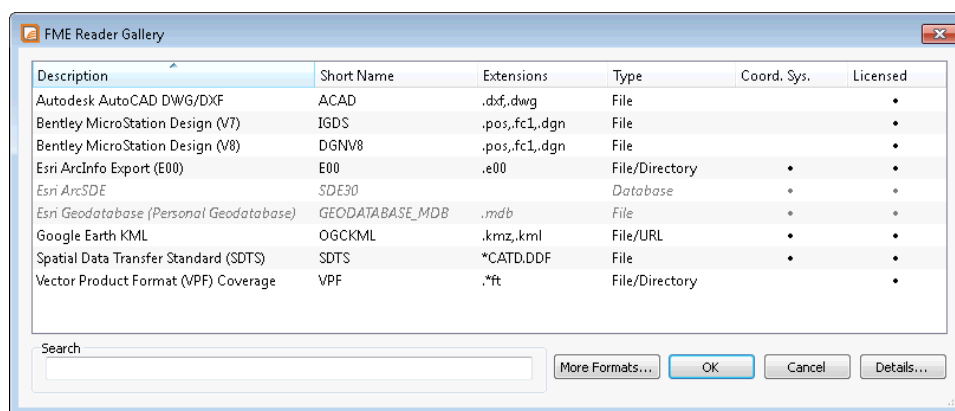
Opening Universal Data Directly

When opening universal data, you can select the data you want to open and specify the name of the dataset you want to display.


The process for opening this data is the same regardless of the format.

To open the universal data directly:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Universal Data**.
2. In the **Specify Data Source** dialog box, in the **Format** drop-down list, click **More Formats....**
3. In the **Formats Gallery**, select the format for the data you wish to open and click **OK**.



To obtain a free trial of the FME Suite and add more formats to this list, click **Add More Formats**.

4. In the **Specify Data Source** dialog box, click **Open file browser**  beside the **Dataset** field.
A dataset is defined as a set of data in the same format.

5. In the **Select File** dialog box, locate and select the data file. If you do not see your data in the list, then select **All Files (*.*)** from the **Files of type** list. After making your selection, click **Open**.

The **Specify Data Source** dialog box refreshes with your selection. If the **Dataset** field remains blank, then check that you are selecting data that matches the format in the **Format** field.

6. To open a directory of data in the **Specify Data Source** dialog box, click **Open advanced browser** button beside the **Dataset** field.

The **Select File** dialog box opens and you can select:


- Directory-based formats by clicking **Add Folders...** and browsing for a specific directory name. Check the **Subfolders** check box to include all sub-folders below that directory. Click **OK**. The new data appends to the original data.

When adding a directory, MapInfo Pro opens all of the data of the specified format it finds in the directory. If you select the **Subfolders** check box, MapInfo Pro opens all of the data with the specified format in the sub folders. The data is merged together when you open it.

- File-based formats by clicking **Add Files** and browsing for a specific file name. To select multiple files, press **Ctrl** while making your selections. Click **Open**.

Select the **Identical Schema** check box if the files have the same schema.

Click **OK** to close the **Select File** dialog box.

7. Optionally, click **Parameters** to set how to handle the output format. This is how you set the display settings for your data.
8. If the coordinate system for your data selection is unknown, then click **Coord. System**  beside the field to select the projection. If you do not specify the coordinate system, you will be prompted to do so later.

Some data contains the coordinate system information in it and others do not, so you may need to specify the coordinate system projection for the data you are opening.

9. Click **OK**.
10. In the **Select Layers** dialog box, select which layers you want to include in the output. By default all layers are selected.

To set display characteristics for one or all of the layers, see [Changing Display Settings for Universal Data](#).

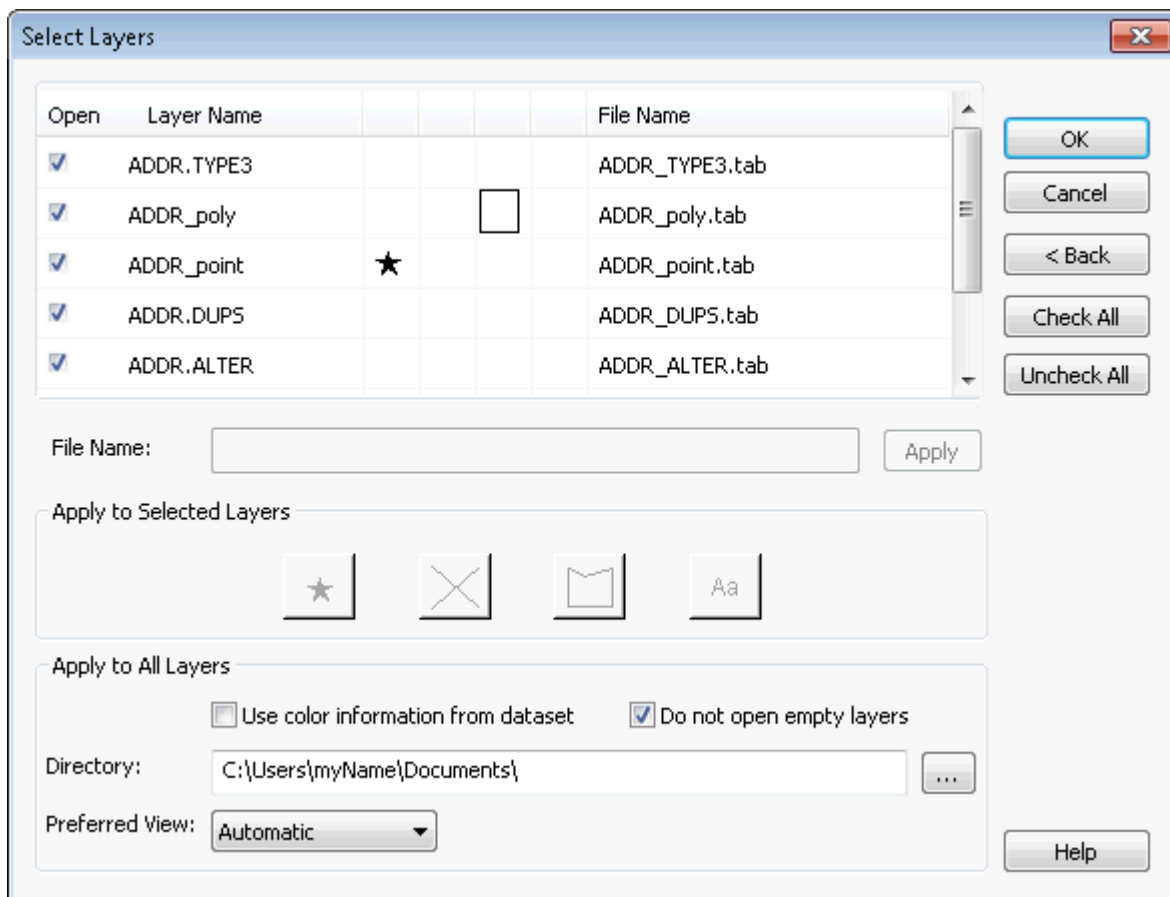
11. In the **Directory** field, type the location to save the output to or browse to select a location.
12. From the **Preferred View** drop-down list, select whether you want to view the output in a Map window (**Current Mapper** or **New Mapper**) or in a **Browser** table.
13. Click **OK**.

If you did not specify the coordinate system in [step 8](#) and the coordinate system is unknown, the **Choose Projection** dialog box displays, so that you can select the projection for the data you are opening. The system defaults to your **Table Projection** setting in the **Map Window Preference** if you do not select a projection here.

The data opens in MapInfo Pro.

Changing Display Settings for Universal Data

When selecting to open universal data, the **Select Layers** dialog box offers control over how the output data will display.



Changing Layer Names

To change the name of the layer, select it, type a new name in the **File Name** field and click **Apply**. Use the **Check All** and **Uncheck All** buttons to select or deselect the **Open** check box for all of the layers. Click the **Back** button to return to the **Specify Data Source** dialog box.

Selecting Layers to Apply New Display Options to

All layers you select together will share the same display characteristics.

- To change the display options of all layers, click the layer name of the first layer, press the **Shift** key, and click the layer name of the last layer
- To change the display options of some layers, click the layer name of the first layer, press the **Ctrl** key, and click the other layers that require the same change
- To change the display options of one layer, click the layer name of the layer

Setting Display Styles for Selected Layers

After selecting layers, use the display buttons to apply new display styles for the geometry in the layers. If the layers contain:

- Point data, click the **Symbol Style** button to change the symbol options
- Line data, click the **Line Style** button to change the line options

- Region data, click the **Region Style** button to change the background options
- Text data, click the **Text Style** button to change the text options

If you want to open maps based on data that is thematically related, assign the same styles to the layers that contain that information.

Avoiding FME License Failures when using Two Versions of MapInfo Pro

If you are using side-by-side installations of both the current version of MapInfo Pro and an older version and you remove the older version, you may remove the current FME license by mistake. You will know when you start MapInfo Pro and an error displays informing you that the FME license failed. FME may be looking in the registry for the ProgramDirectory key under the earlier version of MapInfo Pro.

To work around the problem:

1. Start the current version of MapInfo Pro.
2. When the FME license failure error message displays on the screen, close MapInfo Pro and then restart it.

Avoiding Out of Disk Space Errors when using Universal Data

When you open universal data using this feature, the data is stored locally temporarily so you can reopen it faster the next time you use MapInfo Pro. For example, the temporary file folder location is:

```
C:\Users\<username>\AppData\Local\MapInfo\MapInfo\Professional\<versionum>\UniversalDataCache\
```

If you find that you are opening large files with many layers using this feature, these files can get very large and may impact the performance of your system. If you see *Out of Disk Space* errors, you may want to delete these files to see if this data is the cause of the error. Whenever you delete temporary files, you will have to reopen that stored data to display it again.

Coordinate System Behavior and Universal Data

Some of the universal data you are working with contains coordinate system information and some do not. If you are opening Spatial Data Transfer Standard data and some of the ESRI data, the coordinate system information entry is handled for you. Coordinate system information for AutoCAD, Microstation Design and VPF data must be specified, although VPF data is usually in the Longitude/Latitude WGS 84 projection.

Refreshing the Universal Data

You can refresh the data from the original data source using the Universal Data Table Refresh command. This allows you to incorporate changes to the original data in your new MapInfo Pro map.

To refresh the universal data:

1. The data you want to refresh must be open in a Map window.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Tables** from the list, to open the **Tables** window.

3. Highlight the layer of Universal data and on the **TABLE** tab, in the **Maintenance** group, click **Database**, and **Refresh Oracle Table**.

Setting the AutoCAD Options

The documentation describing the options in this dialog box are from Safe Software's *Help System*.

To set the AutoCAD file options:

1. Select the AutoCAD format and appropriate data.
2. Click **Settings** to display the AutoCAD Settings. Select the appropriate options and click **OK**.

For Autodesk AutoCAD DWG/DXF input settings, see [Input Settings for Autodesk AutoCAD DWG/DXF Dialog Box \(FME\)](#).

Opening Older AutoCAD Files

For a small number of files, an older version of the reader can successfully open data that a newer version can not. If you are having difficulty opening these DWG or DXF files using the Universal Data feature, you can enable an older, deprecated DWG/DXF reader to appear in the Format Gallery, and use this reader to open these files.

To do this, you must edit the *formats.db* file in the UT folder of your MapInfo Pro installation directory. This change does not effect the UT, which will always use the newer DWG and DXF readers.

To open older versions of DWG and DXF files:

1. In your MapInfo Pro installation directory, click your UT directory and use a text editor to edit the *formats.db* file.
2. Search for the following line:

```
DWG|AutoCAD DWG/DXF (Deprecated) |FILE|BOTH|BOTH|NO|DWG Files (*.dwg) /DXF
Files (*.dxf) %*.dwg;*.dxf%DWG Files (*.dwg) %*.dwg%DXF
Files (*.dxf) %*.dxf%All Files%*. *| |NO|YES|YES|NO
```

3. And change it to:

```
DWG|AutoCAD DWG/DXF (Deprecated) |FILE|BOTH|BOTH|NO|DWG Files (*.dwg) /DXF
Files (*.dxf) %*.dwg;*.dxf%DWG Files (*.dwg) %*.dwg%DXF
Files (*.dxf) %*.dxf%All Files%*. *| |NO|YES|YES|YES
```

4. Save your changes to this file.
5. Close MapInfo Pro and reopen it.

The next time you display the Formats Gallery, the deprecated DWG/DXF reader displays.

Setting the ArcInfo Export File Options

The documentation describing the options in this dialog box are from Safe Software's *Help System*.

To set the ArcInfo Export file options:

1. Select the ESRI ArcInfo Export format and appropriate data.
2. Click **Settings** to display the E00 Input settings. Select the appropriate options and click **OK**.

For ESRI ArcInfo Export (E00) input settings, see [Input Settings for ESRI ArcInfo Export \(E00\) Dialog Box \(FME\)](#).

Setting the ArcSDE Data Options

Note: To access ESRI Personal Geodatabase data, see [Setting the ESRI Personal Geodatabase Data Options](#).

To access your ArcSDE data, MapInfo Pro must have access to the following ArcSDE client dynamically linked libraries (DLLs):

- sde.dll
- sg.dll
- pe.dll

These libraries are installed with the ArcGIS 9.2 desktop application, the ArcSDE SDK 9.2 or ArcReader 9.2 and they are present if you have installed ArcView 9.2, ArcEditor 9.2, or ArcInfo 9.2. For more information about ArcGIS Desktop applications and the ArcSDE SDK, refer to the appropriate ESRI documentation.

You can get these DLLs by downloading the ESRI ArcReader 9.2, which is a free download:

<http://www.esri.com/software/arcgis/arcreader/>

The PATH environment variable in your system settings should reference the local folder that contains these DLLs. For example, if you have ArcGIS 9.2 Desktop installed to:

```
C:\Program Files\ArcGIS
```

then the following directory should contain the ArcSDE 9.2 client libraries, and this directory needs to be added to your PATH:

```
C:\Program Files\ArcGIS\ArcSDE\bin.
```

Similarly, if the ArcSDE SDK 9.2 is installed to the default location, then the required ArcSDE 9.2 client libraries should be in the following directory, which needs to be added to your PATH:

```
C:\ArcGis\ArcSDE\bin.
```

If you do not adhere to this path configuration, the **Formats Gallery** dialog box will display the ArcSDE data, but it will be grayed out and unavailable.

To ensure that MapInfo Pro finds DLLs, we recommend that you add their location to your system path or place them in the MapInfo Pro or Universal Translator paths.

To add the DLL location to your Windows path:

1. On the **Start** menu, click **Control Panel**, **System**, and **Advanced** to display the **Advanced** tab.
2. Click **Environment Variables** to display the **Environment Variables** dialog box.
3. In the System Variables list double-click the **Path** entry. Go to the end of the edit box, add a semicolon (;) and add the absolute path to the ArcSDE DLLs. Click **OK** to save your addition.

To set the ArcSDE data options:

1. Select the **ESRI ArcSDE** format and appropriate data.
2. Click **Settings** to display the ArcSDE Input settings. Select the appropriate options and click **OK**.

For ESRI ArcSDE Input Settings, see [Input Settings for ESRI ArcSDE Dialog Box \(FME\)](#).

Notes:

- When you extend MapInfo Pro with the FME Suite Base edition, the ArcSDE format is not available. For a complete list of formats available in the FME Base edition, see <http://www.safe.com/products/desktop/formats/index.php>.
- You cannot open ArcSDE raster datasets using the Universal Data feature. Only vector datasets are currently supported.
- The source data area will default to SDE, which is the data you will use most often. Change the default name if required. If you are using 3.x/8.x/9.x with Oracle, you do not have to change the default data name, since Oracle ignores this field.
- You cannot connect to ArcSDE with the Universal Data command (on the **HOME** tab, in the **File** group, on the **Open** list, click **Universal Data**) if the user name has quotation marks in it.

Setting the ESRI Personal Geodatabase Data Options

To access your Personal Geodatabase data, you must have an ArcGIS desktop application, such as ArcView, ArcEditor, ArcInfo version 8 or greater or the ArcGIS engine. If these applications are not present, the **Formats Gallery** dialog box will display the Personal Geodatabase format, but it will be grayed out and unavailable.

The documentation describing the options in this dialog box are from Safe Software's *Help System*.

To set the ESRI Personal Geodatabase data options:

1. Select the ESRI Geodatabase format and appropriate data.
2. Click **Settings** to display the Personal Geodatabase Input settings. Select the appropriate options and click **OK** to set the input options.

For ESRI Geodatabase MDB input settings, see [Input Settings for ESRI Geodatabase MDB Dialog Box \(FME\)](#).

Note: Not available with FME Base Edition. For a complete list of formats available in the FME Base edition, see <http://www.safe.com/products/desktop/formats/index.php>.

Setting the Microstation Design File Options

The documentation describing the options in this dialog box are from Safe Software's *Help System*.

To set the Microstation Design file options:

1. Select the Microstation Design format and appropriate data.
2. Click **Settings** to display the Design File Input Settings. Select the appropriate options and click **OK** to set the input options.

For Bentley MicroStation Design (V8) input settings, see [Input Settings for Bentley MicroStation Design \(V7\) Dialog Box \(FME\)](#) or [Input Settings for Bentley MicroStation Design \(V8\) Dialog Box \(FME\)](#).

For detailed information on these settings, open the Formats Gallery, select **Microstation Design**, and click the **Details** button.

Setting the Vector Product Format Coverage Settings

The documentation describing the options in this dialog box are from Safe Software's *Help System*.

To set the Vector Product Format Coverage file options:

1. Select the VPF format and appropriate data.
2. Click **Settings** to display the VPF Coverage Input Settings. Select the appropriate options and click **OK** to set the input options.

For Vector Product Format (VPF) Coverage input settings, see [Input Settings for Vector Product Format \(VPF\) Coverage Dialog Box \(FME\)](#).

Note: If your VPF dataset is not tiled and you make entries in these fields, then an error results.

Setting the Google Earth KML Settings

The documentation describing the options in this dialog box are from Safe Software's *Help System*.

To set the Google Earth KML file options:

1. Select the Google Earth KML format and appropriate data.
2. Click **Settings** to display the KML Input Settings. Select the appropriate options and click **OK** to set the input options.

For Google Earth KML input settings, see [Google Earth KML Parameters Dialog Box \(FME\)](#).

Working with the FME Suite

If you install the FME Suite from Safe Software, you can open even more formats from within MapInfo Pro. To extend MapInfo Pro to use these additional formats, use the FME Integration Console that ships with the FME Suite. There are a couple of caveats to keep in mind:

- Make sure that the version of the FME Suite that you are using is the same version or later than that which has been integrated with MapInfo Pro. This means you must have FME Suite 2016 or later. This works on a build number basis, so even a minor update to MapInfo Pro or FME Suite could result in discrepancies between the products and could prevent you from opening particular formats.
- Precisely localizes the dialog boxes of the FME product that we use in MapInfo Pro. However, when you extend MapInfo Pro with the FME Suite, this functionality is effectively run from the FME Suite, using the FME Suite dialog boxes.

For example, if you are running the Japanese version of MapInfo Pro and you install the English version of the FME Suite, the dialog boxes that display for this feature will be in English. If you revert to the MapInfo Pro implementation of this feature, the translated dialog boxes will display in Japanese.

Note: Raster/grid formats and MapInfo TAB/MIF formats are not available when you extend MapInfo Pro with the FME Suite.

Extending MapInfo Pro with FME Suite

You must have a valid FME Suite License to extend MapInfo Pro to open additional data source formats.

To open even more universal data source formats in MapInfo Pro:

1. On the **Start** menu, click **All Programs, FME, Utilities, and FME Integration Console**.
2. To extend MapInfo Pro, click **Extend**.

If you have extended MapInfo Pro and want to return to MapInfo Pro Universal Data functionality only, click **Revert**. You might want to revert to MapInfo Pro if you have the Base FME Suite and you want to work with ArcSDE data.

3. Click **Close** to close the FME Integration Console.

Understanding MapInfo Pro's Use of the Topography Layer

OSGB MasterMap's Topographic Layer contains nine themes including roads, tracks and paths, buildings, landforms, water, height, heritage, structures, and administrative boundaries. You can import these themes as TopographicArea, LandformArea, TopographicLine, TopographicPoint, CartographicText, CartographicSymbols, BoundaryLines, and DepartedFeatures. The TopographicArea feature type contains two 'complexes', Topography and Landform, which contain different polygons of information. The Landform polygons overlap the Topography polygons (which represent land features like slopes and cliffs).

We split the TopographicArea feature type output into two layers so it is possible to save them in different tables. The TopographicArea table contains only output whose areas defined in the OSGB user guide as being part of the Topography complex or *Structuring Layer*. There is a feature type in the **GML Import** dialog box called LandformArea, which allows the creation of the LandformArea table. See [Importing and Displaying GML File Data](#) for a clearer picture of this process in action.

Finding Data on your Map

The **Find** command allows you to search and display a selection in all open windows.

To find selections:

1. From the **TABLE**, **MAP** or **SPATIAL** tabs, point to the **Selection** group and click **Find** from the **Find** command list.

Viewing a List of Open Tables

You can view a list of open tables and can perform operations on the open tables in the Tables window.

To access the list of tables:

- On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Tables** from the list.

The Table list displays. Use the Table list to manage open tables and their attributes.

The **Tables** window has the following features:

- Modeless, so that you can open it and leave it open for the duration of your session. (Modeless windows do not have **OK** or **Cancel** buttons.)
- Dockable to any of the four sides of the MapInfo Pro window: top, left, bottom, and right. The **Tables** window can also share the same space with the **Layers** window.
- Drag and drop enabled, so that you can select tables and drag and drop them to a blank area to open them in a new **Map** window. When dropping tables on to an existing **Map** window, MapInfo Pro adds them to the **Map** window as new layers.
- Sorting enabled, to sort tables based on ascending order of table alias (name), descending order of table alias, and recently opened. Sorting criteria persist across different MapInfo Pro sessions.
- Multi-Selection enabled, to select multiple tables using the **Ctrl** or **Shift** keys.
- Context Menu enabled, so that when you right-click on table aliases (names) a pop-up menu displays and you can perform the desired operations.
- Searching enabled, you can search for a table name in the **Tables** window by typing characters in a **Search** text box. The **Tables** window list refreshes itself to show only those tables that contain the search characters.

For information about how to work with the Table List, see [Working with Tables in the Table List](#).

Displaying Data Details using the Statistics Window

The **Statistics** window displays the details of a selected data record. This information must exist in the .TAB file's metadata to display in the **Statistics** window. As the selection changes, the data is re-tallied, and the **Statistics** window is updated automatically.

To see the details of a data record:

1. Open a .TAB file with statistical data in it.

2. Select a geographical object in the **Map** window.
3. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Statistics** from the list, to open the **Statistics** window.

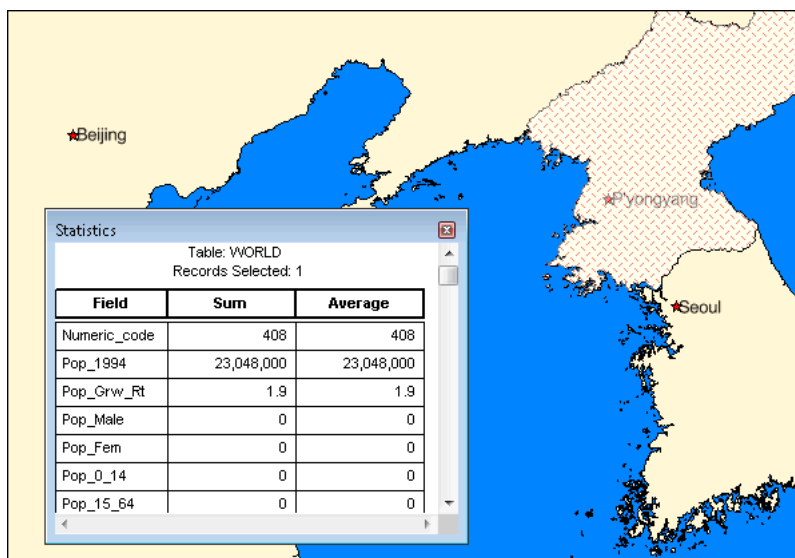
To copy the contents of the **Statistics** window to the clipboard, press and hold the **Ctrl** key and press **C**. Go to the application you want to paste the Statistics data to and do one of the following:

- Right-click to display the shortcut menu, click **Paste**.
- Hold down the **Ctrl** key and press **Insert**.

You cannot select particular contents of the **Statistics** window.

When you want statistics for an entire table, click inside the map to select all the geographical objects in the map.

Figure: Statistics Window



Editing Read-Only Files

To edit read-only files, you can open and save them into a native .TAB format.

To save read-only files as native files while you open them:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Files of type** drop-down list, select the read-only file format of the file you want to work with.
3. Select a file from the list and select the **Create copy in MapInfo format for read/write** to open it in native (.tab) format.

If you do not select the **Create copy** check box, the file opens as read-only and you cannot edit it.

4. Click **Open** to open the file.

CAUTION: These new files will not be updated with any edits you make to the original tables. The reverse is also true. While you can edit these tables in MapInfo Pro, your changes will not be reflected in the original data. When you open these files in this way, they are no longer linked to the original tables.

Saving and Closing Query Tables

When you make selections using **SQL Select**, temporary tables are generated from your source table. When displayed in windows, these tables are named `Query1`, `Query2`, and so on. Closing these tables eliminates them but does not affect your source table. However, if you close your source table, all associated query tables will be closed and eliminated.

To save the contents of a query table:

- On the **HOME** tab, in the **File** group, click **Save Copy As**.

You can then close the query table, effectively deleting it, and later open it under the name of the table you created through **Save Copy As**.

Working with Spreadsheets

When working with a spreadsheet you have to be careful about its structure. Spreadsheets are not organized into records and fields the way databases are. However, since MapInfo Pro is organized as a database, it reads spreadsheet files as though they were database files. When MapInfo Pro reads a spreadsheet file it treats spreadsheet rows as records and spreadsheet columns as fields. Everything in a spreadsheet row is treated as though it were data about a single object. And all the items in a spreadsheet column are treated as though they were the same type of data about different objects.

In databases, the type of data to be found in a particular field is explicitly declared in the database structure. Since spreadsheets allow any type of data in any cell, there are no such explicit declarations. Therefore, when MapInfo Pro reads a spreadsheet, it determines the type of data by examining the data itself. Since it treats columns as database fields, it assumes that every cell in the column contains the same type of data.

Further, MapInfo Pro reads the column width as set in the spreadsheet and only reads the number of characters that fit the width. When a column width has been set to 9 and it contains the label "Sales Forecast," MapInfo Pro truncates that label to "Sales For."

Editing Excel and Lotus Spreadsheets

While you can directly access your Excel and Lotus spreadsheets, you can only read the information.

When you want to do any of the following tasks, on the **HOME** tab, in the **File** group, click **Save Copy As** to save the file in MapInfo Pro's format. The copy is a MapInfo Pro-format table, and you can treat it as any other MapInfo Pro table.

1. Edit information from one of these files.

2. Add new columns to one of these files. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**.
3. On the **TABLE** tab, in the **Edit** group, click **Update Column** to calculate new data values and place them into the file.
4. Use **Modify Structure** to add graphic objects to the file.

Sharing Data with other Applications

This section discusses how to work with data in MapInfo Pro that is shared by other users and applications in your organization.

Sharing Data with Autodesk's AutoCAD Map 3D

MapInfo Pro works with data created in Autodesk's AutoCAD Map 3D and stored in SQLite or in Oracle. You can view this data in MapInfo Pro, save changes made to the data, and then continue to work on the data in Map 3D. However, there are considerations and limitations when reading and writing text layers created in Autodesk's AutoCAD Map 3D.

For more information about Map 3D text layers, refer to the Map 3D product documentation.

Accessing Map 3D Text Layers

Map 3D text layers must be stored either in SQLite or in Oracle. There is no support for reading text layers stored in other formats, such as SDF files.

SQLite users:

To display a Map 3D text layer stored in a SQLite database, you open it in MapInfo Pro like any other SQLite table. For instructions on how to open a table in a SQLite database, see [Opening SQLite Tables](#).

Note: You do not require a MapInfo Map Catalog to open tables in a SQLite database. With other types of databases, such as Oracle or SQL Server, MapInfo Pro stores information about spatial tables and views in the database in a special table. MapInfo Pro opens SQLite tables as mappable without requiring a Map Catalog. For more information, see [Using a MapInfo Map Catalog with a SQLite Database](#).

Oracle users:

To display a Map 3D text layer stored in Oracle, it must first be made mappable. For more information, see the section [Making a DBMS Table Mappable to Display it on a Map](#). For text layers stored in SQLite, this step is not necessary.

To open a text layer, first create a data source connection (see [Creating a Data Source Connection](#)), and then select the text layer table you wish to open. MapInfo Pro recognizes the table as a text layer based upon the table structure. You do not need to indicate to MapInfo Pro that it is a text table.

Working with Map 3D Text Layers

When displaying a text layer in MapInfo Pro, MapInfo Pro uses default settings for text objects unless there is explicit formatting information for individual text objects (see [Using a MapInfo Map Catalog with a SQLite Database](#)). Note that the default settings in MapInfo Pro may differ from that in Map 3D. To change the MapInfo Pro text style defaults, on the **PRO** tab, click **Options**, and **Styles**. On the **Style Preferences** dialog box, click the **Text** button.

Support for Map 3D Text Formatting

MapInfo Pro supports both plain text and a limited subset of MText (AutoCAD multi-line text) formatting. Supported MText formatting includes font name, color, bold, italic, underline, and multi-line text. MapInfo Pro applies formatting to the entire text object. It does not support partial formatting of the text object. When editing a text object in MapInfo Pro and saving it back to the database, any existing formatting for that object is overwritten.

Limitations Working with Map 3D Text

Not all of the style information associated with a Map 3D text layer is stored in the database tables. This includes the default style settings for the Map 3D feature class, as well as advanced functionality such as the use of expressions in the creation of the text object. As a result, the content and appearance of text layers in MapInfo Pro may differ considerably compared to the same layer in Map 3D.

Viewing AutoCAD Text Object Columns in a Table

When MapInfo Pro finds the following columns in a SQLite or Oracle table, it recognizes that they contain data for AutoCAD Text Objects:

- `FeatID`
- `Label_Text`
- `Geometry`
- `Size` (`Size1` for Oracle)
- `Orientation`
- `Horizontal_Alignment`
- `Vertical_Alignment`

`Map_3D` stores text objects as point geometries and associated label text. MapInfo Pro converts the point geometries to text geometries and text specifications are read from the `Label_Text`, `Size`, `Orientation`, `Vertical_Alignment`, and `Horizontal_Alignment` columns. MapInfo Pro assigns default font style preferences to the legend text unless there is specific formatting applied to the individual text objects.

MapInfo Pro processes the label text information, but does not let you work with the label text columns. Only the `FeatID` column is visible in a Browser window, and the label text and text specification columns are hidden.

If an Oracle table includes `ClassID` and `RevisionNumber` columns, then these are hidden.

Sharing Custom Symbols with Other Applications

If you have symbols that are unique to your organization and you wish to share them with all MapInfo Pro users, you can either distribute the symbols to these users or share the symbol files in a workgroup directory. You may want to have your System Administrator assisting with this.

Considerations:

Your symbols must be raster files in one of the formats that MapInfo Pro supports. The most common formats are Graphics Interchange Format (.gif), Joint Photographic Experts Group (.jpeg), Portable Network Graphics (.png), Tagged Image File Format (.tiff), and Windows bitmap (.bmp). For a full list of supported formats, see *File Format Types Supported* in the MapInfo Pro *Help System*. Note that MapInfo Pro does not support Arc/Info Binary Grid format (*.adf).

MapInfo Pro imposes a limitation of 31 characters on the length of the file name for a custom symbol.

Your symbol files must have unique names. If more than one symbol file has the same name, because the files are in different subfolders under the search location (a folder called **CustSymb**), then MapInfo Pro uses the first symbol file that it finds.

MapInfo Pro installs with symbols. The first time MapInfo Pro starts, it copies its **CustSymb** folder from its install location to under the user's **%appdata%** folder and then searches the **%appdata%** location. (It does not search in the MapInfo Pro install location.)

Distributing Custom Symbols to MapInfo Pro Users

If you choose to distribute your organization's custom symbols to all MapInfo Pro users, then have these users put the symbol files in to the directory named **CustSymb** located in their **Application Data (%appdata%)**:

```
%appdata%\Roaming\MapInfo\MapInfo\Professional\<versionum>\CustSymb
```

To determine your **%appdata%** folder location, from the **Start** menu select **Run** and in the **Run** dialog box type **%appdata%**.

You can organize the symbol files in to subdirectories under **CustSymb** and MapInfo Pro will search the subdirectories.

Note: Symbol files must have unique names even if they are organized into subfolders under the **CustSymb** folder.

Sharing Custom Symbols in a Workgroup Directory

Before you begin, take note of the considerations outlined under [Sharing Custom Symbols with Other Applications](#).


If you choose to use a MapInfo Pro network share workgroup, then add your organization's custom symbols to the **CustSymb** folder located under the **Application Data (%appdata%)** folder of the workgroup. You would then point your MapInfo Pro installation to the workgroup directory. This is

already setup correctly for you if you have a MapInfo Pro workgroup installation. If not, then see [Pointing a MapInfo Pro Installation to the Workgroup Directory](#). For details about a workgroup installation, see the chapter titled *Workgroup Installations* in the *MapInfo Pro Install Guide*.

You can organize your symbol files into subdirectories under the workgroup's `CustSymb` folder and MapInfo Pro will search the subdirectories. Symbol files must have unique names even if they are organized into subfolders under the `CustSymb` folder.

Pointing a MapInfo Pro Installation to the Workgroup Directory

To point a MapInfo Pro installation to the shared data files, such as custom symbols, located in a Workgroup folder:

1. On the **PRO** tab, click **Options**, and **Directories**.
2. In the **Directory Preferences** dialog box, in the **Workgroup Directory** pane, select the **Use when searching for application data files** check box and type the path, or click  to select the path, to the workgroup directory.

Note: You can use named drives or UNC paths in the Workgroup Directory field.

3. Click **OK** to confirm your change.


The application saves this new path to your registry. Each time you open MapInfo Pro after this, the application uses this new path to access the Application Data Files.

To switch back to using your local files only and stop sharing common data files, such as symbols, repeat the above steps and clear the **Use when searching for application data files** check box.

Using Your Organization's Symbols on a Map

To view and use your organization's symbols on your map:

1. In the Map window, double click on a map symbol on your map. Or, instead of setting a per-object style, use a layer style override.

The map layer must be editable, which can be set in the Layers window by clicking the **Editable**  icon for the map layer.

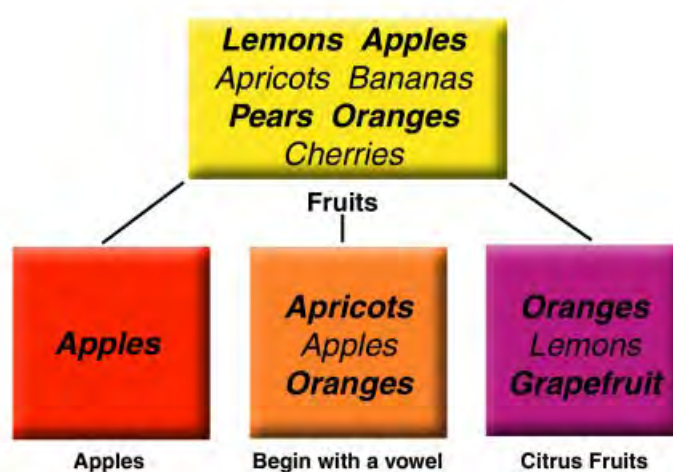
2. In the **Point Object** dialog, click the symbol **Style** button.
3. In the **Symbol Style** dialog, from the **Font** drop-down list, select your custom symbols. From the list of available symbols, select one to view the symbol style.

Selecting and Querying Data

This chapter presents the ins and outs of selecting records from tables. As you use MapInfo Pro you will find yourself selecting records quite often. This chapter covers an overview of selecting and querying methods.

Selecting Your Data in MapInfo Pro

While MapInfo Pro allows you to attach data to objects on a map, its true analytical power is its ability to group and organize data. Once your data is broken down into logical groups, you can analyze it based on one or more variables.



For example, you have a basket of fruit. You want to organize the fruit into different categories, based on one or more variables:

- Put all the apples into one group
- Put all the citrus fruit into one group (oranges, lemons, grapefruit)
- Put all the fruit that begins with a vowel into one group (oranges, apples, apricots)

There are many different ways that you could group the fruit. Some fruit would fall into more than one category (oranges are citrus fruit and also begin with a vowel). You could also use more than one variable to group your fruit - put all the citrus fruit that begins with a vowel into one group.

MapInfo Pro can retrieve information or even individual records from within your data. We refer to the record or records that are retrieved this way as *selections*. A selection is a subset of data that has been collected based on one or more variables.

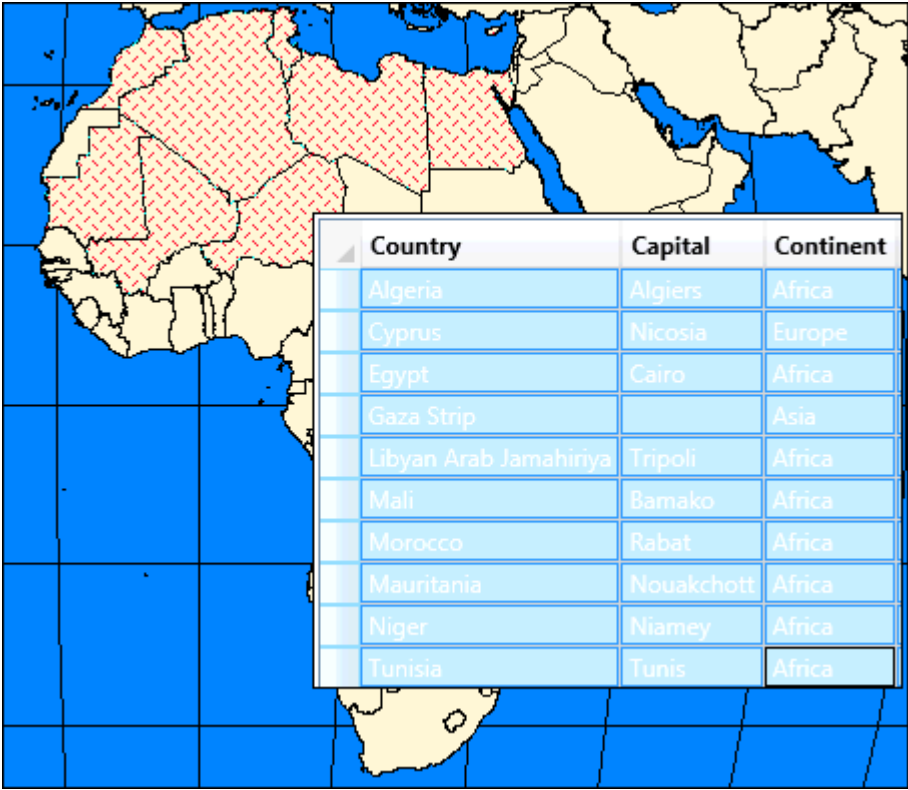
For example, you have a table of customer records. You could create a subset of all customers who live within a 50 mile radius of Prague. Or, you could create a subset of all customers who purchased over \$1000 of merchandise. Or, you could create a subset of all customers whose last name begins with the letter "B".

The statements above used to create these subsets are known as *queries*. A query is just another word for a question - which of my customers spent more than \$1,000? Which of my customers lives within 50 miles of Prague?

As with the fruit example, there are many different ways to group your data. Some data records will obviously fall into more than one category. You could also use more than one variable to group your data. Which of my customers lives within 50 miles of Prague and purchased over \$1000 of merchandise? This section gives you some examples and some practical applications of "selecting" in MapInfo Pro.

Characteristics of Selections

Selections are temporary tables. When you make a selection, MapInfo Pro creates this temporary table (called a selection) to store the records you have selected.



Country	Capital	Continent
Algeria	Algiers	Africa
Cyprus	Nicosia	Europe
Egypt	Cairo	Africa
Gaza Strip		Asia
Libyan Arab Jamahiriya	Tripoli	Africa
Mali	Bamako	Africa
Morocco	Rabat	Africa
Mauritania	Nouakchott	Africa
Niger	Niamey	Africa
Tunisia	Tunis	Africa

You can perform many of the tasks with a selection table that you can perform with a permanent (base) table such as:

- View it in a **Browser**, a **Map** (if it has graphic objects), or a **Layout** window.

- Cut and copy it into the clipboard and paste it into another table, or even into another application. (See [Setting Your Clipboard to Copy Maps in to Word, Excel, or PowerPoint.](#))
- Use it to edit a table. If you want to edit only certain records in a table, you can get those records into a selection and then edit that selection.
- Make a further selection from it.

To convert selections into permanent tables, on the **HOME** tab, in the **File** group, click **Save Copy As**. Once you have saved the temporary selection table as a permanent table, you can treat the new table like any other table. Selection tables are totally dependent on the table from which they were created. If you close a base table, all associated selection tables are deleted.

Selection Commands and Tool Descriptions


MapInfo Pro gives you a number of commands and tools for making selections. They fall into two categories:

- Selecting from the screen: **Select**, **Radius Selection**, **Marquee Selection**, **Polygon Selection**, **Boundary Selection**, **Invert**, and **Clear** commands. To select records, click or encircle the associated graphic objects. To select a layer on the map, right-click to display the context pop-up menu, and select **Select All from Selection Layer**.
- Selecting with queries: **SQL Select**, **Select**. When you select records with either of these methods, you create a logical expression that MapInfo Pro uses to select the records. For example, the expression `SALES > 20000` means that MapInfo Pro will select only those records with sales higher than \$20,000. We discuss **Select** and **SQL Select** in more detail in [Using Select to Create Queries](#) and [Using SQL Select to Query Data](#)).

To import a GML file:

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Import** to open the **Import File** dialog box. Choose **OS MasterMap (*.GML)** from the **Files of type** drop-down list and navigate to its location.
2. Select a **GML file** to import. Click **Open** to open the **GML Import** dialog box.

Selecting from the Screen

To select objects from the screen, the layer that contains the objects must be selectable. To make a layer selectable, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. In the **Layers** window, click the **Selectable**  icon beside a layer name to turn **On** selection.

When you select map objects in a selectable layer, MapInfo Pro highlights the objects using **Highlight Control** settings (on the **PRO** tab, click **Options**, and **Styles**). When you select map objects in an editable layer, MapInfo Pro places edit handles (small squares) around the extents of the object you selected.

If you have more than one selectable layer in a **Map** window, MapInfo Pro selects objects from the topmost Selectable layer.

For example, you have a selectable layer of county boundaries and a selectable layer of state boundaries. If the county boundaries are in the topmost layer in the **Map** window, MapInfo Pro selects objects from the county layer. If the state boundaries are in the topmost layer in the **Map** window, MapInfo Pro selects objects from the **STATES** layer. When you use the **Select** command, MapInfo Pro also displays information tips for the topmost selectable layer. As you move your cursor over the objects, the information tips display the object's label expression. You can turn off the information tips in the **Map Preferences** dialog (on the **PRO** tab, click **Options**, and **Map Window**).

Likewise, if you perform a boundary search, the boundary object that you want to search should be in the topmost layer.

For example, you have a layer of postal code boundaries and a layer of state boundaries. If you want to select all objects that fall within a postal code boundary, the postal code layer should be the topmost boundary layer. If you want to select all objects that fall within a given state, the state layer should be the topmost boundary layer. You can reorder the layers in the **Layers** window (On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list).

You can select objects from tables other than the topmost table, by holding down the **Ctrl** key when you are selecting an object. For example, say you have three selectable layers, such as **STATES**, **COUNTIES**, and **CITIES**. If you want to select objects in the **STATES** table, but it is the bottom layer in the **Map** window, do the following:

1. Hold down the **Ctrl** key and click the map with the **Select** command. You are now in the second layer.
2. Hold down the **Ctrl** key and click the map again with the **Select** command. You are now selecting objects from the third layer, the **STATES** layer.

You can find the **Select** command on the **MAP** tab, in the **Selection** group.

Selecting a Single Object from a Map or Layout

Making selections is a basic MapInfo Pro operation. Using the **Select** command is only one way of making selections.

To select a single object from a map or an active map in a layout:

1. On the **MAP** tab, in the **Selection** group, click **Select** from the list of selection commands. The cursor becomes a pointer. If you are editing records in a browser, the cursor becomes an I-beam.
2. Click the object on the map.


The layer where the object is located has to be selectable in the **Map** window. When an object is selected it is highlighted according to the settings you specified on the **PRO** tab, by clicking **Options**, and **Map Window**.

- When the layer is editable, the selected object is surrounded by edit handles and is colored and patterned as it was originally defined.
- When you select another object, the first object is unselected.
- To select a number of objects from a map or an active map in a layout, hold the **Shift** key down while selecting objects.


Selection Commands

MapInfo Pro includes several selection commands on the **MAP** tab to choose records for viewing and analysis, including the **Select**, **Radius Selection**, **Marquee Selection**, **Polygon Selection**, **Boundary Selection**, and **Invert**. Each command is discussed in the next section.

Using Select

Use the **Select**  command to select objects one at a time or to select all objects that are generally in the same area of the **Map** window. You select an object by clicking it using the mouse.

To select an object:

1. Make the layer that you want to select objects from selectable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Explorer** from the list, to open the **Explorer** window. Click the **Selectable**  icon beside the layer name to turn selection **On**.
2. On the **MAP** tab, in the **Selection** group, click **Select** from the selection list. The cursor becomes a pointing hand when moved over the **Map** window.
3. Click an object in the **Map** window. If that object's layer is selectable, MapInfo Pro highlights the object. If the layer is editable, MapInfo Pro puts edit handles around the extents of the object. If the layer is neither editable nor selectable, MapInfo Pro does not allow you to select the object.
4. On the **TABLE** tab, click **New Browser** to display selected records in a **Browser** window. Choose **Selection** from the list of tables and click **OK**. MapInfo Pro creates a **Browser** of the new temporary table. To select records from the **Browser**, simply click each record with the **Select** command.

To select multiple objects individually in a **Map** window:

1. Click the first object to select it.
2. Hold down the **Shift** key and click another object. MapInfo Pro selects that object, too. If you select a second object without holding down the **Shift** key, MapInfo Pro unselects the first object and selects the second object.

See Also:

- [Select command](#)
- [Select Dialog Box](#)

Selecting the Next Selectable Object beneath the Current Object


When you press and hold the **Ctrl** key while using the **Select** command, it selects the next selectable object beneath the current object. When you have several objects overlapped in the same layer, it selects the next object down. When there are no more objects left in the current layer, MapInfo Pro starts selecting objects from the next selectable layer down.

For example, imagine you have three objects overlapped in the same place in a layer. Let us call them Three, Two, and One (moving from the top down). MapInfo Pro selects **Three** if you have not pressed **Ctrl**. If you press the **Ctrl** key, MapInfo Pro selects **Two** on the first mouse click and **One** on the second click.

When this is the only selectable layer, MapInfo Pro cycles back to the beginning (**Three**) on the third click. When, however, there is another selectable layer, MapInfo Pro moves to that layer on the third click.

When selecting a point object, you generally want to position the **Select** command in the center of the symbol. However, some symbols have a hot spot that you must hit in order to select it. For example, the hot spot on the golf flag symbol is the base of the pole.

Using Clear

Use the **Clear**  command to deselect all of the selected objects. You use this most often when you have selected too many objects and want to start over.

On the **MAP**, **TABLE**, or **SPATIAL** tab, in the **Selection** group, click **Clear**.

Your selection is cleared from the memory. You are ready to perform a new selection or a different task.

Deselecting Objects and Removing Objects from the Selection

To deselect:

- An object or remove it from the selection in a **Map** window, press the **Shift** key while clicking on the object. When you click, the object is removed from the selection set.
- All objects, on the **MAP** tab, in the **Selection** group, click **Clear**, or click on the map where there are no objects.

Moving Selected Objects

To move the selected object(s), do one of the following:

- Hold down the mouse button and drag the object to its new location
-

If you press the **Shift** key when the **Arrow** key is selected, the object will move 10 pixels. Since the moves are made in screen pixels, the zoom level affects how far the object is moved.


Rotating Selected Objects

To rotate selected objects:

1. Select the object. The object is highlighted and bounded by four edit handles and a fifth handle below the lower right corner.
2. Click the fifth handle (rotate handle) and hold down the mouse button. Rotate the highlighted box to the desired angle. A rubber banding box is drawn representing the rotated object. Press the **Shift** key while the rubber banding box is being drawn to limit the rotation to 45 degree increments.


Note: You can rotate Lines, Polylines, Polygons, MultiPoints, Collections, Arcs, Ellipses, Rectangles, Round Rectangles. You cannot rotate points.

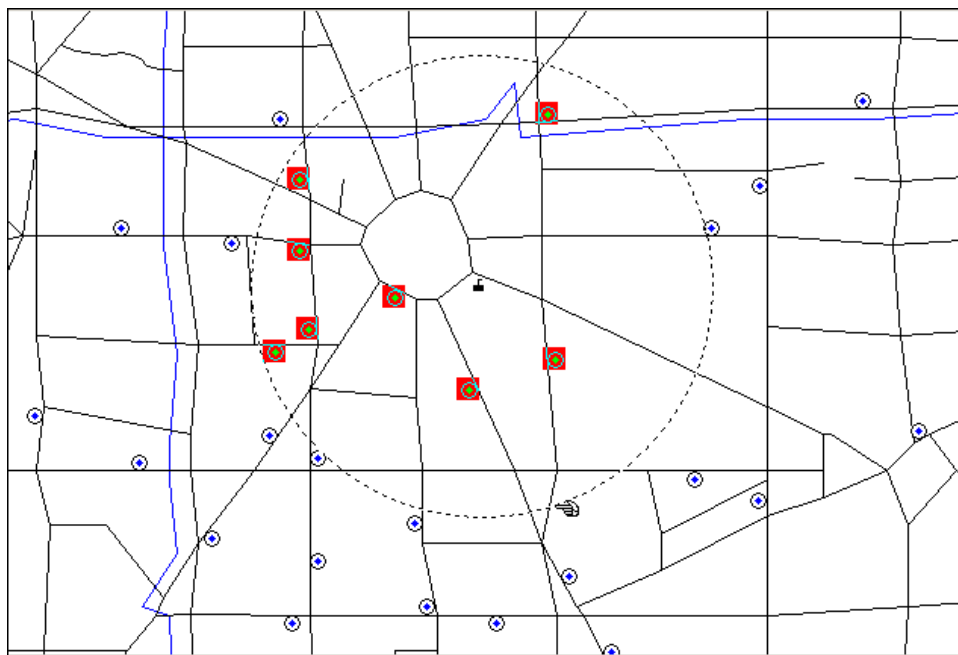
Using Radius Selection

The **Radius Selection**  command selects all objects that fall within a given radius. For example, you have a table of blood donors and a table of blood donation sites. Using the Radius Selection command, you could create a temporary list of blood donors that live within a one-half-mile radius of each blood donation site.

Use **Radius Selection** to select all objects whose centroid falls within the circle. The object does not have to be completely bounded by the circle.

To select objects within a radius:

1. Make the layer that you want to select objects from selectable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Selectable**  icon beside the layer name to turn selection **On**.
2. On the **MAP** tab, in the **Selection** group, click **Radius Selection** from the selection list. The cursor becomes a hand when moved over the **Map** window.
3. Click a place on the map that you would like to use as the center point of your radius search. For example, if you want to select all the homes of all of the children that live within three blocks of the school, click the school icon and use that as the center point.
4. Hold down the mouse button and drag the mouse away from the center point. MapInfo Pro draws a circle around the point and reports the radius of the circle in the Status Bar (lower left corner of the MapInfo Pro screen).




5. When you have the desired radius, release the mouse button. MapInfo Pro highlights all map objects that fall within that circle.

- To see a list of all the records that fall within that circle, on the **TABLE** tab, in the **Contents** group, click **Browser**. Choose **Selection** from the list of tables. MapInfo Pro creates a **Browser** window with the new selection table.


Lastname	Firstname	Address
DUBOIS	JEANLUC-IUC	1330 NEW HAMPSHIRE AVE NW
GOEHNER	T	1400 20TH ST NW
DRAHL	ANNA	1325 8TH18TH ST NW
RYDER	MITCH	1301 20TH ST NW
JOHNSON	R LARRY OFC	1350C ONN AV NW
DRUFF	DAN	21 DUPONT CIR NW
ANDONLY	JUAN	1520 20TH NW
ADAMSON SHERRY	1234	19TH ST NW

Using Marquee Selection

The **Marquee Selection**  selects objects within a rectangle. By clicking and dragging using the **Marquee Selection**, you create a dotted rectangle, or marquee box around objects you want to select. All selectable objects in the topmost selectable layer are included in the marquee box.

Note: To select objects from another layer, you must turn off selectable in the Layers window for the upper layers. Only objects from one layer at a time are selected.


To select objects within a rectangle:

- Make the layer that you want to select objects from selectable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Selectable**  icon beside the layer name to turn selection **On**.
- On the **MAP** tab, in the **Selection** group, click **Marquee Selection** from the selection list. The cursor becomes a hand when moved over the **Map** window.
- Click a place on the map outside of the area you want to include in the marquee box.
- Hold down the mouse button and drag the mouse to form a dotted rectangle around the points you want to select.
- When you have reached the desired rectangle size, release the mouse button. MapInfo Pro highlights all map objects that fall within that rectangle.
- To see a list of all the selected records, on the **TABLE** tab, in the **Contents** group, click **Browser**. Choose **Selection** from the list of tables and right-click to reach the Browse command. MapInfo Pro creates a **Browser** window with the new selection table.


Adding Objects to the Selection Set

Use the **Shift** key with the **Marquee Selection** command when you wish to add newly selected objects to the previous selection.

Using Polygon Selection


The **Polygon Selection**  command selects map objects within a polygon that you draw on a map.

To select objects using **Polygon Selection**:

1. Make the layer that you want to select objects from selectable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Selectable**  icon beside the layer name to turn selection **On**.
2. On the **MAP** tab, in the **Selection** group, click **Polygon Selection** from the selection list. The cursor becomes a pointing hand when moved over the **Map** window.
3. Click the map location at which you want to place the first end point of the polygon. Move the cursor over your map in any direction. MapInfo Pro draws a line from the point where you clicked to the cursor.
4. Click to create another endpoint. Continue to move the cursor and click until you have the desired number of sides to your polygon.
5. To close the polygon, make your last click as close as possible to the first click. MapInfo Pro closes the polygon and selects the objects that are within it.


Note: Press **Shift** while using **Polygon Selection** to add newly selected objects to the previous selection.

Using Boundary Selection

The **Boundary Selection**  command selects objects that fall within a given region or boundary. When you use this command, MapInfo Pro selects all objects within any boundary on the map, such as state or county boundaries, police precincts, or sales territories.

For example, you have a layer of states and a layer of retailers. Using the **Boundary Selection** command, you could click a state and create a temporary list of all the retailers in that state.


To select objects within a region:


1. Make the layer that you want to select objects from selectable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Selectable**  icon beside the layer name to turn **On** selection.
2. On the **MAP** tab, in the **Selection** group, click **Boundary Selection** from the selection list. The cursor becomes a cross hair when moved over the **Map** window.
3. Click within a boundary object. MapInfo Pro selects all objects that fall within that boundary.

For example, if you click on a region in a selectable layer that contains other objects, such as points. All objects in the topmost selectable layer, including the cosmetic layer, within the region will be selected. The tool chooses all objects within any polygonal region, ellipse, or rectangle on the map, such as a state or county boundary, a police patrol district or a sales territory. When the region is a complex one, with several component polygons, it includes all the component polygons in its search. If an object's centroid is located in another region, it will not be included in the search.

4. To see a list of all the records that fall within that boundary, on the **TABLE** tab, in the **Contents** group, click **Browser**. Choose **Selection** from the list of tables. MapInfo Pro creates a **Browser** window with the new selection table.

Using Invert

The **Invert**  command is a convenient way to select many objects at once. You simply select the few objects that you do not want, and then invert the selection to select all the objects you do want.

1. Make the layer that you want to select objects from selectable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Selectable**  icon beside the layer name to turn selection **On**.
2. On the **MAP** tab, in the **Selection** group, click **Select** from the selection list. The cursor becomes a cross hair when moved over the **Map** window. Click one or two map objects.
3. On the **MAP** tab, in the **Selection** group, click **Invert**. MapInfo Pro selects all the objects that are not part of the current selection, and cancels the current selection.

Other Search Methods

You can draw your own polygons and search for objects within them. For example, you have a table of city streets and a table of retail businesses. Since streets are made of lines and not boundaries, you cannot search within a city block. However, you could create boundaries by tracing the street map with the **Polygon** command. You could then search for objects within that boundary.

You can also create search polygons with the Buffer command. The Buffer command is used to create boundaries around points, lines, or other boundaries. For example, you want to search for all customers who live within five miles of Interstate 90. Using the Buffer command, you could create a polygon that would encompass any area within five miles of Interstate 90.

You could even use the Buffer command to create a boundary around another boundary. For example, you want to search for all radio stations that are located within twenty miles of a given county. Using the Buffer command, you could create a polygon that would encompass any area within twenty miles of the county boundary.

To find a point in a polygon (perform a polygon search), two layers must be Selectable: the layer containing the objects you are selecting, and the layer containing the boundary you want to use in selecting those objects.

Unselecting Objects or Records

You may choose to:

- Clear one object or record from a group of selected objects or records.
- Clear a group of selected objects or records.
- Clear selected objects.

To cancel the selection of a record from a group of selected records in a **Browser** window, press the **Ctrl** key while selecting records.

To cancel the selection of all selected objects, you can either click the **Map** window where there are no objects or on the **MAP** tab, in the **Selection** group, click **Clear**.

Querying Your Data in MapInfo Pro

A *query* is a mathematical question that you pose to your database to collect information. In MapInfo Pro, the following four query builders are available, **SQL Select**, **Simple Select**, **Select By Location** and the **SQL** window. You can access these from the **SQL** list in the **Selection** group under the **TABLE**, **MAP** and **SPATIAL** tabs.

In the case of *Select*, you can pose a question of a single table. For example,

- Which of my customers spent more than \$20,000?
- Which of my customers live in Vermont?

With *Select By Location*, you can select objects from one table based on their location relative to objects in another table.

In the case of *SQL Select* and the **SQL** window, you can ask your question from one or several table(s) of information and perform these tasks:

- Derive new columns - columns that calculate new values based on the contents of your existing columns.
- Aggregate your data so that you see only a listing of subtotals instead of seeing your entire table.
- Combine two or more tables into one results table.
- Show only the columns and rows that interest you.

Making Queries using the SQL Select Command

To create a query using SQL Select:

1. Open the table you wish to query, if you have not already done so. The table that you query is known as the base table. If you use SQL Select to perform a query on the `World` table, the `World` table is your base table.
2. In the **Selection** group on the **TABLE/MAP/SPATIAL** tab, click on the **SQL** list and then click on **SQL Select**. The **SQL Select** dialog box displays. Fill in the portions of the **SQL Select** dialog box that meet your needs. When you click **OK**, MapInfo Pro performs the query.

MapInfo Pro extracts data from your base table, stores the query results in a special, temporary table, known as the results table. The results table contains only the rows and columns that meet your criteria. The default name of the results table is `Selection` (although you can specify a different results table name in the **Into Table Named** field in the **SQL Select** dialog box).

3. Open a **Map** window and/or a **Browser** window if you want to see the query results. By default, MapInfo Pro displays the results table in a **Browser** window automatically (unless you clear the **Browse Results** check box in the **SQL Select** dialog box).

If your results table is called **Selection** (the default name), the **Browser** window shows a different table name, such as `Query1` or `Query2`. This is because the moment you browse the `Selection` table, MapInfo Pro takes a "snapshot" of the table, and names the snapshot `Queryn` (where *n* is a number, one or greater). MapInfo Pro takes the snapshot because `Selection` is a special table name; `Selection` dynamically changes every time you select or de-select rows.

In the **SQL Select** dialog box, you can enter a different name for your results table (for example, you can name your results table `My_Query`). This prevents MapInfo Pro from renaming your results table `Queryn`.

4. MapInfo Pro automatically selects all rows in the results table. Thus, after you perform SQL Select, you can perform operations on the entire set of selected rows. For example, you could apply a different fill color to all selected rows (on the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Region Style**), or you could cut or copy all selected rows.
5. Usually, any alterations you make to the results table are automatically applied to your original (base) table. For example, if you use the **SQL Select** command to select some of the rows from the `Orders` table, and then you delete some of the rows from your results table, MapInfo Pro deletes the corresponding rows from your base table (`Orders`). However, if your query produces subtotals, you can alter the results table without affecting the base table.
6. On the **HOME** tab, in the **File** group, click **Save Copy As** if you want to make a permanent copy of the results table. If you do not perform **Save Copy As**, the results table will be deleted when you exit MapInfo Pro.

See also:

[Saving a Template](#)

[Making Queries using the Select Command](#)

[Making Queries using the SQL Select Command](#)

Entering SQL Queries with Expert Mode

The **Enter SQL Query** dialog box allows the user to enter queries more complex than the wizard allows using the standard DBMS SQL syntax. Invoking this dialog box ends normal wizard processing (there is no way to back up from this dialog box). This dialog can be reached after establishing a connection to the DBMS and choosing the **Open DBMS Table Options** dialog. Click the **SQL View** button under **Expert Mode**.

To type in multi-line formatted SQL do the following:

- To get a new line press **Enter**.
- To tab press **Ctrl+Tab**.
- To cut and paste from the clipboard, press **Ctrl+X** to cut, **Ctrl+C** to copy, and **Ctrl+V** to paste.

Using the SQL Select Dialog Box's Where Condition Field

The **Where Condition** field serves multiple purposes. On some occasions, you might use a **Where Condition** expression to filter your table, so that you see only the rows that meet certain criteria. On

other occasions, you use the **Where Condition** field to specify a relational join, so that your query can include columns from two or more tables.

Note: You cannot use aggregate functions in the **Where Condition** field.

Using the SQL Select Dialog Box's Select Columns Field

Use the **Select Columns** field to specify which columns should appear in the query results table.

- If you want the results table to have the same set of columns as your original table, enter an asterisk (*) in the **Select Columns** field.
- If you want the results table to have a different set of columns than your original table, delete the asterisk and enter a comma-separated list of column names or expressions, as described below. The **Select Columns** field can include an asterisk or a list of column expressions, but not both. Fill in the **From Tables** field before you fill in the **Select Columns** field.

If your query involves more than one table, each column name must be preceded by the name of its table, with a period separating the table and column names. Thus, if you are performing a query that involves two tables, one of which is the *Canada* table, and you want the query to include the *Population* column from the *Canada* table, you must use the column expression *Canada.Population*. The Columns drop-down list automatically inserts the table name in front of each column name whenever you use two or more tables.

Updating a SQL Select Query Table

You can use **Update Column** on the result of an SQL Select multi-table join, provided the SQL Select statement does not have a *Group By* clause.

To update a column in one table with information from another table:

1. Join the tables with SQL Select.
2. On the **TABLE** tab, in the **Edit** group, click **Update Column** on the **Selection** table, and the update will automatically take effect in the appropriate base table. You can also access this command from the **SQL** list in the **Selection** group under the **TABLE**, **MAP** and **SPATIAL** tabs.

Making Queries using the Simple Select Command

To make a query:

1. In the **Selection** group on the **TABLE/MAP/SPATIAL** tab, click on the **SQL** list and then click on **Simple Select**. The **Simple Select** dialog box displays.
2. Click on the **Select Records From Table** drop-down list and choose the table from which to select the records.
3. Type your query expression in the **that Satisfy** box, or click the **Assist** button to display the **Expression** dialog box which helps you write an expression.

4. Type a name in the **Store Results** in table box for the temporary table that stores the results of your query or choose selection (the default). If Selection is chosen, MapInfo Pro automatically names the table Query 1, Query 2 etc.
5. To sort the query by the value in some column (optional) click the Sort results by column drop-down list and choose the column containing the value you want to sort with.
6. Click **OK**. A Browser window of your query results displays if the **Browse Results** box is checked.

You can use Select to highlight objects in a map or a table that meet certain criteria and create a results table that you can browse or map like any other table.

- When you are working in a Browser window, the records meeting the criteria of the query are highlighted.
- When you are working in a map, the graphic objects of the chosen records are highlighted.
- When you are working with both a Map window and a Browser window, the objects and the records are highlighted.

In all cases, a working table is automatically created called Query 3. This table contains the results of the query. You can map this table like any other table. The table can also be saved as a separate table with **Save Copy As**.

Saving Queries

You can save and reuse queries using the Save Query command (on the **TABLE** tab, in the **Content** group, click **Save**, and **Save Table** or **Save Query**). This command is enabled when you create a query using the **SQL Select** or **Select** command. Save Query is available only for queries created using SQL Select or Select commands.

Queries are saved using a MapInfo Pro table type. These tables consist of two files; a .TAB and a .QRY. Once a query is saved in one of these tables, it may be re-executed by simply opening the table.

Use the Saving a Template option to save a query statement and use it with an updated version of the table on which it was created or use it with a table containing the same fields as the table on which the query statement was created.

To save a query:

1. Create a query using the **Select** or **SQL Select** command. This enables the Save Query Command.
2. On the **TABLE** tab, in the **Content** group, click **Save** and **Save Table** or **Save Query** to open the **Save Query** dialog box.

Complete the **Save Query** dialog box to save the query as a MapInfo Pro table file (.TAB).

When you next open this .TAB file, the tables on which the query is based are re-opened and the query is re-executed.

Loading Templates

The **Save Template** and **Load Template** options in the **Select** and **SQL Select** dialog boxes allow you to save a query and reload the query statement. When you save a query, a .QRY file is created. The .QRY file is saved in the directory specified in *Options/Preferences/Directories*.

To load a template:

1. Click **Load Template** in the **SQL Select** or **Select** dialog box. The **Load Dialog From Query File** dialog box opens.
2. Choose the .QRY you want to use. The dialog box controls are filled in with the values saved in the template.
3. Click **Open** to load the template.

Making Queries using the Select By Location Command

The **Select By Location** dialog lets you select objects from one table based on their location relative to objects in another table. In other words, it enables you to create a selection using a spatial join between two tables.

To make a query:

1. In the **Selection** group on the **TABLE/MAP/SPATIAL** tab, click on the **SQL** list and then click on **Select By Location**. The **Select By Location** dialog box displays. You can also launch this command from the map window's context menu. Alternatively, press **B** (Shift+b) to open the **Select By Location** dialog box when at least two mappable tables are open, and a map window is active.
2. Use the **Select objects from** and **Compared to objects in** drop-down lists to choose the tables from which to create the spatial join. The list of tables includes query tables as well as the current Selection if there is one.

Note: Each item in the lists has a tool-tip showing table descriptions, if any, the table's coordinate system, and the number of records in the table.

3. Use the **Relation** drop-down list to specify the spatial method to use when selecting objects from the first table in relation to objects from the second table.

You can choose from a list of spatial operators (*Contains, Contains Entire, Intersects, Within, Entirely Within*) and an option for *Within a Distance*. When both, the **Select objects from** and **Compared to objects in** drop-down lists have a selection, the **Relation** list-box will automatically select and display a spatial operator that makes sense for both tables. This is based on the predominant object type in each table and whether table bounds overlap. If the table bounds don't overlap, then **Within a Distance** is suggested. You can change this and choose the relation you want to use.

4. Click **OK**.

Note: The **OK** button is not enabled until all input is valid. The input is valid when both tables are selected, and they don't refer to the same table or same base table. If **Within a Distance** is the selected relation, that the distance value is valid (greater than 0).

Note: Once OK is pressed, the previous control settings are remembered and displayed the next time the user opens the dialog. If a table was previously used but is no longer open when the dialog is next opened, the combo box will be empty and the OK button disabled.

Note: Once OK is pressed, an SQL query is constructed and added to the application's catalog of queries (it becomes available in the SQL Window's scripts list), and then executed. If any error occurs, a message box is displayed.

Using the Within a Distance Spatial Operator

When **Within a Distance** spatial operator is selected, a text-box for distance, distance units drop-down, and an option to select a distance calculation method becomes visible.

Note: The units drop-down is initialized to your system preference for Distance (System Settings in the Backstage).

By default, the **Spherical** distance calculation method is selected, and **Within a Distance** uses the `ObjectDistance()` MapBasic function to find the minimum distance between two objects. The function uses a spherical calculation method for the return value in the units selected. If the calculation cannot be done using a **Spherical** distance method (for example, if the first object's Table Coordinate System is NonEarth), then the **Cartesian** distance calculation method is used.

You can also select **Cartesian** as the distance calculation method (this uses the `CartesianObjectDistance()` MapBasic function). **CartesianObjectDistance()** returns the minimum distance between two objects using a Cartesian calculation method for the return value in the units selected. If the calculation cannot be done using a Cartesian distance method (for example, if the first object's Table Coordinate System is Lat/Long), an error dialog box is displayed.

See Also:

- [Select By Location command](#)
- [Select By Location Dialog Box](#)

Making Queries using the SQL window

Use the **SQL** window to build and execute SQL queries and statements. The SQL window is essentially a script editor wherein you can write and execute one or more SQL statements. The scripts are run using the *immediate* mode interpreted MapBasic and are not compiled.

For details about the SQL window, please see [SQL Window](#).

Note: All limitations of the MapBasic window apply to the SQL window as well.

To create a query using the SQL window:

1. Open the tables you wish to query on if you have not already done so.
2. On the **MAP** tab, in the **Selection** group, click on the **SQL** list and then click on **SQL** to open the **SQL** window. When the **SQL** window opens for the first time, a select statement template is pre-loaded in the script pane.
3. Write a SQL script in the script pane and click the **Run** button at the bottom of the **SQL** window to execute the script. Depending on your script and output selections, the results are displayed in a browser window, on a map, or saved to a file. The first time you write and run a script:
 - It is given a name based on the type of statement and tables used. It is marked as modified with an "*" before the name to indicate that it has been modified.
 - It shows up at the top of the Recent scripts list. If you edit a script and rerun, the script is updated with the changes, and a new script is added to the list with an incremental version number appended to the original file name (for example, ".1" or ".2"). A history of changes is maintained this way.

The **SQL** List Drop-down (accessed by clicking on **SQL**, On the **MAP** tab > **Selection** group) also contains a list of the most recent SQL scripts created using the SQL window. When you hover over a script name in that list the following controls become visible:

Rename Script - To rename an SQL script, click the **Rename Script** button in the **Recent** list.

Save Script to disk - To save an SQL script, click the **Save Script** button in the **Recent** list. A script cannot be saved unless it has a valid name.

Note: When an unsaved script is saved, it is given its own group.

Edit Script - To edit an SQL script, click the **Save Script** button in the **Recent** list. A script cannot be saved unless it has a valid name.

Note: When an unsaved script is saved, it is given its own group.

Mark as Favorite - Click on the **Mark as Favorite** button to add your selected script to the **Favorites** list in the **SQL** drop-down list. Click again to toggle and **Mark as Not Favorite**.

Note: When an unsaved script is marked as favorite, it is saved and given its own group.

SQL Window

The SQL Window can be used to create and run SQL Select, Insert, Update and Delete statements that can be saved for later re-use. You can also create MapBasic scripts that contain multiple SQL and other MapBasic statements. It can be divided into the following sections:

Scripts

The **Scripts** collapsible section consists of a combo-box containing a list of SQL scripts saved to disk along with scripts that are still being written and not saved. For details, see [Working with SQL Scripts](#). The **Open a saved script** button adds a script to the list from a file (.QRY or .MBS) and makes it current. The **Create new script** split-button loads a new script template of a specific type (Select, Insert, Update, Delete, Script) in the script editor.

Assist

The **Assist** section keeps track of your recent activities and provides a one-click way to reuse and add items to your scripts. It keeps the last five recent and most used items of each intellisense type. When new tables are opened, they are also added. The default list is based on each script type with commonly used keyword and operators, etc. This section also contains the current distance and area unit. Clicking on an item in the list adds it at the current cursor position.

The section is collapsible but expands using a wrap panel, you can resize, and scroll-bars will appear. The color of the item text reflects syntax coloring. A context menu allows you to clear the list or reset it back to default. Individual Items can be removed by clicking the **x** when the mouse is over an item. You can also add custom items by selecting text in the SQL script editor and using the context menu item, **Add to recent items**.

Note: Use shortcut "Alt+A" to put focus on the **Assist** pane.

SQL window drop-downs

This section shows drop-downs similar to what we have in the SQL select and expression builder dialog-boxes. The following helper drop-down options are available:

1. **Table** - Lists all the open tables except raster or grid, WMS, WMTS, and tile server. It stays open so that you can pick one or more tables using a single-click or Enter. Double-clicking or using `ctrl+enter` adds the selected table at the current cursor position in the script editor, closes the drop-down, and the focus goes to the script editor.
2. **Joins** - Lists the suggested joins when more than one table is selected. The drop-down is single select only if two tables are selected, and multiple select if more than two tables are selected.
 - a. If there is a selection, it replaces it.
 - b. If no where clause, it appends "\r\nWhere".
 - c. If empty where clause, it just appends join
 - d. If non empty where clause, it appends "AND" if word following cursor is not in (and, or, noselect, into, hide, group, order)
 - e. If non empty where clause, it prepends "AND" unless preceding word is (where, and, or)

Spatial joins are shown first in the list if tables are mappable, followed by attribute joins. A spatial join is suggested between tables based on the predominant object type of each table.

- The types of joins available are Contains, Contains Entire, Intersects, Within, Entirely Within, and Within a Distance.
- Both directions are suggested, for example, if tables selected are `world` and `world_caps`, then `"world contains world_caps"` and `"world_caps within world"` are both suggested.

- Exception is the **Within a Distance** join. This is only suggested in one direction; the same direction as the table projection list. A distance value is suggested and is based on the distance between the centroids of each table's bounds.
- The spatial join is then ranked based on the number of rows each table has: if the first table has fewer rows than the second table, it is ranked higher.

An attribute join is suggested between tables when:

- The column data types match.
- If the matching data type is char, and both columns have the same char width.
- The column names (headers) are exact matches or close matches (for example, column 1 name = "state_name" and column 2 name = "state" are a close match).
- Both directions are suggested, for example, if tables selected are `world` and `world_caps`, then `"world.county= world_caps.county"` and `"world_caps.county= world.county"` are both suggested.
- The object, float, and decimal column data types are ignored.

The attribute join is ranked based on the following:

- An exact column name match is ranked higher than a close match, for example, if col1 name = "state_name" and col2 name = "state_name", the rank is increased by 1, whereas if col1 name = "state_name" and col2 name = "state", the rank is not increased.
- When both columns are indexed, the rank is increased by 2.
- When one column is indexed, the rank is increased by 1.
- If col1 comes from table with fewer rows than col2, the rank is increased by 1.

Both sets of Joins are then ordered from highest to lowest rank, and clipped to at most 10 each.

3. **Column** - Lists all the columns from the currently selected tables. This drop-down is disabled if no tables are selected in the **Tables** drop-down. Just like the **Tables** drop-down, this drop-down stays open so that you can pick one or more columns using a single-click or Enter. Double-clicking or using `ctrl+enter` adds the selected column at the current cursor position in the script pane, closes the drop-down list, and the focus goes to the script editor.
4. **Operator** - Lists all the available SQL arithmetic, comparison, and logical operators. Click to add the selected operator at the current cursor position in the script editor and close the drop-down.
5. **Aggregate** - Lists all the available SQL aggregate functions. Click to add the selected aggregate function at the current cursor position in the script editor and close the drop-down.
6. **Function** - Lists all the available MapBasic functions. Click to add the selected MapBasic function at the current cursor position in the script editor and close the drop-down. Additionally, this drop-down contains a search box at the top that you can use to filter the list of MapBasic functions in the drop-down by typing into the search box.
7. **Value** - The expression is set whenever a column or expression is picked using the **Column** drop-down or intellisense. Also, if some text is selected when the drop-down is opened, it is used as the expression. This drop-down stays open so that you can pick one or more values using a single-click or Enter. Double-clicking or using `ctrl+enter` adds the selected column at the current cursor position in the script pane, closes the drop-down list, and the focus goes to the script editor (multiple values should be comma-separated). The drop-down is populated with the

first 1000 unique values or with values returned in first two seconds. Use the **Refresh** button to search for more records. If you enter some text in the search box, only records containing that value are returned.

The Drop-downs each have a keyboard shortcut (only when focus is in the text-box).

Drop-Down	Shortcut
Table	CTRL+Shift+T
Join	CTRL+Shift+J
Column	CTRL+Shift+C
Operator	CTRL+Shift+O
Aggregate	CTRL+Shift+A
Function	CTRL+Shift+F
Value	CTRL+Shift+V

Scripts Editor

The **Scripts Editor** is a RichTextBox where you write your SQL scripts. It is a feature-rich editor supporting syntax highlighting, syntax validation, different color configurations for scripting items like Tables, Columns, Functions Operators, etc. It also supports intellisense using "`ctrl+space`".

Note: Use shortcut "Alt+S" to put focus on the **Scripts Editor**.

Scripts Message Area

Displays errors or exceptions when a script is executed. Syntax validation results and elapsed time are also displayed here.

Output Options Area

At the bottom of the window, there are several buttons:

- Browse
 - For Select scripts, creates a new browser window with the results.
 - For other script types, tries to find the table referenced in an existing browser window and brings that window to the front. If no browser window could be found, then a new browser for the table is created.
 - Button is selected by default.

- Map
 - For Select scripts, adds the results as a new layer to the top-most map window and brings that map to the front, or creates a new map window if none exist..
 - For other script types, adds the table referenced by the script to the top-most map window if that map doesn't already contain a layer for it, then brings that map window to the front.
- Color Override - When adding the results of a Select statement to map window, applies a color override with the selected color. The color override control is only visible for Select scripts.
 - Overrides are off by default: shows "None" and a Paint Can icon to denote that the control is for applying color.
 - Click on the split button to open the pop-up to select different modes.
 - First radio button turns off color override, icon changes to show Paint Can and "None".
 - Second radio button switches to "Automatic" mode where colors are initialized to a Color Brewer qualitative color group (8 colors), icon changes to show the next color with a gradient border.
 - This list of colors is shown in the color palette picker in the "Automatic Colors" section.
 - Each time a script is executed that includes the Map option, the currently selected color is applied to the override styles, and the color picker will select the next color from the "Automatic Colors" group.
 - Any of these colors can also be selected as the manual color.
 - Third radio button switches to "Manual" mode using the color currently shown by the palette picker, icon changes to the selected color with no border.
 - Or you can click directly on the color palette to switch to "Manual" and select the new color.
 - Color remains sticky.
- Find - Finds results in the map and browser windows.
- Run button - Executes the script. You can also use the following shortcuts to execute a script:
 - **Ctrl+Enter** executes the script and returns the focus back to the text-box.
 - **Ctrl+Shift+Enter** executes the script and the focus remains with the map or browser windows opened/added to.

Working with SQL Scripts

When MapInfo Pro starts, it reads all .MBS files from the saved scripts' preferences location. You can load a .QRY or .MBS file from the SQL window.

SQL scripts are executed using "immediate" mode interpreted MapBasic and are not compiled.

As you insert, update, delete, or select statements using the **SQL Select, Simple Select, Select By Location, Update Column, Add Rows**, new scripts are added to the **Recent** list in the **SQL** list drop-down. Also, as you edit and update a SQL script using the **SQL** window, new **point** versions

are added and grouped with the currently loaded script. They also appear at the top of the **Recent** list in the **SQL** list drop-down.

These scripts can be edited and run via the **SQL** window. In addition, a MapInfo Pro add-in can add or remove scripts from the collection using the object model. Integrated Mapping apps have access to the collection, as well.

When you click on the **Scripts** combo-box and hover your mouse over one of the scripts, you will see the following options:

Mark as Favorite

Click on the **Mark as Favorite** button to add your selected script to the **Favorites** list in the **SQL** drop-down list. Click again to toggle and **Mark as Not Favorite**.

Note: When an unsaved script is marked as favorite, it is saved and given its own group.

Save Script

To save a SQL script, click the **Save Script** button in the **Scripts** combo-box. A script cannot be saved unless it has a valid name.

Note: When an unsaved script is saved, it is given its own group.

Rename Script

To rename a SQL script, click the **Rename Script** button in the **Scripts** combo-box.

Delete Script

Click the **Delete Script** button in the **Scripts** combo-box to delete the selected script. If you try to delete a script that has been saved to a file, a confirmation dialog appears. Click **OK** to delete the script.

Reload Saved Script

For the currently selected script, the **Reload Saved Script** button makes a copy of what is in the script editor, then loads the script again from disk.

The SQL window uses the same font as the MapBasic window. To change the font press F8 when the cursor is in the MapBasic Window. Currently you cannot change the font directly from the SQL Window. It is persisted in a preferences file.

SQL Query Improvements

Cross Joins

The SQL Select statement now support cross joins, for example:

```
Select expression_list
From table_name [ , ... ] [Cross Join]
```



```
[ Where expression_group ]
[ Into results_table [ Noselect ] [ Hide ] ]
[ Group By column_list ]
[ Order By column_list ]
```

In MapInfo Pro, the default SQL version is *1700*. Therefore, cross join support is not available by default, and join conditions are evaluated from left to right. To allow cross joins, you must set the SQL version to *1900* using the MapBasic `Set SQL Version` statement. This would allow support for cross joins, and join conditions would be evaluated from right to left.

Note: If the SQL version is set to *1900*, you can perform cross-joins with or without using the **Cross Join** keyword in the SQL Select statement. To allow cross-joins with SQL version *1700*, use the **Cross Join** keyword explicitly in the SQL Select statement.

Joins between more than two Dynamic Query tables

You can now create joins between more than two dynamic query tables. Earlier, this was restricted to only joins between two dynamic query tables. For example,

```
Select * from ehitis where ehitis.system_kood = "1106800020020" AND
ehitis.kood = "001" into query1
SELECT systeemi_eesvoolu_osa.id, systeemi_eesvoolu_osa.rajatis_id
FROM systeemi_eesvoolu_osa, rajatis, query1
WHERE systeemi_eesvoolu_osa.rajatis_id = rajatis.id
AND rajatis.ehitis_system_kood = query1.system_kood
```

Making Queries using the Select By Attribute Command

Use the **Select By Attribute** window to create a selection using the conditions and attributes from the table directly.

To make a selection:

1. In the **Selection** group on the **TABLE/MAP/SPATIAL** tab, click on the **SQL** list and then click on **Select By Attribute**. The **Select By Attribute** dialog box displays. You can also launch this command from the map window's context menu. Alternatively, press (Ctrl+Shift+z) to open the **Select By Attribute** dialog box when a mappable tables is open and active.
2. Use the **Table** drop-down lists to choose the table from which to create the selection. The list of tables includes query tables as well as the current Selection if there is one.

Note: Each item in the lists has a tool-tip showing table descriptions, if any, the table's coordinate system, and the number of records in the table.

3. Use the **Conditions** section to specify the conditions and attributes to use when selecting objects from the table.

The **Conditions** scrollable list contains a list of columns from the table whose values you can use to query the table with various conditions. The column list by default displays 40 columns

from the table. Indexed columns are given priority in this list and displayed first. If your table has more than 40 columns, click the **Add..** button at the top of the **Conditions** section to add more columns to the list. By default 1000 values are loaded for a particular column. If your table columns has more than 1000 rows, click the refresh button at the end of each column to load another 1000 rows.

You can choose from a list of options at the top of the Conditions section to narrow down your selection:

- a. **All:** (AND) All specified condition in the column list must be met for the record to be included in the result set.
 - b. **Any:** (OR) Any one condition in the column list must be met for the record to be included in the result set.
 - c. **Add:** Add more columns to the column list.
 - d. **Indexed:** This is a toggle button. Only indexed columns will be shown in the column list when pressed.
 - e. **Empty:** This is a toggle button. Empty columns without any conditions will not be shown in the column list when pressed.
4. Enter a name for the selection query. This name is also added to the **Recent** list in the SQL list drop-down in the **Selection** group.
 5. Select how to display the script results from the following option at the bottom:
 - a. **Display results in new Browser window**
If the button is pressed MapInfo Pro displays the query results in a new Browser window.
 - b. **Add results to topmost Map window**
If the button is pressed MapInfo Pro adds the results as a new layer to the top-most map window and brings that map to the front, or creates a new map window if none exist.
 - c. **Add color override to results added to topmost Map Window split button**
When adding the results of the query to a map window, this option applies a color override with the selected color. Color override is off by default (shows "None" and a Paint Can icon). Click on the split button to open the pop-up to select different modes.
 - First radio button turns off color override, the split button icon shows the Paint Can and "None".
 - Second radio button switches to "Automatic" mode where colors are initialized to a Color Brewer qualitative color group (8 colors), the split button icon changes to show the next color with a gradient border.
 - Third radio button switches to "Manual" mode using the color currently shown next to the third button, the split button icon changes to the selected color with no border. Or you can click directly on the color palette drop down to switch to "Manual" and open the color palette picker and select a different color. This color remains sticky and will not change unless the user selects a different color from the palette or switches to Automatic mode.

When you click directly on the color palette drop down, this opens the color palette picker. The "Automatic Colors" section shows all the colors that are used for automatic mode. Any of these colors can also be selected as the manual color.

d. **Find results in Map or Browser windows**

If the button is pressed MapInfo Pro finds results in map and browser windows. In a map window, the view will zoom to the extents of the selection if "Zoom on Find Selection" Map Preference is checked (see the Editing tab in the Map Preferences dialog). The button is disabled when the NoSelect button is pressed.

e. **Execute the query without changing the current selection (NoSelect)**

If the button is pressed MapInfo Pro performs the query without changing the pre-existing Selection table. Press this button if you need to perform a query, but you do not want to de-select whatever rows are already selected. The button is disabled when the output table name is "Selection". Change the output table name to something other than "Selection" to enable the button.

6. Click **Run** to execute the selection query.

Selecting and Using Queries

Select allows you to query a table. It allows you to select records and objects from a table according to their attributes. You can use it to highlight objects in a Map or Browser window that meet certain criteria. You can also create a results table that you can browse or map like any other table.

For instance, by formulating queries with **Select**, you can ask MapInfo Pro to:

- Show only postal code regions where the average household income is above \$65,000.
- Show only postal code regions where the median age is 42.
- Show only the postal code regions where the household income is above \$65,000 and the median age is 42.
- Show only records for all orders received in July or September.
- Show cities of over 100,000 people in Texas, California and Florida.

When you are working in a Browser, MapInfo Pro highlights the records meeting the criteria of the query. When you are working in a Map window, the graphic objects of the chosen records are highlighted. When you are working in both windows, the objects in both are highlighted. In all cases, MapInfo Pro automatically creates a working table called Selection that contains the results of the query. You can browse or map this table like any other table. The table can also be saved as a separate table with **Save Copy As**.

Finding an Object or Street Address

Your tables must be mappable and indexed. If you need to set up these components, on the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**.

To find an object or street address:

1. On the **TABLE** tab, in the **Selection** group, click **Find**, and **Mark** to open the **Find** dialog box.
2. Click the Search table drop-down list and choose a table from which to search.
3. Click the for objects in column drop-down list and choose the column containing the location information of the objects you are looking for.

You now have the option of refining the search. Use this option when you are trying to find an object or address whose name is not unique and is used for other objects or locations.

For example, when you are searching for the town of Ipswich in Great Britain, do you want Ipswich in Suffolk county or Ipswich in Essex county. Refining the search by county allows you to specify the county for each town, rather than just the town name.

- Optional - Click the **Refine search with table** drop-down list and choose a refining table (the table must contain regions, such as states, counties, census tracts etc.).
 - Optional - Click the **using boundary name column** drop-down list and choose your refining column, the column containing the name of the boundary.
4. Check the **Find in Front Window Only** check box when you want the Find operation executed only in the Front Window. When this check box is unchecked, the Find operation is executed in all windows. When checked, if features are found, they will be marked with a symbol in a Map Window. If the Browser window is the active window, it will be scrolled so the record appears in the Browser view.

When you have finished defining *where* to look for your search data and selecting between the front most map and all maps then specify *what* data to look for.

5. Click **OK** to open the **Find** dialog box. This dialog box allows you to specify what data to look for.

The name of the column that you specified in the first **Find** dialog box is listed to the left of the list box (for example, Street). When locating a street address, type in "# Name", such as "30 Elm St" or "1045 Templar Blvd." What you type in depends on geocoding preferences specified on the **PRO** tab, when you click **Options**, and **Address Matching**.

Note: MapInfo Pro comes with a text file called MAPINFOW.ABB [MapInfo Pro Abbreviations], that contains a list of common street abbreviations, such as "St" for "Street" and "Blvd." for "Boulevard," and so forth. These help MapInfo Pro to obtain exact matches. To familiarize yourself with the MAPINFOW.ABB file, you can take a look at its contents in the Notepad Text Editor.

6. Type the name of the object or address you are searching for in this box. If you have used the **Refine** option in the first dialog box, a second column name is listed (for example, ZIP).
7. Type the name of the refining boundary in this box. If MapInfo Pro cannot find an exact match for the object you specified, it lists possible matches.
8. Click **Up** or **Down** to move to other pages and choose a specific entry from the list.
9. Click **OK** and the find is initiated.

You can also use the **Mark** command to locate street intersections. When you type in the name of the object to be found in the second **Find** dialog box (enter object name to find), separate the

two items by a double ampersand (&&). For example, to find the intersection of Congress Street and Christie Street, type "Congress Street && Christie Street."

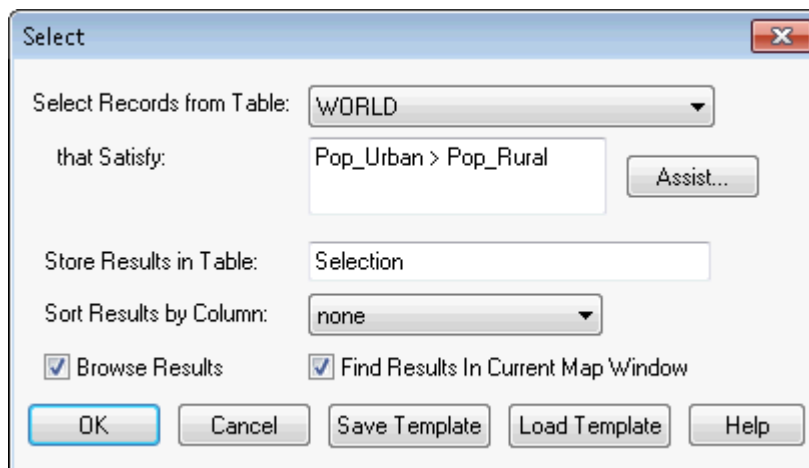
Finding and Displaying a Selected Object

When you create a query or a SQL query, you may want to see the results of that query visually on the map.

To find and display a selected object:

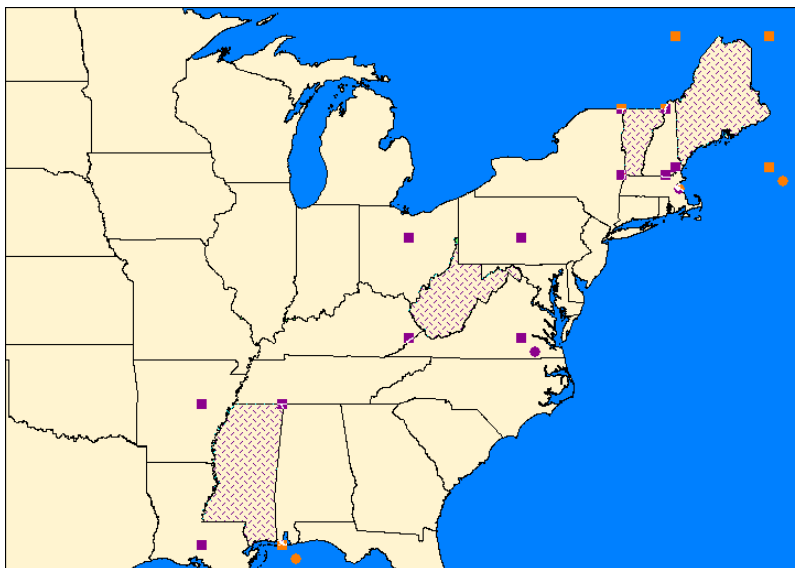
1. Do one of the following:
 - On the **MAP** tab, right-click on the Launcher button in the lower right corner of the group to reach the **Select** dialog box.
 - On the **MAP** tab, in the **Selection** group, click **SQL Select** to open the **SQL Select** dialog box.

The **Find Results in Current Map Window** check box displays in both dialog boxes.



2. Create your query and verify that it is correct, selecting the open table that you want to query.
3. Select the **Find Results in Current Map Window** check box to display the results upon completion.
4. Click **OK** to display the results.
5. For more information, see *Selecting All Objects from a Table* in the *Help System*.

Figure: Query Results of Urban Population > Rural Population



Selecting All Objects from a Table

To select all objects from a table:

- For a **Browser** window, click the **Select All** button located on the upper-left corner cell of the window. This selects all the records in the table.
- For a map, on the **Layers** window, right click the layer sample and select **Select All**. This selects all the objects in the topmost selectable layer.
- For a **Layout** window, press **Ctrl+A**.

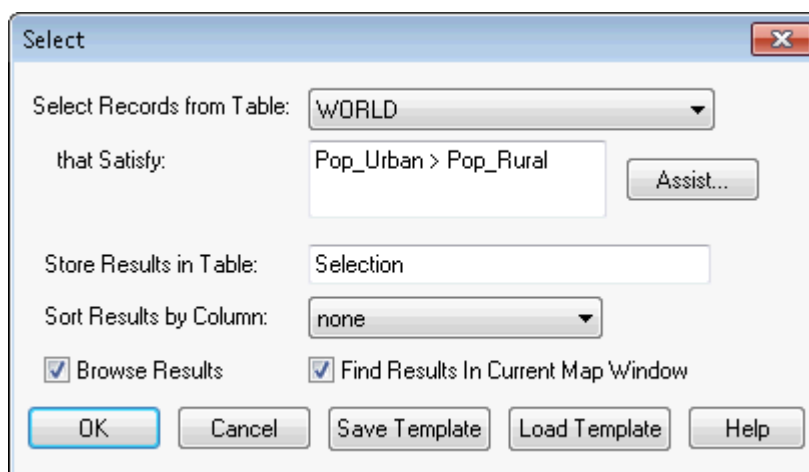
Note: You can also select a layer on the map, right-click to display the context pop-up menu, and select **Select All from Selection Layer**.

Displaying Query Results Quickly

When you create a query or a SQL query, you can display the results visually on the map.

To find and display the results of a query automatically:

1. Do one of the following:
 - From the **TABLE** tab click on the Launcher button in the lower right corner of the Selection group. The **Select** dialog box. You can also do this from the **MAP** or **SPATIAL** tabs.
 - From the **TABLE** tab, select **SQL Select** to display the **SQL Select** dialog box



*The **Find Results in Current Map Window** check box displays in both dialog boxes. If there are no open Map windows, this check box is disabled. You cannot save this check box setting to a template. This option is cleared by default.*

2. Create your query and verify that it is correct, selecting the open table that you want to query.
3. Select the **Find Results in Current Map Window** check box to display the results. Click **OK**.

Choosing Which Columns Appear in the Results Table

If you enter one or more column names in the Select Columns field, the results table will include only those columns. This is useful when you are using a table that has many columns, but you only want to work with a few of those columns (perhaps because only a few of the columns fit on the screen at once).

To enter a list of column names:

1. Enter a table name in the **From Tables** field, if you have not already done so. You can either type a table name or choose a table name from the Tables drop-down list.
2. Click in the **Select Columns** field, so that the insertion point appears in the field.
3. Delete the asterisk (if there is an asterisk in the field) by using the **Backspace** key or the **Delete** key. The **Select columns** field can contain an asterisk or a list of column names, but not both.
4. Choose a column name from the Columns drop-down list in the right part of the dialog box. MapInfo Pro copies the column name into the **Select Columns** field.
5. Choose additional names from the Columns drop-down list if you want the query to include additional columns. As you select additional column names, MapInfo Pro automatically inserts commas to separate the column names.

Creating Statistical Calculations

You can perform statistical calculations on a column in a table or query/selection. These statistics can then be used in other applications.

To perform statistical calculations for a column:

1. On the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Statistics** to open the **Calculate Column Statistics** dialog box.
2. Click the Table drop-down list to display a list of available tables.
3. Select the table you want to use by clicking on the table drop-down columns.
4. Click the Column drop-down list to display a list of available tables.
5. Select the column you want to use.
6. Click **OK**. The **Column Statistics** dialog box displays. The **Column Statistics** dialog box displays statistics for the specified table's column.

Creating Query Expressions

To perform a Select query, you must create an expression. An expression is a logical statement that is used to ask your question. For example, you have a table of apartments for rent. If you want to create a temporary table of all apartments that cost less than \$800 a month, you could use the expression:

- $RENT < 800$

where RENT is the name of a numeric column that contains the per month rent rate.

MapInfo Pro searches the apartment table for all records that satisfy this condition and puts those records in a temporary table that you can map, browse, or carry out additional queries.

You can also perform mathematical operations on your data. For example, you want to create a temporary table of all apartments that have a total cost of less than \$800. Total cost is equal to the sum of the rent and the monthly utilities.

You could use the expression:

- $RENT + UTILITIES < 800$

You are telling MapInfo Pro to add the number in the RENT column and the number in the UTILITIES column and then compare that number to 800.

For more information, see [Creating Expressions](#) for details in creating a variety of expressions.

Specifying an Expression

There are two ways of creating an expression. The first method is to type in the expression directly. When you are creating very simple expressions, this method is usually faster. The second method is to click the **Assist** button in the **Select** dialog box and build your expression using the pop ups in the **Expression** dialog box. This method is particularly useful when you are just learning how to build expressions or when you are building very complex expressions.

To specify an expression:

1. On the MAP tab, click on the Launcher button in the lower right corner of the Selection group to open the **Select** dialog box.
2. Click the **Assist** button.

3. In the **Expression** dialog box, type your expression directly into this box, or choose from the drop-down list selections to create an expression.
4. Click **Verify** to verify that your expression is valid.
5. Click **OK** to return to the **Select** dialog box.
6. Click **OK** to run the expression.

The **Expression** dialog box gives you three drop-down lists that you can use to build your expression: columns, operators, and functions.

Columns

This pop up lists every column in the table from which you are selecting. If the table contains derived columns from previous queries, those columns will also be listed.

Operators

This pop up contains mathematical and logical operation symbols. The mathematical operators in this pop up include addition, subtraction, multiplication, division, greater than, less than, and equal signs. You can use these symbols to create mathematical formulas. For example, from your table of sales representatives you want to select those sales representatives who, on the average, gross more than \$2000 per month. Gross sales is computed by adding together sales and commission.

You have two columns in your table: TOTAL_SALES, which is total sales for the year for each representative and COMMISSION, which is total commission for the year for each representative. You could build the following expression:

- $(TOTAL_SALES + COMMISSION) / 12 < 2000$

This expression tells MapInfo Pro to add the number in the TOTAL_SALES column with the number in the COMMISSION column. However, this gives you gross sales for the year. We want average gross sales for the month. Therefore, we divide the sum by 12, which will give us a monthly average. We then compare that figure with 2000.

The Operators pop up also includes logical operators conjunctions AND, NOT, OR and LIKE. The LIKE operator can be used with two wildcard characters: '%' and '_'. The '%' character matches zero or more characters. The '_' character matches only one character.

Functions

This pop up contains mathematical functions that take one or more parameters and return a value. You use functions to perform basic mathematical functions on the data in that column. For example:

- `abs(<number>)`

takes the absolute value of the numbers in the specified column.

For example, a meteorologist wants to select all days where the temperature in her city was more than 10 degrees warmer or cooler than the national average. She has a column in her table, AVG_DIFF, that contains the difference between the national average and city average.

She could create the following expression:

- $AVG_DIFF < -10 \text{ Or } AVG_DIFF > 10$

This expression tells MapInfo Pro to select all records that have an average difference less than -10 or greater than +10. However, she could also create the following expression:

- `abs(AVG_DIFF) > 10`

This expression tells MapInfo Pro to select all records where the absolute value of the average difference is greater than ten.

The Functions pop up contains many other functions, including area, perimeter, sin, cos, and date-related functions. For a complete list of functions, see [Creating Expressions](#).

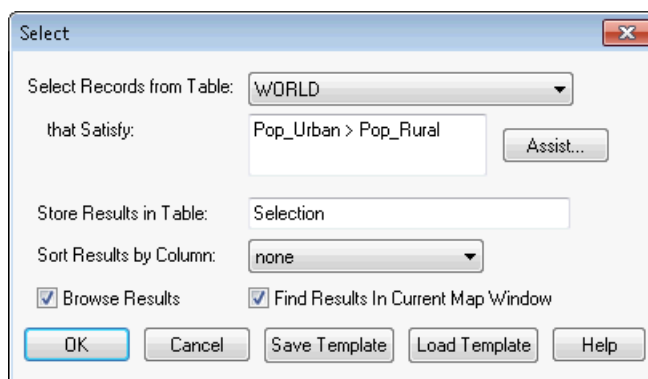
Verify

This button reviews the expression you have created and verifies that it is valid. This is particularly helpful if you are new to writing expressions.

Using Select to Create Queries

In general the process for selecting objects using Select is:

1. On the MAP tab, click on the Launcher button in the lower right corner of the **Selection** group to open the **Select** dialog box.



- **Select Records from Table** - Select the table from which to select records.
 - **that Satisfy** - Create the expression to select records.
 - **Store Results in Table** - Choose a storage place for results.
 - **Store Results in Column** - Choose column for sorting.
2. To see a list of the records you have selected, select the **Browse Results** check box. MapInfo Pro creates a Browser of the new selection table.
 3. To display the query results in the currently active Map window, select **Find Results in Current Map Window**. If there are no open Map windows, this check box is disabled. You cannot save this check box setting to a template. This option is cleared by default.
 4. Click **OK** to begin the query.

MapInfo Pro names the table Query1. It will name the next temporary selection table Query2. You can override MapInfo Pro's default name and give the selection a descriptive name. Type the new

name into the Store Results in Table box. The table can also be saved as a separate table with **Save Copy As**.

Example: Selecting

MapInfo Pro makes finding information and locations easy. You can use the **Select** feature to create subset databases. As an example, we use the WORLD table to select countries with a literacy rate greater than 90%.

1. Open the `WORLD.TAB` table.
2. On the MAP tab, click on the Launcher button in the lower right corner of the **Selection** group to open the **Select** dialog box.
3. Complete the **Select** dialog box:
 - **Select Records from Table** - From the Select records from table drop-down list, choose **World**.
 - **Assist** - Click the **Assist** button to display the **Expression** dialog box.
4. Complete the **Expression** dialog box as shown in the figure:
 From the Columns drop-down list, choose **Literacy**.
 From the Operators drop-down list, choose **>** (the greater than sign).
 Type **90**.
 Click **Verify** to confirm the syntax of your expression. Click **OK** to close the **Verify** dialog box.
5. Click **OK** to close the **Expression** dialog box. The **Select** dialog box redisplay.
6. Select the **Browse Results** check box.
7. Click **OK**. MapInfo Pro creates a Browser that contains the selections. Notice that the selections display in both the World map and Browser.

Country	Capital	Continent	Nu
Argentina	Buenos Aires	South America	
Australia	Canberra	Australia	
Austria	Vienna	Europe	
Anguilla	The Valley	North America	
Barbados	Bridgetown	North America	
Bermuda	Hamilton	North America	
Belgium	Brussels	Europe	
Belize	Belmopan	North America	
Belarus	Minsk	Europe	

Making a New Table Using a Subset of a File

Many of the data sets that are used with MapInfo Pro include more objects and information than necessary for some projects. In many cases it is easier to work with a subset of the complete data product. For example, if you were tracking crime statistics for a county by census tract, you would not need the census tracts for the entire state.

There are two ways to create a new table that will contain a subset of the records from an existing file. You can interactively select the objects representing the records you would like to put in the new table using one of the select commands. Or, you can use the SQL Select command to choose a subset of objects based on an SQL function. For an example using the SQL Select command, see [Example 1 - Computing Population Density Using Area](#). Saving the resulting table is the same procedure, whether you choose the objects interactively or use an SQL Select statement.

Note: Many of the queries on the following pages can be done either by using the **SQL Select** command or through the simpler Select command. Because SQL Select is more versatile and more commonly used, the **SQL Select** dialog box is used in the following examples.

Support for Saved Queries in MWS (XML) Files

You can write MapBasic SQL queries to a workspace file as MapInfo SQL language queries and add the map definitions based on those queries to an MWS file. In MWS they are saved as MapXtreme Views in a MapInfoSQLDataSourceDefinition element in the DataSourceDefinitionSet.

SQL queries, and the MWS map definition layers based on them, are written to the MWS if you select the option **Save Queries in Workspace** in the **Startup** dialog box (on the **PRO** tab, click **Options**, and **Startup**). Only queries referenced by a Map window will be written to the MWS.

To use this functionality:

1. Select the **Save Queries in Workspace** option in the **Startup** dialog box (on the **PRO** tab, click **Options**, and **Startup**). If you do not select this check box and the map selected from the **Select Mapper Windows** dialog box has only one layer based on a query, the query is not saved, and a map definition with an empty layer list is written.
2. Create and execute a SQL query.

Note: Only SQL statements can be saved to workspaces when they are created on the **MAP** tab, in the **Selection** group, by clicking **SQL Select**, opening the **Select** dialog box from the Selection group Launcher button, or created from MapBasic Select statements.

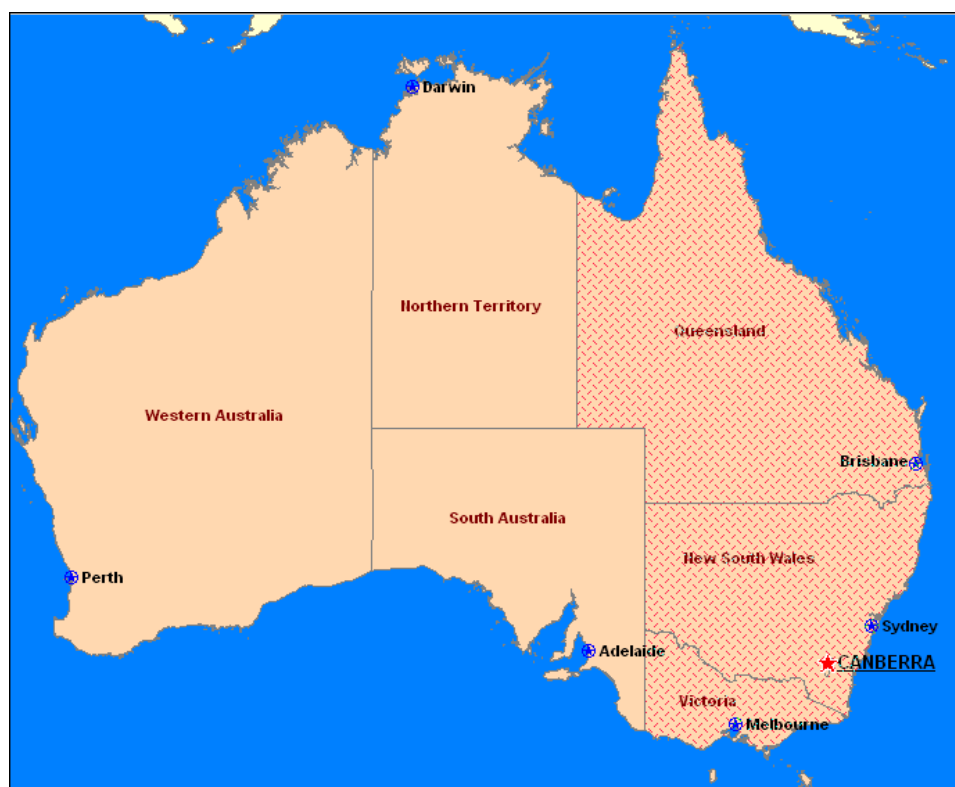
1. Create a Map window based on your SQL query.
2. On the **HOME** tab, in the **File** group, click **Save Workspace** and then select the **MapInfo Workspace Format (*.mws)** as the output format. MapInfo Pro cannot map selections with `Group By`, so `Group By` clauses are ignored. MapInfo Pro only translates the `Order By` clause.

Note: MapInfo Pro cannot support sub selects in queries. The operators **Any** and **All** are not supported in the MapXtreme 2004 or later versions of MapInfo SQL and subselects are not either.

Interactively Selecting Objects

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Table**, and then open the table in a **Map** window.

2. Select the objects that will make up the subset with the **Select**, **Radius Selection**, or **Polygon Selection** commands. **Shift-click** to select multiple objects.



3. On the **HOME** tab, in the **File** group, click **Save Copy As** and save the **Selection** table. The table can be saved with any filename.

Using SQL Select to Query Data

A *selection* is a subset of data rows in a table, chosen based on the contents of one or more columns from the table. You create selections by formulating questions, or queries, about your data. How many customers live in the state of Idaho? Which police precinct has the highest rate of violent crime? MapInfo Pro stores the results of these questions in temporary tables called *query tables*.

While MapInfo Pro's **Select** command lets you formulate sophisticated queries, **SQL Select** goes even further. The records in the query table generated by the Select command do not have any information in them that is not contained in the records of the base table. They are, in fact, the same records. They have been arranged so that they can be viewed together.

With **SQL Select** you can create query tables containing information that was only implicit in the base table(s).

The **SQL Select** dialog box is one of the most elaborate ones in MapInfo Pro. But do not be intimidated. Once you learn what each box is used for, it is fairly simple to create powerful selection statements. You can type directly into the boxes or you can use the pop up menus on the right to enter items into the boxes.

The easiest way to describe the dialog box is to walk you through an example, step-by-step. This example uses data from the `WORLD` table included in MapInfo Pro, so you can try out this SQL Select exercise yourself. We have included a brief description of the parts of the dialog box with each step. A complete description of each box is given after the example.

Note: Expanding the text controls is no guarantee that the resulting query can be handled by MapInfo Pro. You can still receive the *Query too complex* error when adding larger queries.

Example 1 - Computing Population Density Using Area

In this example, we will use the world map to create a table of all the countries that have a population density of over 500 people per square mile.

The following formula computes population density:

- `POPULATION / AREA`

While the `WORLD` table has a population column (`pop_1994`), it does not include a column for country area. However, since the `WORLD` table has graphic objects associated with the records, MapInfo Pro can compute the total area for each country.

Open the `WORLD.TAB` table, and maximize its display by clicking the window's maximize button. On the **MAP** tab, click **SQL Select** to display the **SQL Select** dialog box. You can also reach the dialog box from the **TABLE** and **SPATIAL** tabs.

To complete the **SQL Select** dialog box:

1. In the **From Tables** box, choose **WORLD** from the Tables drop-down list.

You can specify more than one table in an SQL statement. This example uses only one table, `WORLD`.

You should fill in the **From Tables** box before you fill in the **Select Columns** box. MapInfo Pro uses the tables in the **From Tables** box to generate the list of columns in the Columns drop-down list.

2. Place your cursor in the **Select Columns** box and delete the asterisk (*). In this example, we will specify a list of columns to be included in the resulting query table, instead of including all columns.

Note: An asterisk (*) in the **Select Columns** box means by default that all columns would be queried.

Remember, the query table is the temporary table that MapInfo Pro creates to store the results of the query.

3. Select **Country** from the Columns drop-down list.
4. Select **pop_1994** from the Columns drop-down list.

Now, we need to compute population density. Remember, population density is computed by dividing population by area. There is no Area column in the table. However, there is a function,

Area, which will compute the area of any mappable object. Since the `WORLD` table is mappable, MapInfo Pro can compute the area of each country and, therefore, the population density of each country.

5. Select the division sign (/) from the Operators list.
6. Select **Area** from the Functions popup.

This creates a *derived* column. A derived column is a column that contains the results of calculations performed on another column or columns. When MapInfo Pro creates the query table, it will include two columns: the **Country** column and the **pop_1994/Area(obj, "sq mi") column**, which is our population density column. MapInfo Pro includes a units statement with all geographic functions. If you wanted MapInfo Pro to return the area in square kilometers, you would change "sq mi" to "sq km."

Now, we need to build an expression that selects only those countries whose population density is over 500 people per square mile.

7. Tab to the Where Condition box and select **pop_1994** from the Columns drop-down list.
8. Select the division sign (/) from the Operators drop-down list.
9. Select **Area** from the **Functions** pop up.
10. Select the greater than sign (>) from the Operators drop-down list.
11. Type the number **500**.

We have now built the expression "Select all countries whose population density (pop_1994/Area(obj, "sq mi")) is more than (>) 500 people per square mile."

12. Leave the **Group by Columns** box blank.
13. Tab to the **Order by Columns** box and select **Country** from the Columns list.

The **Order by Columns** box allows you to specify the order the records in the query table will display. By selecting Country, MapInfo Pro will list the records in alphabetical order, according to country name.

14. Tab to the **Into Table Named** box and type `DENSITY`.

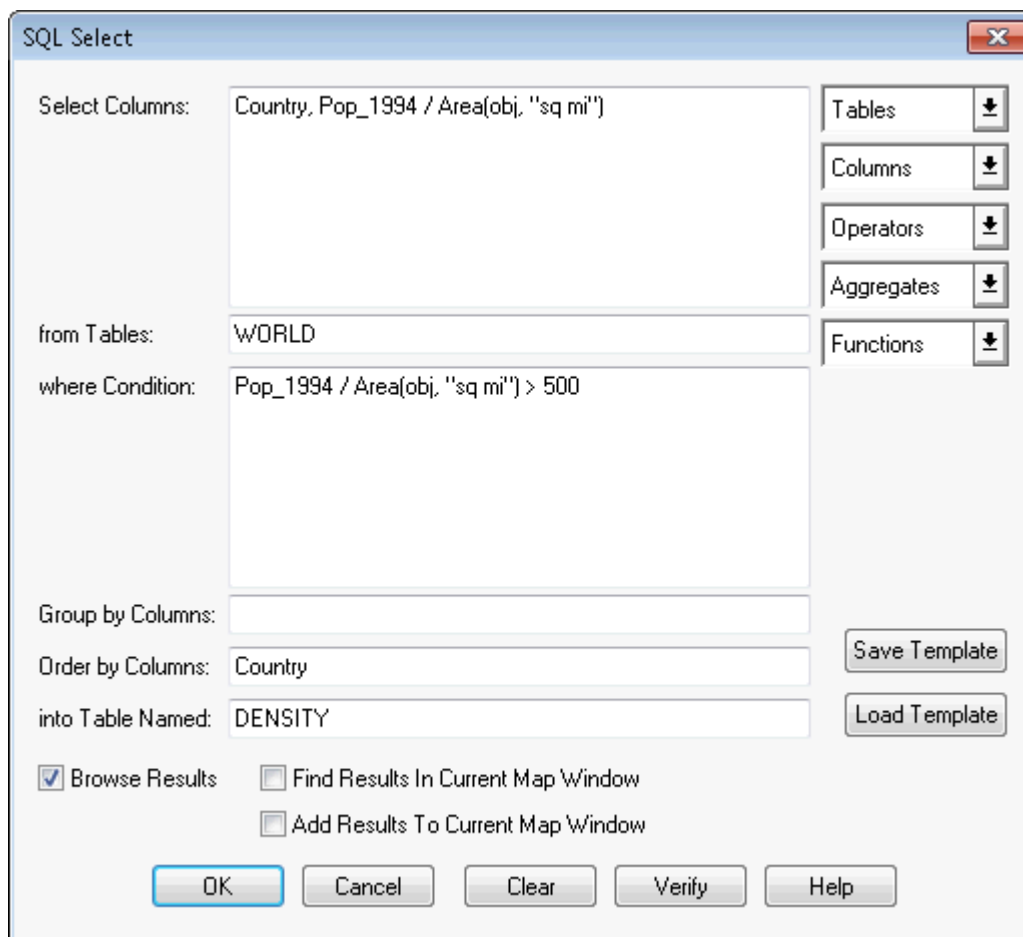
By default, MapInfo Pro names the query table Query1. Subsequent query tables will be named Query2, Query3, and so on. You can change the name of the query table by typing in a new table name in the **Into Table Named** box. MapInfo Pro will name the query table `DENSITY`.

15. Click **Verify**.

MapInfo Pro checks the syntax of your SQL statement. If there are any errors in your statement, MapInfo Pro gives you an error message telling you what the error is and which box contains the error.

16. Select the **Browse Results** check box to create a **Browser** of the query table. If you do not select **Browse Results**, MapInfo Pro still creates the temporary query table but does not display it. If you wanted to display the table after the fact, on the **TABLE** tab, in the **Content** group, click **New Browser**, and select `DENSITY` from the list.

17. To display the query results in the currently active Map window, select **Find Results in Current Map Window**. If there are no open Map windows, this check box is disabled. You cannot save this check box setting to a template. This option is cleared by default.



SQL Select

Select Columns: Country, Pop_1994 / Area(obj, "sq mi")

from Tables: WORLD

where Condition: Pop_1994 / Area(obj, "sq mi") > 500

Group by Columns:

Order by Columns: Country

into Table Named: DENSITY

☒ Browse Results ☐ Find Results In Current Map Window ☐ Add Results To Current Map Window

OK Cancel Clear Verify Help

Tables Columns Operators Aggregates Functions

Save Template Load Template

18. Click **OK** to create the following table.

The first column contains the country name. The second column contains the population density. Note that the countries are listed in alphabetical order (Order By: Country) and the population density for each country listed is over 500 people per square mile (pop_1994/ Area(obj, "sq mi") > 500).

Example 2 - Computing Population Density with SQL

To set up an SQL Select statement that selects only those states with a high population density, do the following:

1. Open the STATES table in a Map window.
2. On the **MAP** tab, click **SQL Select** and fill in the **SQL Select** dialog box. You can also reach the dialog box from the **TABLE** and **SPATIAL** tabs.

- **Select Columns:** *
- **from Tables:** States
- **where Condition:** (Pop_1990 / Total_Area) > 500
- **into Table Named:** HIDENTITY

This creates a new table, HIDENTY, that contains only those states with a relatively high population density (population divided by total area). The asterisk (*) in the Select Columns box transfers all of the columns in the STATES table to the HIDENTY table.

3. On the **HOME** tab, click **Save Copy As** and save the Selection table. The table can be saved with any filename.

Examples of Group by Columns

Imagine that you have a table of customer orders. Each row in the table represents a single order. One column in the table contains the name of the sales representative who booked the order, another column contains the name of the customer, and yet another column contains the order amount.

For each sales representative, you want to find out:

1. The number of orders booked by that representative;
2. The average order amount entered by that representative;
3. The total value of the orders entered by that representative.

The following SQL Select query produces the desired results:

Select columns	Sales_Rep, count(*), average(AMOUNT), sum(AMOUNT)
from tables	Orders
group by columns	Sales_Rep

Notice the Group By Columns field and the three aggregate operators in the Select Columns field. What MapInfo Pro does is:

1. Find all the rows for a particular sales representative.
2. Count the number of rows: Count(*).
3. Calculate the average value of orders for the representative: Avg(AMOUNT).
4. Calculate the total value of the orders for the representative: Sum(AMOUNT).

MapInfo Pro does this for each sales representative and produces a results table that has a single row for each representative. The aggregate operators (Count, Avg and Sum) subtotal the data values for all of the rows having the same value for Sales_Rep.

Consider this SQL Select:

Select columns	Customer, Count(*), Avg(AMOUNT), Sum(AMOUNT)
from tables	Orders
group by columns	Customer

This is essentially the same query as the previous one, except that we are grouping by Customer rather than by Sales_Rep. This SQL Select finds the count, average, and sum of orders for each customer rather than for each sales representative.

The following example demonstrates a multi-column grouping:

Select columns	Sales_Rep, Customer, count(*), average(AMOUNT), sum(AMOUNT)
from tables	Orders
group by columns	Sales_Rep, Customer

We have specified two column names in Group By Columns. In this case, MapInfo Pro groups rows first by sales representative and then by customer. The result table for this query has one row for each different customer/sales representative combination. When a particular customer has ordered through two or more sales representatives, there is a row summarizing that customer's business with each sales representative. The rows are grouped first by sales representative and then, for each representative, by customer.

Example - Using the Group by Columns Field to Subtotal the Results Table

The Group By Columns field in the **SQL Select** dialog box is optional. If you enter one or more column names in this field, the results table will contain subtotals, or *aggregate information*, for the table.

When you specify a Group By Columns value, MapInfo Pro queries the specified column(s) to see which rows have the same value in that column. Thus, if you have a Customers database, and you Group By the StateName column, MapInfo Pro places all Texas customers in one group, while placing all California customers in another group, etc. MapInfo Pro then calculates aggregate information (sums, averages, etc.) for each group.

To specify subtotal criteria:

1. In the **Group By Columns** field, enter the name or number of the column(s) MapInfo Pro should use to calculate subtotals.

For example, if you want to total your Customer table on a state-by-state basis, enter the column name (e.g., StateName) representing the customer's state.

2. Enter the same column name (e.g., StateName) in the **Select Columns** field.
3. Enter one or more aggregate operators (**Sum**, **Count**, **Avg**, **Min**, or **Max**) in the Select columns field. Remember to separate the aggregate operators with commas.

For example, if you want to count how many customers are in each state, enter the expression: Count(*). If you want to calculate the total of all sales within each state, enter an expression such as Sum(sales) (where Sales is the name of a column).

All columns in the **Select Columns** field that are not based on aggregate functions must be listed in the **Group By Columns** field. These are the columns MapInfo Pro examines to determine the groupings. Each set of unique data values on these columns has a single row in the query table. Derived columns should be designated by numbers indicating relative position: "1," "2," "5," for first, second, and fifth column, respectively.

For example:

Select columns	Month(sick_date), Count(*)
from tables	sick days
group by columns	1

This query tells MapInfo Pro to count all the rows recorded for a particular month and produce a query table grouped by month. The results table has one row per month, and that row has a column indicating how many people were sick during that month.

In the **Group By Columns** field, you should refer to columns by their name or number (where 1 represents the first column listed in Select Columns field). When you are not using a join, you can use regular field names. When you are grouping by the value of a derived column or if you are joining tables, you must use a column number rather than a column name. When referring to columns by number, do not prefix the number by "col."

You can enter more than one column in the **Group By Columns** field. MapInfo Pro first groups rows by the first column you list. Within those groupings, MapInfo Pro groups rows by the second column, and so forth. For each resulting row, the query table contains aggregate values for all columns based on aggregate functions.

Note: Columns in the **Select Columns** field that are based on aggregate functions cannot be listed in the **Group By Columns** field. However, every column in the **Select Columns** field, which is not an aggregate operator, should be listed in the **Group By Columns** field.

Example - Using the Order by Columns Field to Sort the Results Table

The **Order By Columns** field in the **SQL Select** dialog box lets you sort the rows of the results table. Sorting affects the top-to-bottom order of how rows appear in a Browser window. You may want to sort your results table if you intend to print the Browser window as a report.

The **Order By Columns** field is optional; if you leave the field blank, the results table is not sorted. If you enter a column name in the **Order By Columns** field, MapInfo Pro sorts the results table according to the contents of that column.

Performing Multi-Level Sorts

Under some circumstances, you may need to specify two or more columns in the **Group By Columns** field. For example, if you sort the City_1K table according to the State column, the results table is sorted by state name; however, within the group of rows for California, the cities are not sorted, San Francisco appears above Anaheim. To correct this problem, you can enter two column names in the **Order By Columns** field:

Select Columns:	*
From Table:	City_1K
Group By Columns:	State, City

When the **Group By Columns** field contains two or more column names, MapInfo Pro performs a multi-level sort. In the preceding example, MapInfo Pro first sorts the City_1K table by the contents of the State column; then, for each group of rows having the same State name, MapInfo Pro performs a secondary sort. The secondary sort alphabetizes the rows within each state according to city. The row for California, Anaheim now appears above the row for California, San Francisco.

Saving Queries

Any query created using the Select or SQL Select commands can be saved as a MapInfo Pro query table. Query tables consist of a .TAB file and a .QRY file. After you have executed a Select or SQL Select statement, on the **TABLE** tab, in the **Content** group, click **Save Table** or **Save Query** to save the query as a table. When you open this table, the tables on which the query is based are re-opened and the query is re-executed.

Note: Queries made against other queries cannot be saved as a table or in a workspace.

Saving Queries to Workspaces

You can also save queries in workspaces. When you open a workspace that contains a query, the query will execute and any windows created by the query will redisplay. Unlike saving a query as a table, a separate .TAB file is not created when you save a query to a workspace.

Note: To save queries to a workspace, the **Save Queries in Workspaces** check box must be selected in the Startup preferences. MapInfo Pro selects this check box by default.

Activating Save Query when Using a Workspace

To activate the **Save Query** option when using a workspace, you must activate the **Save Queries in Workspaces** option in the **Startup Preferences** dialog box.

1. On the **PRO** tab, click **Options**, and **Startup** to open the **Startup Preferences** dialog box.
2. Check the **Save Queries in Workspaces** option (default setting).
3. Click **OK**.

If you selected this option and open a workspace, the associated queries are regenerated. A separate MapInfo Pro table (.tab) file for the queries is not created.

Note: Only queries created using the **SQL Select** or **Select** commands are saved in a workspace.

Using Date- and Time-Based Data in Maps and Queries

If you maintain time- or date/time-specific data, you may be interested in querying that information and displaying it visually in your maps. Time and DateTime data types let you display that data thematically and as part of a query analysis. You could use this data type for many types of projects, such as to display crime information based on Date and Time or to post schedules based on resource availability on a particular date. Also, you can use the date and time data from Access, Excel, dBase, and remote databases.

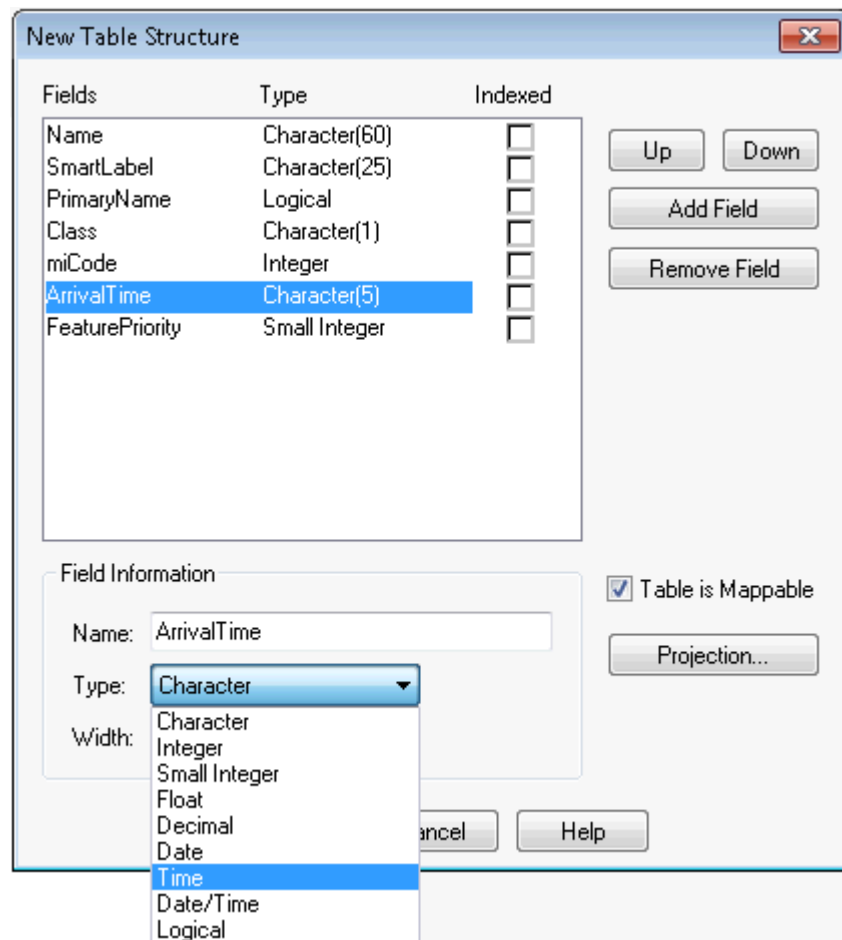
Time and DateTime data types options are made available in the lists of your Query dialog boxes.

Using Time and Time/Date Data Types

You can convert existing fields with time or time/date information into Time and Time/Date formats, so you can use them for querying and thematic maps.

To convert your data:

1. Open the data you want to convert in MapInfo Pro.
2. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**, and select the table for which you want to change the data type. The **Modify Table Structure** dialog box displays.



3. To change the **ArrivalTime** field from a character field to a Time field, click the Type drop-down arrow and select the Time type.
4. Click **OK** to save your change.

Adding Time or DateTime Data Types to Existing Data

If you have existing data and want to add Time or DateTime content to it, check the following table to ensure that the data is in a format that MapInfo Pro can recognize as Time or DateTime.

Table 1: Time and DateTime Data Formats

Enter	To Format for Time	To Format for DateTime
Date	Not Applicable.	yyyyMMdd Sets value to the specified Date at midnight.

Enter	To Format for Time	To Format for DateTime
Time	HHmmssfff. Can also use the locale settings for a Time string.	HHmmssfff Sets value to current date at specified Time. Can also use the locale settings for Date and Time strings separated by a space.
DateTime	yyyyMMddHHmmssfff Sets value to Time portion of DateTime value.	yyyyMMddHHmmssfff

where:

HH refers to hours, **mm** refers to minutes, **ss** refers to seconds, **ff** refers to fractions of seconds, **yyyy** refers to years, **MM** refers to month, **dd** refers to date

Converting Existing Data to Time or DateTime Data Types

If you have Time or DateTime data in your tables already, check to see if it is in the format you want by checking the [Time and DateTime Data Formats](#). If you have a lot of data and it is not in the format you require for your tasks, you can use one of the MapBasic conversion functions to assist you with this process.

Converting	Date	Time	DateTime
String	Assumes the form yyyyMMdd or locale settings for a date string if Date format is "local" or the U.S. form if Date format is "US". *	String can be in the form HHmmssfff or can use the locale settings for a Time string. **	String can be in the form yyyyMMddHHmmssfff or can use the locale settings for Date and Time strings separated by a space. ***
Number	Assumes the form yyyyMMdd. If any portion of the Date is invalid the value is set to null. May display this error: "Could not convert data."	Assumes the form HHmmssfff. If any portion of the Time is invalid the value is set to null and display this error: "Could not convert data."	Assumes the form yyyyMMddHHmmssfff. If any portion of the DateTime is invalid the value is set to null and display this error: "Could not convert data."
Date	No conversion	Sets value to null and display this error: "Could not convert data."	Sets value to the specified Date at midnight.

Converting	Date	Time	DateTime
Time	Sets value to null. May display this error: "Could not convert data."	No conversion	Sets value to current date at specified Time.
DateTime	Sets value to Date portion of DateTime value.	Sets value to Time portion of DateTime value.	No conversion

Additional Notes for Converting a String

***** to a Date

If the year is last in the current Date format, you can omit it and MapInfo Pro will assume the current year. If the data specifies a two-digit year, MapInfo Pro assigns the century based on the current Date Window. If the Date is invalid the value is set to null and MapInfo Pro may display the error, "Could not convert data."

****** to a Time

MapInfo Pro accepts both military and AM/PM forms. The data can specify the entire locale in AM or PM strings or use just the first character of each. The data may omit the milliseconds, seconds, and minutes if the lower-order portions are also omitted. If the Time is invalid the value is set to null and MapInfo Pro may display the error, "Could not convert data."

******* to a DateTime

The conversion rules for Date and Time apply for the respective portions of the string. If the data omits the Time portion, MapInfo Pro assumes midnight. If the DateTime is invalid the value is set to null and MapInfo Pro may display the error, "Could not convert data."

Additional Notes for Converting a Number to a String

The conversion rules for Date and Time apply for the respective portions of the string. If the data omits the Time portion MapInfo Pro assumes the Time is midnight. If the DateTime is invalid the value is set to null and MapInfo Pro may display the error, "Could not convert data."

If you have a lot of data and it is not in the format you require for your tasks, you can use one of the MapBasic conversion functions to assist you with this process.

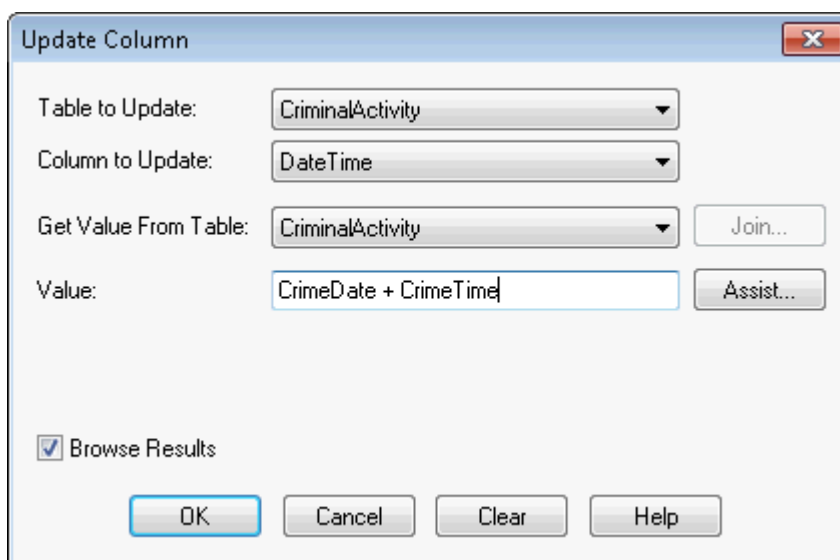
Creating a DateTime Column from Two Separate Columns

To create a DateTime column from a Date column and a Time column:

1. Open your data in MapInfo Pro Browser window. We use `CrimeActivity.TAB` from the Introductory Data on your DVD.

2. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure** to display the **Modify Table Structure** dialog box.
3. Click **Add Field** and type a Date_Time label in the **Name** field.
4. Select **Date/Time** in the Type drop-down list and click **OK**.
5. On the **TABLE** tab, in the **Edit** group, click **Update Column** to display the **Update Column** dialog box.
6. Select the table name in the Table to Update drop-down list.
7. Select the name of the new column you just created in the Column to Update drop-down list.
8. Select the table name again in the Get Value from Table drop-down list.
9. Click the **Assist** button to display the **Expressions** dialog box.
10. Use the Column drop-down list to create the following expression and click **OK**:

```
DateColumnName + TimeColumnName
```



For more about using math expressions with Time and Date information, see [Using Arithmetic Operators with Time and Time/Date Data Types](#).

1. Click **OK** to update the new column with the Date and Time information.

Creating Thematic Maps using Time and Time/Date Data Types

For ranged thematic maps, Time values will be able to be rounded by seconds, minutes, and hours. The default is **seconds**. When you select **None**, MapInfo Pro does not round the electing the seconds and displays a granularity of milliseconds.

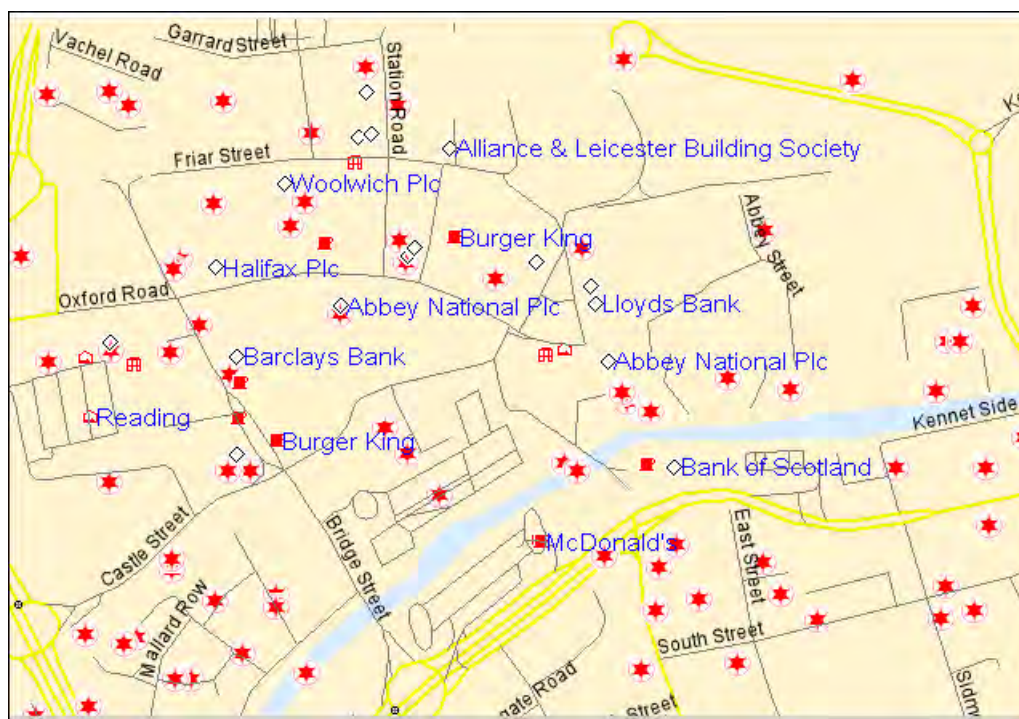
To create a thematic map using DateTime information:

1. Open your data in MapInfo Pro Browser window. Use the appropriate background map to give your data perspective. Here we use the Great Britain data in the Introductory Data on the MapInfo Pro DVD.

2. On the **MAP** tab, in the **Selection** group, click **SQL Select** to display the **SQL Select** dialog box.
3. Place your cursor in the **from Tables** field and select the table name that contains the DateTime data in the **from Tables** drop-down list. For our example we used the *CrimeActivity* table.
4. To find out the location of crimes between April 10, 2003 and April 10, 2004 and between the hours of 12 and 8 p.m., we entered this text in the **where Condition** box:

```
Crime_Date between "04/10/2003" and "04/10/2004" And Crime_Time between
"12:00:00 PM" and "08:00:00 PM"
```

1. Select the **Browse Results** and **Find Results in Current Map Window** check boxes to display the results.
2. Click **OK** to create the query and display the results.



Using Arithmetic Operators with Time and Time/Date Data Types

You can use the addition and subtraction operators with the Time and Time/Date data types as follows:

Data type	Operator	Data type	Result	Notes
Time	minus (-)	Time	Number	The number represents the number of seconds between two times as a floating point number. The fractional part of the result represents milliseconds.
Time	+ or -	Number	Time	The number represents the seconds to add to the first Time. The Time wraps around midnight so that 11:59 PM + 120 seconds equals 12:01 AM.
DateTime	minus (-)	DateTime	Number	The number represents the number of days between two DateTimes as a floating point number. The fractional part of the result is the fractional portion of a day, as in today at noon minus today at midnight equals one half day.
DateTime	+ or -	Number	DateTime	The number represents the number of days to add to the first Time.

Using Comparison Operators with Time and Time/Date Data Types

The comparison operators are =, <>, <, >, <=, >= and should all work as expected for the Time and DateTime values. For Time values, the smallest Time is "12:00:00.000 AM" while the largest Time is "11:59:59.999 PM".

The "Between" operator works as expected for DateTime values. For Time values, we support wrap-around comparisons. For example:

TimeValue Between "2:00 AM" And "10:00 PM" is true if the TimeValue is greater than or equal to "2:00 AM" and less than or equal to "10:00 PM"

TimeValue Between "10:00 PM" And "2:00 AM" is true if the TimeValue is greater than or equal to "10:00 PM" and less than or equal to "11:59:59.999" **or** greater than or equal to "12:00 AM" and less than or equal to "2:00 AM"

Using Logical Operators with Time and Time/Date Data Types

A Time or DateTime field with a value is **true**, while the same field with a null value indicates **false**. The behavior of the logical operators And, Or, and Not should follow logically from this.

Interpreting Excel Data

Using Excel you can format numeric cells as Dates and/or Times. Excel determines the meaning of the 'm' format code as either 'month' or 'minute' based on the rest of the format code.

Fields registered with	Are treated as
Date format but not Time format	Date fields
Time format but not Date format	Time fields
Date format and Time format	DateTime fields

Note: The Date fields in older MapInfo Pro files are treated as Date fields until you re-register them to use the DateTime data type. Older versions of MapInfo Pro supported Date fields with the format 'y' (year), 'm' (month), or 'd' (day). Time fields within the format 'h' (hour) or 's' (second) were treated as Float fields. Fields with Date and Time format codes were treated as a Date field and the Time information was ignored.

See Also:

[Ensuring that Dates Display Correctly for Excel for Macintosh Tables](#)

[Controlling how MapInfo Pro Handles Mixed Data Type Columns](#)

Interpreting Microsoft Access Data

Access data uses a DateTime type, but not separate Date or Time types. MapInfo Pro registers the Access DateTime type fields as DateTime fields.

Note: The Date fields in older MapInfo Pro files are treated as Date fields until you re-register them to use the DateTime data type.

When you save a MapInfo table to Access format, MapInfo Pro writes Date, Time, and DateTime fields as Access DateTime fields. The .TAB file itself maintains the Date, Time, and DateTime types so when you reopen the file, the Date, Time, or DateTime data displays. If you attempt to open these .TAB files using a non-MapInfo application, these fields display as DateTime.

Interpreting dBase Data

The dBase format supports Date fields but does not explicitly support Time or DateTime fields. Therefore, when you register an existing dBase file, there will be no Time or DateTime fields. When

you save or export a MapInfo table with Time or DateTime fields to a dBase file, Time and DateTime fields are written out as character fields of length 9 and 17, respectively so that the data is written out in numeric formats.

When you save a MapInfo table to dBase format, the .TAB file maintains the Time and DateTime types so that when you reopen it the data displays as either Time or DateTime. If you attempt to open these .TAB files using a non-MapInfo application, these fields display as character fields.

Time and DateTime Data Type Support for Remote Databases

The Time and DateTime data types (see [Using Date- and Time-Based Data in Maps and Queries](#)) ensure that the server DATE, TIME, and DATETIME/TIMESTAMP match the MI Date, MI Time, and MI DateTime.

Note: When you open a version 900 or later live .TAB file (linked .TAB files are really native tables with a local table definition), MapInfo Pro matches the behavior of previous releases; the server DATE and DATETIME or TIMESTAMP values are converted to MI Date and server TIME to MI Char.

Handling Time and DateTime Data From Remote Databases

When you download Date, Time, and DateTime data type information to MapInfo Pro, this is the results you can expect:

Table 2: MapInfo Pro Data Type

	DATE	TIME	DATETIME
From Oracle (OCI)	DATE		TIMESTAMP*
From Microsoft Access			DATETIME*
From Microsoft SQL Server			DATETIME*
From PostGIS	DATE	TIME	DATETIME

*Backward compatibility depends upon the .tab file version as described above.

When you commit table data from MapInfo Pro to these remote database servers, MapInfo Pro updates the server table with the value that the user provides in the browser. MapInfo Pro may apply some restrictions during the input time.

Working with Time and DateTime Data on the Server

When you create a new table or save a copy of a table with Date, Time, and DateTime data type information on a DBMS server, this is the results you can expect:

In MapInfo Pro	To Oracle	To Microsoft Access	To Microsoft SQL Server
DATE	DATE	DATETIME*	DATETIME*
TIME	TIMESTAMP(3)*	DATETIME*	DATETIME*
DATETIME	TIMESTAMP(3)	DATETIME	DATETIME

*The MapInfo Pro data type will be extended on the servers. When the same data returns to MapInfo Pro it becomes the data type identified on the server. This mismatch is caused by a mismatch between the data types in the server and MapInfo Pro.

As you can see from the previous table, there may be conversion issues involved depending on the local type and the type of database server you are communicating with. To make the data type conversion clearer we have added some messages to inform you of the details of the conversion when you are creating a new table or saving a copy of a table data to a remote database. When you use the **Create New Table** or **Save Copy of Table as** dialog boxes, red messages display at the bottom of the dialog box to inform you of the Date, Time, and DateTime conversion details.

If you create a new table with Date, Time, and DateTime data using MapBasic statement, the notification is a little different. If you use the Server Create Table statement, keep in mind that the statement only supports the types that are also supported by the server. Therefore, Time type is prohibited from this statement for Oracle, PostGIS, Microsoft SQL Server and Access servers and the Date type is prohibited for Microsoft SQL Server and Access servers. You should replace unsupported types with DateTime to create a table that contains Time information on a column.

If you create a copy using a MapBasic statement and the source table contains Time or Date type columns, these columns will be converted to DATETIME or TIMESTAMP depending on whether the server supports the data types or not and the parameters you pass in. You can control this behavior using the ConvertDateTime clause. If the source table does not contain Time or Date data type, this clause is not operational. If ConvertDateTime is set to ON (which is the default setting), Time or Date type columns will be converted to DATETIME or TIMESTAMP. If ConvertDateTime is set to OFF the conversion is not done and the operation will be cancelled if necessary. If ConvertDateTime is set to INTERACTIVE a dialog box will pop up to prompt the user and the operation will depend on the user's choice. If the user chooses to convert, then the operation will convert and continue; if the user chooses to cancel, the operation will be cancelled. The Time type requires conversion for all supported servers (Oracle, PostGIS, Microsoft SQL Server and Access) and the Date type requires conversion for Microsoft SQL Server and Access database servers.

Note: For Microsoft SQL Server and Access database servers, this restriction could be an backward compatibility issue. In previous releases, we did the conversion without explaining it. In this release, we suggest you use the DateTime data type instead of Date data type. If you still use the Date data type, the conversion operation will fail.

Interpreting ASCII and CSV Data

When you register ASCII or CSV files, MapInfo Pro does not automatically recognize fields as being of type Date, Time, or DateTime. In fact, we do not recognize Date, Time or DateTime data for ASCII and CSV files. However, when you export a MapInfo table to these formats, MapInfo Pro writes out the Date, Time, and DateTime fields in their numeric formats.

Using Templates for Queries

Query templates enable you to save Select or SQL Select statements as templates and reload them. This saves you the trouble of having to rebuild a query each time you want to use it. Both the **Select** and **SQL Select** dialog boxes have Load Template and Save Template options to enable you to do this easily. Query templates are useful for re-creating a query with an updated version of the table used in the original query, or for executing a query on a table that has the same fields as the table on which the query statement was created.

Loading a Template

You can load any saved query template.

To load a query template:

1. In the **Select** or **SQL Select** dialog boxes, lick the **Load Template** button. The **Load Dialog From Query File** dialog box displays. It lists the .QRY files.
2. Select the .QRY file you want to use, and click **Open**. The Select or **SQL Select** dialog box displays with the values from the template already filled in. Simply execute your query to create the query browser.

Renaming a Template

Rename a template by selecting and clicking the template name; enter a new name up to 64 characters.

Saving a Template

After you have finished writing your Select or SQL Select query, you can save the query as a template.

To save a query as a template:

1. In the Select or **SQL Select** dialog boxes, click the **Save Template** button to save the query to a template, or query file. The **Save Dialog to Query File** dialog box displays.
2. Give the query file a name, select a folder, and click **Save**. Query files are saved with a .QRY extension and are saved in the directory specified in the Directories preferences.

Note: The query does not need to be complete or syntactically correct to save it to a template.

Deleting a Template

To delete a template:

- Select the template name and press the **Delete** key. A dialog box displays prompting you to confirm or cancel the operation. If no templates of the given type exist, a button to restore a default template displays.

Deriving Columns

A derived column is a column in a query table whose contents are created by applying an expression to the values of columns already existing in some base table. In the example above, population density was a derived column. By default, the **Select Columns** box contains an asterisk (*), indicating that all of the columns in the base table are to be included in the query table. If you do not want all of those columns, you should delete the asterisk and list only those columns that you want to use. You are not limited to creating one derived column. You can create as many derived columns as you want. Note that the more derived columns you create, the longer it will take MapInfo Pro to execute the query.

You can also create derived columns based on the aggregate functions *count*, *sum*, *avg*, *wtavg*, *max*, and *min*. For example:

- `sum(Population)`

would give you the population for the entire world.

- `sum(Area(obj), "sq mi")`

would give you the area for the entire world.

Creating Column Aliases

When MapInfo Pro creates a derived column, it uses the expression itself as the name for that derived column, which can be awkward. You can, however, specify an *alias* for the column. For example, the population density column in our DENSITY Browser was titled:

- `Population / Area(obj, "sq mi")`

To rename the column, add the new name to the Select Columns box when listing the columns.

The alias must follow the expression. It must also be separated from the expression by a blank space and enclosed in quotes. For example:

- `Country, Population / Area(obj, "sq mi") "POP_DENSITY"`

When MapInfo Pro creates the temporary query table, the population density column will now be named POP_DENSITY.

You can use aliases to rename any column in a table, not just derived columns. For example, if each country in your table is a separate sales territory for your corporation, you might want to rename the Country column "TERRITORY". The procedure is identical:

- Country "TERRITORY", Population / Area(obj, "sq mi") "POP_DENSITY"

Example - Computing Total World Population Density

In this example, we demonstrate several SQL Select features:

- *Create derived columns* based on an aggregate function.
- *Rename columns* by typing column aliases.
- *Create a new results table* based on the WORLD table.
- *Perform SQL Select* on the new table.

In this example, you have a table of world population statistics (WORLD). You would like to create a table that shows the population density of the entire world. Use the following formula:

- TOTAL POPULATION / TOTAL AREA

While the WORLD table does not have total population or total area columns, we can derive them by applying the sum() aggregate function to the Population column and the Area function. We will do this in our first query.

1. Open the WORLD table, and maximize its display.
2. On the **MAP** tab, click **SQL Select** to display the **SQL Select** dialog box.
3. In the **From Tables** box, choose **WORLD** from the Tables drop-down list .
4. In the **Select Columns** box, delete the * (keep the cursor in this box for the next steps).
5. From the **Aggregates** drop-down list, select **Sum**.
6. From the **Columns** drop-down list, select the population column. The cursor is now on the inside of the end parenthesis []). Move it to the outside using the **Right Arrow** key.

Note: Sum (Population) creates a derived column to compute the total world population.

7. Press the **Spacebar** once and type the column alias **"Total_Pop"** with quotation marks. Remember to always use a blank space to separate an alias from its expression.

Note: The Sum(Population) column will appear in the results table as Total_Pop.

8. From the **Aggregates** drop-down list, select **Sum**.
9. From the **Functions** drop-down list, select **Area**. The cursor is now on the inside of the end parenthesis []). Move it to the outside with the **Right Arrow** key.
10. Sum(Area) creates a derived column to compute the total area.
11. Press the **Spacebar** once and type a column alias **"Total_Area"** with quotation marks.

Note: The Sum(Area(obj, "sq mi")) column will appear in the results table as Total_Area.

12. Leave the **Where Condition**, **Group By Columns**, and **Order By Columns** fields blank.

13. In the **Into Table Named** box, type **TOT_POP_AREA** as the name for this table.
14. Click **Verify**.
15. Select the **Browse Results** check box.
16. Click **OK**.

MapInfo Pro produces a query table named TOT_POP_AREA containing two columns. The first column shows a value for the total population and the second column shows a return value for the total area.

TotalPop	TotalArea
5,167,298,341	54,946,146.44

Now that we have the total population and total area, we can compute the world's population density by performing an SQL Select on the TOT_POP_AREA table we just created.

In this SQL Select, we will divide the total population by the total area.

1. On the **MAP** tab, click **SQL Select** to display the **SQL Select** dialog box.
2. In the **From Tables** box, delete the information from our last query.
3. From the **Tables** drop-down list, select **TOTAL_POP_AREA**.
4. In the **Select Columns** box, delete the information from our last query.
5. From the **Columns** drop-down list, select **Total_Pop** . Remember, this is the column from our last query.

Notice that when you select Total_Pop, COL1 appears in the **Select Columns** field. This is the column number of that field. When choosing derived columns from a previous query, MapInfo Pro uses the column number instead of the name. Columns can be referred to by name or number, where the number designates the order the column has in the **Select Columns** box. COL1 and COL2 refer to the first and second columns, respectively.

6. From the **Operators** drop-down list, select the division sign (/).
7. From the **Columns** drop-down list, select **Total_Area**. COL2 displays in the Select Columns field.
8. Leave the **Where Condition**, **Group By Columns**, and **Order By Columns** fields blank.
9. In the **Into Table Named** box, type **WORLD_DENSITY** as the name of this table.
10. Click **Verify**.
11. Select the **Browse Results** check box.

12. Click **OK**.

MapInfo Pro produces a query table named **WORLD_DENSITY** that will return a value for the population density in people per square mile for the entire world.

TotalPop/TotalArea
94,043

Aggregating Data

When you aggregate data, you perform a mathematical operation on all of a column's values in all of the records in your table. Unlike the Select command, which only allows you to perform mathematical functions on individual records, SQL allows you to aggregate (or summarize) data across records.

MapInfo Pro looks for each *unique* set of data values in the specified column or columns and creates one row for each such unique set. When you aggregate data, you need to specify:

- How the records will be grouped.

- How the data will be aggregated (summarized).

For example, you have a table of sales representatives and their sales figures for the past three months:

SALES_REP	MONTH	SALES
John	May	1200
Cathy	May	900
Julie	May	1100
John	June	900
Cathy	June	1400
Julie	June	600
John	July	1200
Cathy	July	700
Julie	July	1000

MapInfo Pro could also compute the total sales for each representative by specifying in the **SQL Select** dialog box:

- Select Columns: SALES_REP, sum(SALES)
- Group by Columns: SALES_REP

SALES_REP	sum(SALES)
John	3300

SALES_REP	sum(SALES)
Cathy	3000
Julie	2700

or MapInfo Pro could compute the average sales for each representative:

- Select Columns: SALES_REP, avg(SALES)
- Group by Columns: SALES_REP

SALES_REP	avg(SALES)
John	1100
Cathy	1000
Julie	900

or MapInfo Pro could compute the total sales for each month:

- Select Columns: MONTH, sum(SALES)
- Group by Columns: MONTH

MONTH	sum(SALES)
May	3200
June	2900
July	2900

MapInfo Pro has six aggregate functions:

- **Count(*)**: counts the number of records in a group. It takes * as its argument because it applies to the record as a whole, and not to any particular field in the record.
- **Sum** (expression): calculates the sum of the values in <expression> for all group records.
- **Average** (expression): calculates the average of the values in <expression> for all the records in a group.
- **WtAvg** (expression): calculates the weighted average of the values in <expression> for all the records in a group.
- **Max** (expression): finds the highest value in <expression> for all records in a group.
- **Min** (expression): finds the lowest value in <expression> for all records in a group.

Grouping and Ordering Your Data

You can group your SQL query by a particular column so that all rows that contain the same value are grouped together. Specify this column in the Group by column box in the **SQL Select** dialog box. When used in conjunction with aggregate functions, rows with the same value in all grouping columns are treated as a group. Duplicate rows are suppressed and aggregate values are reported for derived columns based on the aggregate functions. Specify the column(s) by name or by position number as listed in the Select Columns box. When using derived columns, you must specify the column number.

Along the same lines, you can tell MapInfo Pro to order the results of your query in a certain way. By default, MapInfo Pro orders records by their ascending value (which is alphabetical for character fields). When you list more than one column, MapInfo Pro orders the records by the first column. Records with identical values in the first Order by column are ordered by their values in the second Order By column. Like the Group By clause above, use column names or position number. For derived columns use the number. Do not use "col" with the position number.

Calculating Derived Columns

SQL Select can calculate derived columns and store the derived columns in the results table. A derived column is a special, temporary column that MapInfo Pro calculates on-the-fly, based on the contents of one or more columns that already exist in your base table.

For example, your table might contain the fields *Purchases92* and *Purchases93* (representing the total of each customer's purchases in 1992 and 1993, respectively). If you want your query results to show a Total Purchases column, showing each customer's combined purchases from 1992 and 1993, you can include a derived column in your Select Columns field.

In this example, the derived column would have the form:

```
Purchases92 Purchases93.
```

Similarly, you may have a table of customer information that contains the fields *Fname* (representing the customer's first name) and *Lname* (the customer's last name). If you want your results table to

include each customer's full name, you can include a derived column in your Select Columns field. In this example, the derived column might have the form:

```
Fname " " Lname.
```

To specify a derived column, you enter an *expression* in the Select Columns field. A derived column expression is a combination of column names, operators (such as, and -), and functions (such as the UCase\$ function, which converts a string column into uppercase).

If you have not already done so, you must enter one or more table names in the From Tables field before you specify derived columns.

To specify a derived column expression:

1. In the **SQL Select** dialog box, click in the **Select Columns** field. The insertion point appears in the field.
2. Delete the asterisk from the **Select Columns** field, if you have not done so already.
3. Enter a column expression. The column expression should include one or more column names. If the expression includes more than one column name, the expression typically includes an operator (such as, or -) to combine the columns into one derived value. There are many different functions and operators that you can use in a column expression.
 - Assign an alias to the column expression, if desired. To specify an alias, type a space after the column expression, then type the alias name in double quotation marks. Alias names are optional. If you give your column expression an alias, the alias will appear at the top of the column when you display the results table in a Browser window. If you do not assign an alias name, MapInfo Pro uses the content of the expression as the default alias (e.g. "Fname Lname").
4. Specify additional column names or derived column expressions, as desired. If you enter additional column expressions, enter commas to separate the expressions.

The following example shows a derived column expression that performs addition, adding the values from two numeric columns. This example assumes that both Purchases92 and Purchases93 are numeric columns:

```
Select Columns: Purchases92 Purchases93
```

The next example shows the same column expression, with the addition of an optional column alias ("Net_Purchases"):

```
Select Columns: Purchases92 Purchases93 "Net_Purchases"
```

The next example shows a derived column expression that performs division, dividing the contents of the Population column by one million:

```
Select Columns: Population / 1000000 "Millions"
```

The next example shows a derived column expression that combines two string columns. This example assumes that both Fname and Lname are string columns:

```
Select Columns: Fname " " Lname "Full_Name"
```

When the columns are string columns, the plus operator () performs string concatenation, rather than numerical addition. Thus, the expression Fname " " Lname produces a string consisting of a first name, followed by a space, followed by a last name.

The next example shows how a derived column expression can incorporate function calls. The Proper\$ function operates on a string value and returns a string that has proper capitalization (only the first letter is capitalized).

```
Select Columns: Proper$( Fname " " Lname ) "Full_Name"
```

The next example shows how to use the Format\$ function to reformat numeric columns. Ordinarily, numeric columns do not include commas, which, unfortunately, make it hard to read large numbers. The following example uses the Format\$ function to insert commas into the Purchases93 column. This example assumes that Purchases93 is a numeric column:

```
Select Columns: Format$( Purchases93, "$,#" ) "Purchases_1993"
```

The string expression "\$,#" tells the Format\$ function to display a dollar sign before the column and to include commas in the column.

The next example shows how a derived column can calculate the geographic area of each row in the base table:

```
Select Columns: Area( Obj, "sq km") "Net_Area"
```

Obj is a special column name, representing the geographical object that is attached to each row of the table.

Joining Tables Using SQL Select

When performing an SQL Select operation with multiple tables, MapInfo Pro needs to join information from the records in the various tables. You may have a map table containing only graphic objects and their names and a table of statistical data for some geographic region. You want to display the statistical data on the map table. You could use SQL Select to create a query table in which your statistical data and map data are joined in one table.

Whenever you are working with multiple tables, you must put a statement in the Where Condition telling MapInfo Pro how to match up the rows in the different tables. For example, you have the WORLD table that contains countries and a table of economic statistics (Eco_Stats), also broken down by country.

You want to create a query table that contains both sets of data:

- Select Columns: * (an asterisk indicates include all columns in the query table)

- From Tables: World, Eco_Stats
- Where Condition: World.Country = Eco_Stats.Country

The two columns that you want to match do not have to have the same name. For example, you have a table of international customers (Int_Cust) that contains a sales territory column (TERRITORY). This column contains continent names, since your company breaks up its sales territories according to continent. If you wanted to temporarily join the two tables:

- **Select Columns:** *
- **from Tables:** World, Int_Cust
- **where Condition:** World.Continent = Int_Cust.TERRITORY
- **into Table Named:** WORLD_DENSITY
- Select the **Browse Results** check box.

Example - Total Population and Area by Continent

Given that MapInfo Pro can aggregate data, we can compute total population and total area for every continent in the world. We want to create a table with the following information:

- Number of countries per continent (in alphabetical order)
- Total population per continent
- Total area of each continent

To create a table that captures this data:

1. Open the `WORLD.TAB` table, and maximize its display by clicking the **Maximize** button.
2. On the **MAP** tab, click **SQL Select** to display the **SQL Select** dialog box.
3. In the **From Tables** box, type **WORLD** (or choose **WORLD** from the **Tables** drop-down list).
4. In the **Select Columns** box, delete the * character.
5. From the **Columns** drop-down list, choose **Continent**.
6. From the **Aggregates** drop-down list, choose **Count(*)**.
7. Press the **Spacebar** once and type the column alias **"COUNTRIES"** with quotation marks. Remember to always use a blank space to separate an alias from its expression.

Note: The Continent Count(*) column will appear in the results table as COUNTRIES.

8. From the **Aggregates** drop-down list, select **Sum**.
9. From the **Columns** drop-down list, select the Population column. The cursor is now on the inside of the end parenthesis [)]. Move it to the outside using the **Right Arrow** key.

Note: Sum (Population) creates a derived column that computes the world population.

10. Press the **Spacebar** once and type the column alias **"Total_Pop"** with quotation marks.

Note: The Sum(Population) column appears in the results table as Total_Pop.

11. From the **Aggregates** drop-down list, select **Sum**.
12. From the **Functions** drop-down list, select **Area**. The cursor is now on the inside of the end parenthesis [)]. Move it to the outside using the **Right Arrow** key.

Note: Sum(Area) creates a derived column that will compute the total area.

13. Press the **Spacebar** once and type a column alias **"Total_Area"** with quotation marks.

Note: The Sum(Area(obj, "sq mi")) column appears in the results table as Total_Area.

14. In the **Group by Columns** box, choose **Continent** from the **Columns** drop-down list.
15. In the **Order by Columns** box, choose **Continent** from the **Columns** drop-down list.
16. In the **Into Table Named** box, type **POPULATION** as the name for this table.

The Count(*) counts all the records in the table. However, since we are grouping the countries according to continent, MapInfo Pro reports the number of countries in each continent and puts it in a column called COUNTRIES (the alias).

- **Select Columns:** Continent, Count(*) "COUNTRIES", Sum(Pop_Rural) "TOTAL_POP", Sum(Area(obj, "sq mi")) "TOTAL_AREA"
- **from Tables:** WORLD
- **Group by Columns:** Continent
- **Order by Columns:** Continent
- **into Table Named:** POPULATION

17. Click **OK**.

Using the Where Condition

The order of fields used in the Join does not matter. Either of the following syntaxes is acceptable:

```
Select * from A,B where A.field1 = B.field1>
Select * from A,B where B.field1 = A.field1
```

However, keep in mind that when you switch the order of geographic operands, the geographic operator must also change. The following statements will produce identical results:

```
Select * from states, cities where states.obj contains cities.obj
Select * from states, cities where cities.obj within states.obj
```

Order of Clauses

The order in which Join clauses are performed does not matter. For example, each of the following are valid clauses:

```
Select * from Us_custg,States,City_125
where States.state = City_125.state and States.state = Us_custg.state
and
Us_custg.order_amt > 10000
Select * from Us_custg,States,City_125
where States.state = City_125.state and States.state = US.custg.state
and
Us_custg.order_amt > 10000
Select * from Us_custg,States,City_125
where Us_custg.state = States.state and Us_custg.order_amt > 10000 and
States.state = City_125.state
```

Error Handling

If an invalid Where condition that uses an OR as a logical operator is detected, MapInfo Pro will indicate an error has occurred. Usually this error will display whenever MapInfo Pro cannot find a join between two tables. For example, if you have specified the following incorrect condition:

```
Select * from A,B where A.field1 = B.field1 or A.field1 = B.field2
```

This error message displays:

```
No join specified between A and B. Invalid join condition in Where clause
```

Joining Tables Geographically (Using Geographic Operators)

When two tables have graphic objects, MapInfo Pro can join the tables based on the spatial relationship between those objects. Thus, even if your tables do not share a common column, you may be able to join the tables.

Geographic operators allow you to select objects on the basis of their spatial relationship to some other object. MapInfo Pro has a special column name you use with geographical operators: "obj" or "object". This column name refers to the graphic objects that are attached to your table.

The geographic operators go between the objects being specified. Select the geographic operators from the Operators drop-down list.

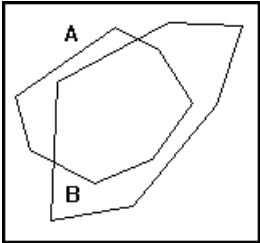
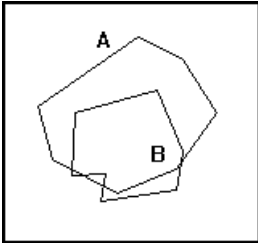
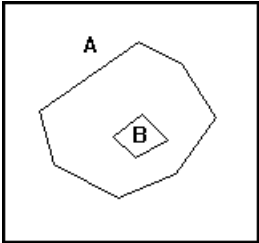
The following table lists the geographic operators:

Contains	Object A Contains Object B if B's centroid is anywhere within A's boundary.
Contains Entire	Object A Contains Entire Object B if B's boundary is entirely within A's boundary.
Within	Object A is Within Object B if its centroid is inside B's boundary.

Entirely Within	Object A is Entirely Within Object B if A's boundary is entirely within B's boundary.
Intersects	Object A Intersects Object B if they have at least one point in common or if one of them is entirely within the other.

The difference between **Contains** and **Within** on the one hand, and **Contains Entire** and **Entirely Within** on the other, hinges on how the geographic comparison is made. For **Contains** and **Within**, the comparison is based on object centroids. For **Contains Entirely** and **Entirely Within**, the comparisons are based on the whole object.

The following graphic illustrates this point:

		
Object A contains Object B Object B within Object A	Object A contains Object B Object B within Object A	Object A contains Entire Object B Object B entirely Within Object A Object A intersects Object B Object B intersects Object A

In each case, object A contains object B because the centroid of object B is inside the boundary of object A. However, in the cases at the left and in the middle, part of object B is outside the boundary of object A. Only in the case to the right is all of object B inside object A. Only in this case could we assert "object A Contains Entire Object B" or "Object B Entirely Within Object A." Further, if A contains entire B, then A contains B, and If A is entirely within B then A is within B.

MapInfo Pro can perform a simple **Contains** or **Within** comparison more rapidly than a **Contains Entire** or **Entirely Within**. Therefore, unless you are absolutely sure that objects are completely inside other objects, you should use **Contains** and **Within** rather than **Contains Entire** or **Entirely Within**.

Geographic operators provide a way of joining tables. When there are no columns in the tables on which you can base your join, you can use a geographical operator to specify the join (in the Where Condition field). If you want to perform a query that involves both a Cities table and a States table, you can join the tables using either of the following expressions:

1. Cities.obj within States.obj

2. States.obj contains Cities.obj

In either case, MapInfo Pro finds the cities within each state and then associates a row for a city with the row for the state that contains it. In the same SQL Select query, you could also use aggregate functions to count the number of cities per state or to summarize city-based data on a statewide basis.

When you have a table of counties and one of customers, where counties are polygons and customers are points, you could specify a geographic join using either of the following geographic expressions:

1. Customer.obj within County.obj
2. County.obj contains Customer.obj

Geographic operators are particularly useful in conjunction with subselects.

Performing Subselects

MapInfo Pro allows subselects in SQL Select. A subselect is a select statement that is placed inside the **Where Condition** field of the **SQL Select** dialog box. MapInfo Pro first evaluates the subselect and then uses the results of the subselect to evaluate the main SQL Select.

For example, suppose you want to select all states where the population is greater than the national per-state average for 1990. In other words, if the average state population is five million, you want to select all states having population greater than five million. In effect, you want to use the following filter criterion in the **Where Condition** field:

```
Pop_1990 > The Average State Population
```

However, you do not know what that average is. But you know that MapInfo Pro can calculate that average using the following aggregate expression:

```
Avg (Pop_1990)
```

To calculate the average state population, enter a subselect in the Where Condition field. The Where Condition field can then compare the results of the subselect against the Pop_1990 column. To perform such a query, fill in the **SQL Select** dialog box as follows:

Select columns	*
from tables	States
where condition	Pop_1990 > (Select Avg(Pop_1990) From States)

The subselect is in the Where Condition field, following the greater-than (>) operator. The subselect must be enclosed in parentheses.

The most useful subselects contain a select clause, a from clause, and a where clause, as follows:

```
select some columns from some tables where some condition
```

Consider the following SQL Select, which selects all cities in states with more than 4,000,000 people:

Select columns	*
from tables	Cities
where condition	obj within any(select obj from States where POP_1990 > 4000000)

The subselect returns the graphic objects for all states with a 1990 population greater than 4,000,000. The main Select statement then gets all the cities that are in any of the states chosen in the subselect. Notice that the main Select statement uses a geographical operator (within) to do this.

Although the preceding query uses both the States table and the Cities table, the Cities table is the only table listed in the From Tables field. That is because we are not joining the two tables. We are only using States in the subselect. If a table is only used within a subselect, the table name does not need to appear in the From Tables field.

In the next example, we select all states that intersect Tennessee, in other words, all of the neighboring states.

Select columns:	*
from tables	States
where condition	obj intersects (select obj from States where state = "TN")

First, MapInfo Pro performs the subselect:

```
select obj from states where state = "TN"
```

This subselect finds the graphic object for Tennessee. Next, the main Where condition finds all objects in the States table that intersect the graphic object for Tennessee. You could use a similar query to select all street segments that cross a given street.

Now consider this example:

Select columns	*
from tables	county
where condition	county.obj contains any (select obj from dealers)

This query finds all counties containing a dealer. The main Where condition has the form: *a county object contains a dealer object*. The set of dealer objects is produced by the subselect: select obj from dealers. MapInfo Pro selects the rows for every county object that contains a dealer object.

Finally, here are a few notes on subselects:

- You can use tables in the subselect that are not listed in the From Tables field. However, you must list these tables in the From clause of your subselect (as shown in the preceding examples).
- When the subselect is used with the "any" or "all" keywords, the subselect must return one and only one column. The following syntax example is not valid, because it tries to return two columns (state_name and Pop_1990):
Any(select state_name, pop_1990 from states)
- When the subselect is not used with "any", "all", or "in", the subselect must return exactly one row value. The following example would not be valid, because the subselect returns a set of rows:
obj within (select obj from states where POP_1990 > 2000000)
- When the subselect is not used with "any", "all", or "in", you cannot use a Group by Columns clause in the subselect.
- You cannot have nested subselects, that is to say you can only have one subselect per Select statement.

Joining Two or More Tables

Typically, you store your information in several different tables. You have your own data files, and you may also have various databases of statistical information that you purchased from MapInfo Pro. SQL Select allows you to create relational joins so that you can bring information from these various tables together into a single results table.

When you want to join two tables, you must determine whether one of the columns in the first table contains values that match one of the columns in the second table. Imagine that you have a table of counties that has demographic information - the population of people in various age ranges, ethnic groups, and occupational categories in each county. You may also have a database containing information about customer orders. You want to examine these two tables and see if certain kinds of orders come from counties having certain demographic characteristics. Perhaps you want to select counties according to combinations of orders and demographic characteristics. To do this you have to be able to join the two tables.

Suppose the counties table contains the name of the county. Similarly, one of the columns in the order table contains the name of the county in which the order originated. Thus, these two tables

have one field in common, the county name. MapInfo Pro can use that common field to join the two tables.

CountyName	Pop_1980	Pop_1990	Order #	Customer	County
Foster	23,789	27,135	478001	Francis	Foster
Williamette	35,456	34,846	478002	James	Foster
Mason	147,101	151,201	478003	Wickwire	Mason

Counties Table Orders Table

Within the **SQL Select** dialog box, you use the Where Condition field to tell MapInfo Pro how to join the two tables. The **SQL Select** dialog box might look like this:

```
Select Columns:  *
From Tables:    Counties, Orders
Where Condition: Counties.CountyName = Orders.County
```

The order of the table names (in the From Tables field) is important. If both tables contain map objects, the results table will only retain the map objects from the first table listed in the From Tables field. Furthermore, when the query is complete, MapInfo Pro automatically selects some or all of the rows from whichever table is listed first in the From Tables field. Thus, in the preceding example, MapInfo Pro will select some or all of the rows from the Counties table. The results table will also include data copied from the Orders table, but the Orders table will not be selected per se.

When you join two tables, the number of rows in the results table depends on how well the two tables match up. Suppose you have an Orders table with 10,000 rows, and you join the Orders table to the States table, which has fifty rows. The results table may contain as many as 10,000 rows. However, if some of the rows in the Orders table fail to match any of the rows in the States table, the results table will contain fewer than 10,000 rows. Thus, if 400 of the rows in the Orders table do not have a state name (perhaps due to data-entry errors), and if the relational join relies on the state name, the results table may only contain 9,600 rows.

You can use Update Column to modify the results of an SQL Select multi-table join. When you want to update a column in one table with information from another table, you can:

1. Join the tables with SQL Select.
2. Use Update Column on Selection. The update automatically takes effect in the appropriate base table.

Performing Outer Joins

An SQL outer join refers to the process of joining data from a larger table and a smaller table where you would like the result to be all the records in the larger table joined to whatever records matched from the smaller table. A problem arises if this is done as a standard join. A standard join in SQL Select will yield a table of only those records that matched. You would like to have empty fields where there is no match. For example, suppose you have a table containing a listing of all of the apartments in a building. There is also a table containing records for each of the tenants. The tables each have a field with the apartment number in it. Your task is to generate a table of all of the apartments and the tenants occupying the apartments. Some of the apartments will be vacant and have no match in the tenant field.

The first step is to create a subset of the data where you can successfully match the apartment to the tenant.

1. On the **MAP** tab, click **SQL Select**. Set up the following SQL query:
 - **Select Columns:** APARTMNT.Address, APARTMNT.AptNumber, TENANTS.Name
 - **from Tables:** APARTMNT, TENANTS
 - **where Condition:** APARTMNT.AptNumber = TENANTS.AptNumber
 - **into Table Named:** Selection
2. Click **OK**. Your selection appears as a query browser. Save this query to a base table.
3. On the **HOME** tab, click **Save Copy As**. The **Save Copy As** dialog box displays. Choose the appropriate directory for your file and name it `RESULT.TAB`. Click **Save**.
4. On the **HOME** tab, in the **File** group, from the **Open** list, click **Table** and open the `RESULT` table. This table includes all of the records from both tables where there was a match.
5. Select the records from the `APARTMNTS` table that had no match in the tenants table. On the **MAP** tab, click **SQL Select** and set up the following SQL query:
 - **Select Columns:** *
 - **from Tables:** APARTMNT
 - **where Condition:** APARTMNT.AptNumber Not In
 - **into Table Named:** Selection

The resulting query table is a list of all of the apartments that are not in the `RESULT` table. To include these records in your `RESULT` table, you must append them.

6. On the **TABLE** tab, click **Append Rows**. Append the last query table to the `RESULT` table. This appends the list of vacant apartments to the list of occupied apartments.

Using the Instr Function to Find Data

The `InStr` function is used to locate a substring within a larger string. This function is useful for searching a character field to find the position of a specific character or group of characters. It can also be used to find any occurrence of the substring.

For example, to select all of the streets in the POINTS table that contain the word "Main" in the STREET column, set up your SQL Select statement as follows:

- **Select Columns:** *
- **from Tables:** Points
- **where Condition:** InStr(1,STREET,"Main") > 0
- **into Table Named:** Selection

In the above example, if the InStr function finds the word "Main" anywhere in the STREET column of the Points table, it will return a value greater than zero (the position of the first letter of "Main" in the string being searched). The syntax of the INSTR function is as follows:

`INSTR (position, string, substring)`

where:

- *position* is the starting position of the search
- *string* is the text string or field containing the string to be searched
- *substring* is the text string that you are searching for

To find the position of the word "test" in a given text string, the InStr function will look like this:

`INSTR(1,"This is a test of the Instr function ","test")`

When this statement is executed, the value 11 is returned.

Note: If the string that you are searching for does not exist, the value 0 is returned.

Selecting Records from One Table that are Not in Another

The following SQL statement allows you to select records from one table that are not in another table based on a field common to both tables. For example, if you have a table, STATE1 and want to select all of the records from STATE1 that are not in CITY125.

1. On the **MAP** tab, click **SQL Select**.

- **Select Columns:** *
- **from Tables:** STATE1
- **where Condition:** Not state In (Select state From CITY125)
- **into Table Named:** Selection

Note: The statement syntax is as follows: NOT *columnname* IN (SELECT *columnname* FROM *secondtable*)

2. This SQL statement produces a query of all records in the table STATE1.TAB that do not exist in CITY125.TAB.

Selecting Even or Odd Records from a Table

Every record in a table has a sequential record number or a RowID. Suppose you want to select every other record from your table. The easiest way is to check the table through RowID.

To select records that have an odd record number:

1. On the **TABLE** tab, click **SQL Select**. This is also available from the **MAP** and **SPATIAL** tabs.
2. Fill in the **SQL Select** dialog box:
 - **Select Columns:** *
 - **from Tables:** SOILS
 - **where Condition:** ROWID Mod 2 = 0
 - **into Table Named:** Selection

RowID is a function, not a column name in the Soils table.

To select records that have an even record number, on the **TABLE** tab, click **SQL Select**.

1. Fill in the **SQL Select** dialog box: Click **OK**.
 - **Select Columns:** *
 - **from Tables:** SOILS
 - **where Condition:** ROWID Mod 2 > 0
 - **into Table Named:** Selection

RowID is a function, not a column name in the Soils table.

Finding Duplicate Values in a Column

Often data is entered into tables by many different users. Sometimes data is repeated, or there is common information in several different records. This section explains how to find all rows in a table that, for a given column, share a value with another row. This is accomplished by performing two SQL Select statements.

The first SQL Select statement produces a query table with two columns. The first column is a list of all unique values in the data column and the second column lists the number of times that each unique value occurs. The second SQL statement compares each data column value with all rows in the Query table where the count is greater than one.

In the next example, there is a table EMPLOYEE that has two columns Id_Num and Name.

To find the duplicate values, perform the two SQL Selects, modifying them where indicated.

1. On the **TABLE** tab, in the **Selection** group, click **SQL Select** and fill in the **SQL Select** dialog box.
 - **Select Columns:** ID_Num, Count (*)
 - **from Tables:** EMPLOYEE

- **Group by Columns:** 1
- **Order by Columns:** 2 desc
- **into Table Named:** Selection

Substitute the name of your data column for `ID_Num` and the name of your table for `EMPLOYEE`. The number **1** in the Group By Columns box will group the row by `ID_Num` (the first column). The **2 Desc** in the Order by Columns box will arrange the records in descending order based on the values in the `count(*)` field (the second column).

This SQL Select statement returns a query table with two columns. The first column contains every identification number possessed by at least one employee. The second column contains the number of employees that have that identification number. The rows are sorted by the number of employees that have each id number (for example, the count).

2. On the **TABLE** tab, click **SQL Select** and fill in the dialog box.

Also, change `EMPLOYEE` to the name of your table and `ID_Num` to the name of your data column.

In the example, the SQL statement returns a query table containing all of the rows from `EMPLOYEE` with duplicated data column values. The where condition selects all rows from `EMPLOYEE` that have an identification number that is the same as one of the ID numbers in the `Count_By_ID` query table. This sub-select finds all identification numbers that occur more than once.

Calculating the Distance to a Fixed Point

In MapInfo Pro it is possible to calculate the distance from one point to another. This example shows how to calculate the distance from a fixed point to every point in a geocoded table and store the result in another table.

1. Determine the location of the fixed point. To find the position of a symbol on the map, double-click the symbol with the **Select** command. In this example, the X value is -101.697209 and the Y value is 35.550036.
2. On the **TABLE** tab, click **SQL Select** and fill in the **SQL Select** dialog box, substituting your X and Y values for the values mentioned above

As in the previous SQL query, replace `EMPLOYEE` with the name of your table, and `LName` and `FName` with the name of the relevant column from your table.

- **Select Columns:** `LName, FName, Distance(-101.697209, 35.550036, CentroidX(obj), CentroidY(obj), "mi") "Dist"`
- **from Tables:** `EMPLOYEE`
- **into Table Named:** `CUSTDIST`

3. Click **OK**. The resulting query table contains last names and first names plus a new column called `DISTANCE` which records the distance between the fixed location (-101.697209, 36.550036) and the point associated with each row of the table.
4. To save the results in a permanent table, on the **HOME** tab, click **Save Copy As**, and save the `CUSTDIST` table.

Selecting Data from a StreetPro Table

If you are using MapInfo Pro StreetPro products, you may want to create a separate layer of just the highway data. The following selection demonstrates a typical selection of highways.

1. On the **HOME** tab, in the **File** group, from the **Open** list, click **Table**. Select your StreetPro file. In this example, the table name is `NYSHCHES.TAB`.
2. On the **TABLE** tab, click **SQL Select**. Fill in the **SQL Select** dialog box.

- **Select Columns:** *
- **from Tables:** `NYSCHES`
- **where Condition:** `Class = ANY("A10", "A11", "A12", "A13", "A14", "A15", "A16", "A17", "A18")`
- **into Table Named:** `HIGHWAYS`

This will create a new table called `HIGHWAYS` that contains all the primary roads contained in the StreetPro `NYSCHES` table.

3. On the **HOME** tab, click **Save Copy As** and save the `HIGHWAYS` table. The `HIGHWAYS` table can be added to your map as a separate layer.

Note: The above SQL Select statement selects all of the primary roads as defined by the CFCC codes. To determine the class of the streets that you want to select, use the **Info** command on a few of the streets that you want to select, or refer to your StreetPro documentation for explanations of the classes.

Entering SQL Queries using the Expert Button

In the **Open DBMS Table Options** dialog, under **Expert Mode**, clicking the **SQL View** button opens the **Enter SQL Query** dialog box.

This dialog box lets you enter queries that are much more complex than what the wizard allows using the standard DBMS SQL syntax.

When entering queries:

- To get a new line press **Enter**.
- To tab press **Ctrl+Tab**.
- To cut and paste from the clipboard, press **Ctrl+X** to cut, **Ctrl+C** to copy, and **Ctrl+V** to paste.
- Click **OK** to move to the final dialog box of the wizard
- Click **Cancel** to cancel the query. MapInfo Pro returns you to the step in the wizard where you originally clicked the **Expert** button
- Click **Load** to load a SQL statement that has been saved in a file. This button activates the **Load SQL Query** dialog box, which provides you with access to existing files containing SQL statements (*.SQL files). When you load an SQL file, its format will be preserved.

- Click **Save** to save the SQL statement in a file for later use. This button activates the **Save SQL Query** dialog box, which saves the newly constructed SQL statements, or modifications to existing statements. When you save an SQL file, its format will be preserved. Once saved, the SQL statement appears in the list of available *.SQL files in the **Load SQL Query** dialog box.
- Click **Last Query** to load the last query that was executed in this MapInfo Pro session.

Creating Expressions

Formulating expressions is something like writing sentences. There is a vocabulary of words from which you can draw, and these words have to be combined according to syntactic rules. The syntax of expressions is much simpler than the syntax of English, and the vocabulary is vastly smaller. However, most of us have been using English for years and so it seems easy and natural whereas formulating expressions is, at first, sometimes a bit difficult.

However, just as English has simple sentences and complex sentences, so there are simple expressions and complex ones. Even if you do not get the hang of formulating complex expressions, you can still use all the MapInfo Pro commands that use expressions. That is because formulating simple expressions is very easy and, at the same time, allows you to work with your data in powerful ways.

Where Expressions Can Be Used

Use the **Expression** dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Pro dialog boxes. See *Specifying an Expression* in the *Help System*.

Expressions are used in the following commands: **Select**, **Update Column**, **Add Theme** and for labeling operations. Highlight a layer in the **Layers** or **Explorer** windows to display a **LABELS** tab on the ribbon where you can create expressions for labels. Alternatively, double-click on a layer to open the **Layer Properties** dialog box. The Label Display tab provides access to the Expressions dialog box. The expression serves a different purpose in different commands.

For example:

- In the **Select** command the expression states a condition that a record in a table must meet in order to be included in a query table.
- In **Update Column** the expression calculates a value that is then entered into a table.
- In **Thematic Mapping** the expression calculates a value that is then displayed on a map.
- In **Label Properties** you use expressions containing string functions to fine tune your labels.

The expressions fall into two broad categories:

- Expressions that must evaluate to true or false.
- Expressions that simply calculate some value.

Expressions that must evaluate to true or false always have a comparison operator and may have multiple clauses connected by logical operators. Use these expressions for selecting objects.

Expressions that simply calculate some value never have a comparison operator and generally do not have multiple clauses. Use these expressions to calculate values for Thematic Mapping, Update Column, and Label With Column in Layer Settings.

Constructing Simple Expressions

You formulate expressions using column (field) names and constants (for example, specific data values), on the one hand, and functions and operators, on the other. Think of the column names and constants as nouns, and functions and operators as verbs, prepositions and conjunctions. You always need at least one column name or a constant in an expression. How many operators and functions you need depends on what you want to do with your expression.

The simplest possible expression consists of a column name, for example:

1. POP_1990
2. STATE

You could use such an expression in Thematic Mapping to indicate what data is to be represented on the map. In Update Column such an expression would tell MapInfo Pro what data to use in updating a column in the target table.

Here are some slightly more complex expressions:

1. POP_1990 > 17893
2. POP_1990 <= POP_1980
3. COUNTY <> "Orange"
4. POP_1980 * 1.2
5. POP_1990 / TOTAL_AREA
6. round(POP_1990/TOTAL_AREA,.1)

The first three examples use comparison operators. The first tests to see whether the 1990 population is greater than (>) some constant (17893). The second tests to see whether the value of one column, POP_1990, is less than or equal to (<=) the value of another column, POP_1980. The third tests to see whether or not the county is Orange. When the county does not equal (<>) "Orange" the record is selected. You could use any of these expressions in Select or in the Where Condition clause of SQL Select. These commands allow you to select a subset of the records in a table. The expression defines the characteristics of the subset.

Examples 6 and 7 use arithmetic operators. Example 6 multiplies (*) the value of POP_1980 by a constant (1.2) while example 7 divides one column, POP_1990, by the value of another column, AREA.

Example 8 uses the round function to round the value of the expression "POP_1990/TOTAL_AREA" to the nearest tenth (.1).

Expressions 6, 7 and 8 do not have comparison operators and therefore they would not be suitable for use in Select or in the Where Condition clause of SQL Select. However, you could use them alone in Thematic Mapping, Update Column, or Select columns in SQL Select.

Setting Filter Criteria for Expressions

A filter criterion is a logical expression that usually compares a column value against some other value. For example, the following filter criterion uses the greater-than operator (>) to test whether the `Order_Amount` column has a value greater than one hundred:

```
Where Condition: Order_Amount > 100
```

If a query includes the preceding Where Condition clause, MapInfo Pro selects only the rows that have an `Order_Amount` value greater than one hundred.

The Where Condition field can contain two or more logical expressions if the expressions are separated by the word *And* or by the word *Or*. If the expressions are joined by the word *And*, MapInfo Pro only selects the rows that satisfy both criteria. If the expressions are joined by the word *Or*, MapInfo Pro selects any row that satisfies either criterion.

Filter criteria can use any column in your base table(s), regardless of whether you included the column in the Select Columns field.

Columns can be referred to by name or by number, where the number designates the order the column has in Select Columns. Thus, "col1" and "col6" refer to the first and sixth columns, respectively. The number must be preceded by the letters "col".

Using Expressions to Create a New Column

You can create a new column by applying an expression to an existing column, or modifying the expression that defines an existing column. A column you modify or create using an expression is for *display* purposes only. Modifications are not saved with the Browse window. To create an expression that can be saved, create the expression through the **SQL Select** command.

To create a new **Browser** window display column:

1. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
2. Choose **Expression** from the Fields in Table drop-down list, or click **Assist**, to open the **Expression** dialog box.
3. Type an expression or create an expression by choosing parameters from the **Columns**, **Operators**, and/or Functions drop-down lists.
4. Choose **Verify** to validate the syntax of the expression. This step is optional.
5. The expression displays in the **Edit Browser Column** section within the **Name** and **Expression** boxes. Choose **OK** to accept the expression.
6. Choose **OK** if the information in the Name and Expression boxes is accurate.

Editing the Expression that Defines a Column

You use a column you modify or create using an expression is for *display* purposes only. Modifications are not saved with the Browser window. To create an expression that can be saved, create the expression through the SQL Select command.

There are two methods for defining an expression:

- Change the text in the **Edit Expression** box or
- Select the **Assist** option to display the **Expression** dialog box containing drop-down lists of columns, operators and functions

Editing a Column Name

To edit a column name:

1. On the **TABLE** tab in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
2. Choose a column from the **Columns in Browser** list.
3. Position the cursor in the name box.
4. Enter the new column name.
5. Click **OK** to save your change.

Editing an Expression Using Assist

To edit the expression that defines a column using Assist:

1. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
2. Choose the text in the Expression box to make the **Assist** button active.
3. Click **Assist** to open the **Expression** dialog box.
4. Create the expression by choosing parameters from the Columns, Operators, and Functions drop-down lists.
5. Choose **OK** to execute the expression and create a new column display in the Browser window. The new column displays as the right most column in the table.

Editing an Expression by Changing Text

To edit the expression that defines the column by changing the text in the expression box:

1. On the **TABLE** tab, in the **Browser Tools** group, click **Pick Fields** to open the **Pick Fields** dialog box.
2. Choose the column name in the **Columns in Browser** column. The column name and expression display in the **Edit Expression Name** and **Expression** boxes.
3. Type a new expression in the **Expression** box.
4. Choose **OK** to execute the expression and create a new display column in the Browser window.

Constructing Complex Expressions

Now consider examples 9 and 10, that are a bit more complex than 1 through 8:

1. $\text{POP}_{1990} > \text{POP}_{1980} * 1.2$

2. `round((POP_1980*1.2)/TOTAL_AREA,.1)`

We created expression 9 by taking expression 3 and replacing the constant "17893" with the whole of expression 6. Similarly, we created expression 10 by taking expression 8 and replacing "POP_1990" with expression 6.

In general, you create complex expressions by combining simple expressions. Perhaps the best way to learn how to do this is look at some of the examples we have provided (above and following) and create your own expressions based on those examples. However, there are two very general techniques for creating complex expressions.

- Replace a column name or a specific value with a simple expression.
- Combine expressions using logical operators (and, not, or).

Example six illustrates the first technique. There are many examples of the second technique throughout this entry. See particularly the discussion following [Using Logical Operators in Expressions](#).

Entering Specific Values (Constants) into Expressions

Use the **Expression** dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Pro dialog boxes.

When entering specific character strings, numbers, and dates into expressions, you need to observe the following conventions.

Character Strings in Expressions

When typing a particular string into an expression you must enclose it in double quotes. MapInfo Pro then treats it as a string rather than as a column name. For example, strings 1 and 2 shown below are valid string constants, while 3 and 4 are not.

1. "Orange"
2. "New York"
3. Orange
4. New York

Numbers in Expressions

When entering specific numerical values, do not use commas, dollar signs, or any characters other than numerals, decimal points, and the minus sign for negative numbers. You can use E to denote numbers in exponentiation.

Date Values in Expressions

Dates consist of a month, a day, and an optional year. The year is specified by two or four digits and enclosed in double quotes. The components of a date are separated by hyphens or slashes. If the year is not specified, it defaults to the year set on your computer's clock. The following are valid data constants:

System Order	What MapInfo Pro Expects
M/d/yy	02/28/2005
M/d/yyyy	02/28/2005
MM/dd/yy	02/28/2005
MM/dd/yyyy	02/28/2005
yy/MM/dd	2005/02/28
dd-MMM-yy	02-28-2005

Century Window in Expressions

MapInfo Pro includes a date window that converts two-digit input into four digit years. It also allows you to change the default to one that best suits your data. The default is to have date windowing turned off.

Using Mathematical Operators in Expressions

Use the **Expression** dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Pro dialog boxes. Mathematical operators are often used in creating expressions. The following chart shows the operator's symbol, name, example, and how the operators handle different data types.

Symbol	Description	Example	Detailed Example
+	plus	A + B	Date + Number: Date 04/01/2007 + 4: 04/05/2007 FloatNumber + Date: Date 4 + 232: 236
-	minus	A - B (subtraction) -A (negative)	Date - Number: Date Number - Date: Date 236 - 4: 232 some number - some number: Float

*	times	$A * B$	some integer * some integer: Integer some number * some number: Float
/	divided by	A / B	some number / some number: Float
^	exponentiation	$A ^ B$	some number ^ some number: Float

The following calculations are possible:

- Adding numbers to dates to yield another date.
- Subtracting a number from a date to yield another date.
- Subtracting a date from a date to yield a number.

When you add numbers to dates or subtract numbers from dates, MapInfo Pro treats the numbers as specifying a number of days. When you add or subtract a week, you use the number 7.

When you add or subtract a month, you use 30 or 31. When MapInfo Pro subtracts a date from a date, the result indicates a number of days.

Using String Operators in Expressions

+	"concatenation" - connects strings and string expressions.
&	(can be used if preceded by a space)

Strings must be enclosed in double quotes. Consider the following example:

```
"Ms." + Last_Name
```

When MapInfo Pro evaluates this as part of an expression it places "Ms. " in front of each last name. Note that the string constant ("Ms. ") is in quotes. Similarly,

```
"Hello," + "world"
```

gives you "Hello, world." And

```
"4"+"5"
```

gives you "45."

Using Comparison Operators in Expressions

Use the **Expression** dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Pro dialog boxes. Comparison operators are often used in creating expressions. The following chart shows the comparison operator symbols and a description.

Operators	Description
=	"equals"
<>	"not equals"
>	"greater than"
<	"less than"
>=	"greater than or equal to"
<=	"less than or equal to"

Numerical Comparison

Numerical comparisons are based on the numerical values of the expressions and numerical constants.

English: All rows where the household income is above \$65,000.

1. HH_INC>65000

Comment: Do not add the dollar sign or comma. MapInfo Pro does not know what to do with it and gives you an error message.

English: All rows where the median age is 42.

1. MED_AGE=42

Comment: This expression selects only those records where the median age is exactly 42. When your median age data contains a decimal portion (which is the case for MapInfo Pro-supplied demographic data) then it is unlikely that there are many regions with a median age of exactly 42.

The following expression gives you better results:

1. Round(MED_AGE, 1)=42

Comment: The function "round(*somenumber*, *somenumber*)" rounds the first number in the way specified by the second. In this example, the first number is the median age (MED_AGE) and the second is 1, indicating that median age is to be rounded to the nearest whole number.

English: All rows where the amount does not equal \$23,000.

1. AMOUNT<>23000

Comment: You might want to use the Round function, as in 10, if you are not concerned that the value be exactly 23000.

String Comparison

String comparisons are based on the exact character content of the string. In this case ">" means "alphabetically greater than" (for example, comes after in the alphabet) and "<" means "alphabetically less than."

When typing a string into an expression, you should enclose it in quotes so that MapInfo Pro knows to treat it as a string, rather than treating it as a column name.

English: All rows where the vendor is Acme.

1. VENDOR="Acme"

Comment: Note that Acme is in quotes so that MapInfo Pro knows to treat it literally (as a character string) rather than to search for a column named Acme.

English: All rows where the vendor is not Acme.

1. VENDOR<>"Acme"

Date Comparison

English: All entries received on October 9, 1991.

1. RECEIVED="10-9-91"

Note: Consider these conventions:

- The date is enclosed in quotes
- It is in the form: Month, Day, Year
- The numbers in the data are separated by a hyphen or a slash (/)
- Two characters were used for the year. You can also use four characters (1991)

English: All received after October 9, 1991.

1. RECEIVED>"10-9-91"

Comment: This expression does not select those received on October 9, 1991. When you want them as well:

1. RECEIVED>="10-9-91"

English: Records for all received before August.

1. Month(RECEIVED)<8

Comment: This expression uses the Month function to extract the month in the date. It does not specify any particular year. When your database has records for several years, this expression does not pay attention to the particular year.

Logical Comparison

English: All that have shipped.

1. Shipped

Comment: The column "Shipped" is a logical column. It contains "T" for true, or yes, and "F" for false, or no. When an order is shipped, it is marked "T". Otherwise, it is not shipped. For orders that are shipped, expression 28 evaluates to true. For orders not shipped it evaluates to false.

English: All that have not shipped.

1. Str\$(Shipped)="F"
2. Not Shipped

Using Geographic Operators in Expressions

MapInfo Pro has several geographic operators. Use them to select objects on the basis of their spatial relationship to some other object. MapInfo Pro has a special keyword you use with geographical operators: "obj" or "object". This keyword tells MapInfo Pro that it has to get values based on the graphical objects in the table rather than the tabular data.

The geographic operators go between the objects being specified. Select the geographic operators from the Operators menu. Here are the geographic operators:

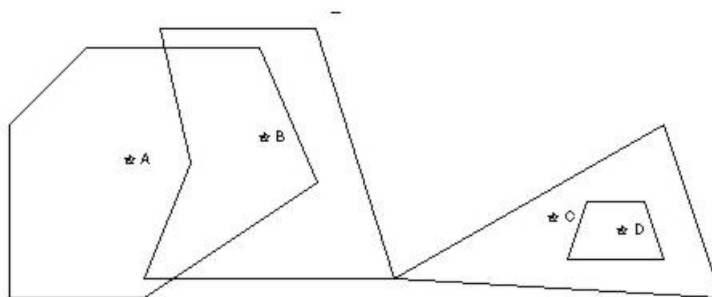
Contains	Object A Contains object B if B's centroid is anywhere within A's boundary.
Contains Entire	Object A Contains Entire object B if B's boundary is entirely within A's boundary.
Contains Part	Object A Contains Part object B if B's boundary is partly within A's boundary.

Within	Object A is Within object B if its centroid is inside B's boundary.
Entirely Within	Object A is Entirely Within object B if A's boundary is entirely within B's boundary.
Partly Within	Object A is Partly Within object B if A's boundary is partly within B's boundary.
Intersects	Object A Intersects object B if they have at least one point in common.

"Contains Part" and "Partly Within" are exactly equivalent to "Intersects"-these are all treated the same way by MapInfo Pro, so the standard syntax "Intersects" is almost universally used.

"Contains" and "Within" are concerned only with objects' centroids.

"Contains Entire" and "Entirely Within" are concerned with the area covered by a region object; the location of the centroid does not matter.



M - Object Centroid

Thus, if A, B, C, and D are all *regions*:

	A	B	C	D
Contains	Object A <i>contains</i> Object B		Object C <i>contains</i> Object D Object C <i>contains entire</i> Object D	
Intersects	Object A <i>intersects</i> Object B	Object B <i>intersects</i> Object A Object B <i>intersects</i> Object C	Object C <i>intersects</i> Object D	

	A	B	C	D
Does Not Intersect	Object A <i>does not intersect</i> Object C			
Does Not Contain		Object B <i>does not contain</i> Object A		Object D <i>does not contain</i> Object C

If A, B, C, and D are all *polylines*,

then the Contains and Within operators are not applicable, but:

	B	C	D
Intersects	Object B <i>intersects</i> Object A Object B <i>intersects</i> Object C		
Does Not Intersect		Object C <i>does not intersect</i> Object D	Object D <i>does not intersect</i> Object C

Similarly, a polyline can not *contain* a point, but it can *intersect* a point; a point can not be *within* a polyline, but it can *intersect* a polyline.

Note: MapInfo Pro can perform a simple Contains or Within comparison more rapidly than a Contains Entire or Entirely Within. Therefore, unless you must be absolutely sure that objects are completely inside other objects you should use Contains and Within rather than Contains Entire or Entirely Within.

Using Logical Operators in Expressions

"And", "or", and "not" are logical operators. You use them to combine expressions in Select and the Where Condition clause of SQL Select. MapInfo Pro treats each such an expression as a test, which it applies to each record in the table. For each test it gets a yes/no (true/false) answer. MapInfo Pro uses the logical operators to tell it how to combine the individual yes/no answers into an overall yes/no answer: Does the current record meet the selection condition?

Operator	Description
and	is "true" if (and only if) both of its arguments (the expressions it joins together) are true. A record must satisfy both of these conditions if it is to be selected.
or	is "true" if either one, or both, of its arguments (the expressions it joins together) are true. A record need satisfy only one of these conditions if it is to be selected. It is also selected if both of its conditions are satisfied.
not	is "true" if its argument (the expression it applies to) is false. A record is selected if it does not meet the stated condition.

Suppose you want to select all properties that are worth \$250,000 or more and are in Columbia county. Each record has to meet two criteria, each of which can be formulated as a simple expression:

- `VALUE >= 250000`
- `COUNTY = "Columbia"`

You could perform one selection for all properties worth \$250,000 or more. Then you could perform another selection on that result, looking for all properties in Columbia county. However, it is easier to combine the two operations into one using the logical operator "and".

- `COUNTY = "Columbia" and VALUE >= 250000`

When MapInfo Pro examines a record to see whether or not it meets the condition set by this expression, it makes the two tests: Does COUNTY equal Columbia? Is the VALUE equal to or greater than 250000? When the answer to both of these questions is true (or yes), then the record is accepted into the current selection. When the answer to one or both of the questions is no (or false), then the record is not accepted into the current selection.

Now, what if you want all properties worth \$250,000 or more and not in Columbia county? You can use "not" to negate the first clause of expression 33, yielding expression 34:

- `not (COUNTY="Columbia") and VALUE>=250000`

Only records where the county is not Columbia satisfy the first clause of expression 34. Now consider expression 35:

- `not (COUNTY="Columbia" and VALUE>=250000)`

Expression 35 is simply the negation of expression 33. Any record that would satisfy 33 does not satisfy 35. Any record that does not satisfy 33 satisfies 35.

You can use "or" when you want to specify alternative conditions, such as:

- `COUNTY="Columbia" or COUNTY="Greene"`

Any record evaluated against this condition is accepted if its county is any one of the two specified counties. One could, of course, use numerical tests as well. For example:

- `TOTAL_AREA>40` or `VALUE>250000`

This tests to see whether the area is greater than 40 or the value is greater than 250000. When either one is true of a record, then that record is accepted into the selection.

In formulating expressions using logical operators you have to be careful how you use them. The following expression, while it seems OK, does not work:

- `COUNTY="Columbia" or "Greene"`

Judging from its English translation-COUNTY equals Columbia or Greene-this expression should operate just like expression 36 and give us any record containing Columbia County or Greene County. But the rules of computational logic and the rules of English are a bit different.

When MapInfo Pro reads expressions it reads them from left to right. One of the things it has to do is to determine how the items in the expression are grouped. Think of this operation as inserting parentheses into the expression. MapInfo Pro reads expression 35 as though it were grouped like expression 39, which is what we intend.

It reads expression 38 as though it were grouped like 40, which is not at all what we want.

- `(COUNTY="Columbia") or (COUNTY="Greene")`
- `(COUNTY="Columbia") or ("Greene")`

Both 39 and 40 have the same first clause. But their second clauses (after the "or") are quite different. The second clause of 40 is simply a literal string, "Greene." By convention, MapInfo Pro evaluates a record against a literal string as being true if that record is not blank. When MapInfo Pro evaluates records against expression 40, all non-blank records are evaluated as true and be accepted into the selection. It does not make any difference how a record evaluates on the first clause. Any non-blank record evaluates as true on the second clause, and one "true" is all it takes to evaluate the entire expression as true.

Let us consider one final example, which is the negation of expression 36:

- `not (COUNTY="Greene" or COUNTY="Columbia")`

Expression 39 is satisfied if the county is Greene or if it is Columbia, but not if it is Montgomery or Warren. Expression 41 is satisfied by any county other than Greene or Columbia, including Montgomery and Warren.

Numeric Clauses

English: All the household income is above \$65,000 and the median age is 42.

- `HH_INC>=65000` and `Round(MED_AGE, 1)=42`

Comment: This expression simply consists of two clauses. The clauses are connected by "and", that means that both clauses must be true of a record for it to be selected.

English: All with a price between \$50,000 and \$100,000.

- PRICE>=50000 and PRICE<=100000

Comment: Now we are setting two conditions that a record must satisfy in order to be selected. By using the operators "greater than or equal to" (>=) and "less than or equal to" (<=) we ensure that the records with the exact prices of \$50,000 and \$100,000 are selected. When we had simply used "greater than" (>) and "less than" (<), the expression would select \$50,001 and \$99,999 but not \$50,000 or \$100,000.

English: All with a price between \$50,000 and \$100,000 or between \$150,000 and \$200,000.

- (PRICE>=50000 and PRICE<=100000) or (PRICE>=150000 and PRICE<=200000)

Comment: This expression has the overall form: (*expression1*) or (*expression2*). Each of these expressions has the same form as expression 36. When a row meets the condition specified by either *expression1* or *expression2*, MapInfo Pro puts the row into the selection.

String Clauses

English: All customers from N to Q.

- LAST_NAME >= "N" and LAST_NAME <"R"

Comment: The first part of the expression checks for names that are either alphabetically equal to "n" or that are alphabetically greater than (after) "n". The second part of the expression checks for names that are alphabetically less than (before) "r". Any name starting with letters "n" through "q" satisfies this condition.

English: All customers from N to Z.

Note: MapInfo Pro comparison operators for strings are not case-sensitive.

- LAST_NAME >= "N"

Comment: Since "z" is the last letter in the alphabet, there is no need to test for it. There cannot be any customers with a last name starting with some letter beyond "z".

English: All customers whose last name begins with C.

- LAST_NAME>="C" and LAST_NAME<"D"

Comment: The logic of this expression is the same as the logic for expression 48.

English: All customers whose last name is between "Ce . . ." and "Cn . . ."

- LAST_NAME=>"CE" and LAST_NAME<"CO"

Comment: The logic of this expression is the same as the logic for expression 46.

English: All not from Texas.

- not STATE="TX"

Comment: The expression causes MapInfo Pro to check the contents of the STATE column. When there is an entry other than "TX" the row is selected.

Date Clauses

English: Records for all received in August 1990

- Month(RECEIVED)=8 and Year(RECEIVED)=1990

Comment: In this expression we specify the year explicitly, using the "year(<somecolumn>)" function to extract it from the date.

- RECEIVED>="8-1-90" and RECEIVED<="8-31-90"

Comment: In this expression we do not explicitly ask for month and year. Instead, we rethink a bit and use an expression that might more accurately be rendered in English as: Records for all received on or after August 1, 1990 and on or before August 31, 1990. The two expressions give equivalent results, but they are formulated differently.

English: Records for all received in July or September

- Month(RECEIVED)=7 or Month(RECEIVED)=9

Comment: As in a previous example, no year for the dates. Depending on the data in your table and what you are trying to achieve, that may or may not be a problem.

When you want to specify the year:

English: Records for all received in July or September of 1989

- month(RECEIVED)=any(7, 9) and year(RECEIVED)=89

Comment: The first clause of this expression uses the keyword "any". The first clause is satisfied if any of the items in parenthesis match the month received - in this case, the months of July and September.

Keyword Clauses

MapInfo Pro supports the use of keywords "any", "all", "in" and "between". These keywords must be typed into expressions.

Use "any" to select any item in a set of items.

- ABBR = any("AL", "MN", "TX")

Expression 54 is true of any record where the state is Alabama, Minnesota, or Texas.

To understand the use of "all" consider expression 55:

- ABBR <> all("AL", "MN", "TX")

This statement says: Give me all orders where the state does not equal Alabama, Minnesota, or Texas. It selects all orders *except* those from Alabama, Minnesota or Texas. Consider what would happen if we issued 56:

- ABBR <> any("AL", "MN", "TX")

Orders from Alabama would be selected because they are not from either Minnesota or Texas; and orders from Minnesota and Texas would be selected for a similar reason.

This example, shows the use of "in":

- ABBR in("AL", "MN", "TX")

This produces the same result as 54.

Note that "in" is equivalent to "=any" and "not in" is equivalent to "<>all".

Finally, consider 58 and 59, which illustrate "between":

- PRICE between 50000 and 100000
- (PRICE between 50000 and 100000) or (PRICE between 150000 and 200000)

These are equivalent to expressions 43 and 44 respectively. You can also use between with character strings (such as are in examples 48, 50, and 51).

Understanding Operator Precedence

When MapInfo Pro evaluates expressions it needs to know which components of an expression to evaluate first. This is called precedence. By convention, certain operators are assigned different levels of precedence. Those with the highest level are evaluated first. The following table lists MapInfo Pro's operators in the order in which they are evaluated. Exponentiation evaluates from the right. This affects expressions with multiple exponents: $2^{-3^{-4}} = 2^{-(3^{-4})}$

Operators at the same level of precedence are evaluated from left to right.

Highest Priority:	Parenthesis
	Exponentiation
	Negation
	Multiplication, Division
	Addition, Subtraction
	Geographic operators, Comparison operators
	Not
	And
Lowest Priority:	Or

For example, the expression $3+4*2$ produces a result of 11. That is because multiplication has a higher precedence than addition and is performed first, in effect:

```
3+4*2=
3+8=
11
```

We can add parenthesis to force MapInfo Pro to do the addition first:

```
(3+4) *2=
7*2=
14
```

Now consider expression 60, which is intended to select all records July or September of 1989.

1. `year(RECEIVED)=89 and month(RECEIVED)=7 or month(RECEIVED)=9`

Because "and" has higher precedence than "or", MapInfo Pro treats this expression as though "year(RECEIVED)=89 and month(RECEIVED)=7" was enclosed in parentheses.

1. `(year(RECEIVED)=89 and month(RECEIVED)=7) or month(RECEIVED)=9`

In this case, any record for July of 89 or for September of any year would be selected. That is probably not what you want. However, by adding parentheses to the second expression, you can get this:

1. `year(RECEIVED)=89 and (month(RECEIVED)=7 or month(RECEIVED)=9)`

In this expression, the parentheses tell MapInfo Pro that "month(RECEIVED)=7" and "month(RECEIVED)=9" are alternatives in the second clause of the expression. MapInfo Pro treats this the same as it treats number 53 above.

Note: When you are not sure how MapInfo Pro evaluates an expression with several operators, you should use parentheses to group elements as you want them.

See Also:

[Using Functions in Expressions](#)

Using Functions in Expressions

Functions take data values and perform some operation on them to produce a new value. Functions have the following form:

`SomeFunction(parameters)`

Most of MapInfo Pro's functions take one or two parameters. A parameter can be a column or another expression. MapInfo Pro uses the keyword "obj" or "object" with the geographic functions: Area, CentroidX, CentroidY, ObjectLen, and Perimeter. This keyword tells MapInfo Pro that it has to get values based on graphical objects in the table rather than tabular data.

Abs

Syntax: `Abs(num_expr)`

Action: Returns the absolute value of a numerical expression. When the expression has a value greater than zero, Abs returns that value. When the expression has a value less than zero, Abs returns a value equal to the value of the expression multiplied by negative one.

Example: Consider the following expression:

1. Abs(numA-numB)

(returns the absolute difference between numA and numB, regardless of which is larger)

The following illustrates how Abs works:

```
Abs (5) = 5
Abs (-3) = 3
Abs (-0.02) = 0.02
```

Area

Syntax: Area(obj, *units*)

Action: Returns the area of the object. Returns 0 if the object has no area or there is no object for the record. Arcs, text, points, lines, and polylines do not have areas. When you choose Area from a menu, the "obj" keyword is placed between the parentheses with the current unit in double-quotes. In most cases the current unit is square miles. To specify another unit, type the unit between quotes.

The units available are:	Unit Name
square miles	"sq mi"
square kilometers	"sq km"
square inches	"sq in"
square feet	"sq ft"
square survey feet	"sq survey ft"
square yards	"sq yd"
square millimeters	"sq mm"

The units available are:**Unit Name**

square centimeters	"sq cm"
square meters	"sq m"
square chains	"sq ch"
square links	"sq li"
square rods	"sq rd"
perches	"perch"
roods	"rood"
acres	"acre"
hectares	"hectare"

Examples: To select all rows for objects that have an area greater than 59 square miles:

1. `Area(obj,"sq mi")>59`

To calculate the population density for an object:

1. `Population/Area(obj,"sq mi")`

To select all rows for objects with a population density less than 250 people per unit area:

1. `Population/Area(obj,"sq mi")<250`

When you want the area in hectares:

1. `Area(obj,"hectare")`

When you want the area in square kilometers:

1. `Area(obj,"sq km")`

CentroidX

Syntax: CentroidX(object)

Action: Returns the x coordinate of the centroid of the object, which is the longitude value for earth maps. The centroid is usually the center of the object's minimum bounding rectangle (MBR).

The value is in decimal degrees if the coordinates are latitudes and longitudes. The value is in whatever units were specified for the table if its coordinates are not latitudes and longitudes.

Examples: To select all objects west of New York City:

1. CentroidX(obj)<-73.997890

To select all objects east of New York City:

1. CentroidX(obj)>-73.997890

CentroidY

Syntax: CentroidY(object)

Action: Returns the y centroid of the object, which is the latitude value for earth maps.

The value is in decimal degrees if the coordinates are latitudes and longitudes. The value is in whatever units were specified for the table if its coordinates are not latitudes and longitudes.

Examples: To select all objects north of New York City:

1. CentroidY(obj)>40.750450

To select all objects south of New York City:

1. CentroidY(obj)<40.750450

To select all objects northeast of New York City:

1. CentroidX(obj)>-73.997890 and CentroidY(obj)>40.750450

The first clause in the expression selects objects east of New York City while the second clause in the expression selects objects north of New York City. Because the two clauses are joined by "and" an object must satisfy both clauses to be selected.

To select all objects that are either north or east of New York City:

1. CentroidX(obj)>-73.997890 or CentroidY(obj)>40.750450

The first clause in the expression selects objects east of New York City while the second clause in the expression selects objects north of New York City. Because the two clauses are joined by "or" an object needs to satisfy only one of them in order to be selected.

Chr\$

Syntax: Chr\$(num_expr)

Action: Chr\$ interprets the value of *num_expr* as a character value. It returns the character corresponding to that value. Accordingly, *num_expr* should be an integer between 0 and 255.

Example: You might want to have labels with information on two lines. You can use Chr\$ to insert a carriage return into a label expression. The ANSI value for a carriage return is 13. Assume that you

want the first line of a label to be a country name and the second line of a label to be the county population.

The following expression produces that result:

1. `Proper$(County)+Chr$(13)+Population`

Note: Some BASIC languages use the convention `Chr$(10)` to represent a line feed. MapBasic allows you to specify either `Chr$(13)` or `Chr$(10)`.

Cos

Syntax: `Cos(num_expr)`

Action: The Cos function returns the cosine of the value of a numeric expression, where that expression represents an angle expressed in radians.

CurDate

Syntax: `CurDate()`

Action: Returns a date value representing the current date.

Examples: To enter the current date into a column:

1. `CurDate()`

You might use this in conjunction with Update Column where you want to enter the current date into some column.

To select all received 30 or more days ago:

1. `Received<=CurDate()-30`

Day

Syntax: `Day(datefield)`

Action: Returns the day of the month from the date. The day is represented as an integer from one (1) to thirty-one (31).

Examples: To select all rows where the date is the first of the month:

1. `Day(date)=1`

To select all rows where the day is Friday and the date is not the thirteenth:

1. `Weekday(date)=6 and Day(date)<>13`

This expression has two clauses. The first clause uses the Weekday function to select records where the day of the week is a Friday. The second clause uses the Day function to select records where the day of the month does not equal (<>) 13. Since the two clauses are connected by "and" both clauses must be true for a row to be selected.

Distance

Syntax: `Distance(x1, y1, x2, y2, units)`

x1 and x2 are East-West (Longitude) coordinates for earth maps

y1 and y2 are North-South (Latitude) coordinates for earth maps

Units is the current distance unit

Action: Calculates the distance between two points.

When you choose Distance from a menu the "obj" keyword is placed between the parentheses along with the current unit in double-quotes. In most cases the current unit is miles.

When you want distance to be in some other unit, you should type the unit in, between quotes. The units available are:

Unit Name	Unit Represented
"mi"	miles
"km"	kilometers
"in"	inches
"ft"	feet
"survey ft"	survey feet
"li"	links
"rd"	rods
"ch"	chains
"yd"	yards
"mm"	millimeters
"cm"	centimeters

Unit Name	Unit Represented
"m"	meters
"nmi"	nautical miles (1 nautical mile represents 1852 meters)

Examples: To calculate the distance between some objects and New York City, located at -73.997890 longitude and 40.750450 latitude:

1. Distance(-73.997890, 40.750450, CentroidX(obj), CentroidY(obj), "mi")

To select all objects west of New York and not more than 20 miles from it:

1. CentroidX(obj) < -73.997890 and Distance(-73.997890, 40.750450, CentroidX(obj), CentroidY(obj), "mi") <= 20

This expression has two clauses. The first clause specifies that an object must be west of New York to be selected. The second clause specifies that an object must be no more than twenty miles from New York in order to be selected. Since the two clauses are connected by "and" both must be true if an object is to be selected.

Format\$

Syntax: Format\$ (*value*, *pattern*)

value is a numeric expression

pattern is a string that specifies how to format the results

Action: Produces a string representation of the numeric value *num_expr*.

Examples: The Format\$() function produces a specially-formatted character string that incorporates a numeric value (specified by the *value* parameter). The Format\$() function can embed a variety of formatting characters (for example currency symbols such as \$, %, periods, and commas) to make the result string more readable or more aesthetically pleasing. Given a numeric value such as 12345.67, your program can use the Format\$() function to produce formatted results, such as \$12,345.67.

The Format\$() function's *value* parameter represents the numeric value that you want to format. The *pattern* parameter is a string of code characters, carefully chosen (by you) to produce a particular type of formatted result. The *pattern* string should include one or more special format characters, such as #, 0, %, the comma character, the period, or the semicolon character; these characters control how the results looks. The *pattern* string can also include one or more cosmetic characters, such as \$, -, (, or), to make the results more attractive.

The next table summarizes the format characters.

Pattern Control Characters	Role in formatting results
#	The result includes one or more digits from the value. However, if the control string contains one or more # characters to the left of the decimal place, and the value is between zero and one, the formatted result string may not include a zero before the decimal place.
0	A digit placeholder similar to the # character; however, if the control string contains one or more 0 characters to the left of the decimal place, and the value is between zero and one, the formatted result string includes a zero before the decimal place.
.	The period character is used in conjunction with the # character. When the pattern string includes a period character, then the number of # characters to the right of the period dictates the number of decimal places that the result string displays.
,	When you include a comma character before the first # character, the result string includes a comma every three digits to the left of the decimal place. The number ten million would appear as "10,000,000" rather than "10000000".
%	The result represents the value multiplied by one hundred; a value of 0.75 produces a result string of "75%". When you wish to include a percent sign in your result, but you do not want MapBasic to multiply the value by one hundred, place a \ (backslash) character before the percent sign.
E+	The result is formatted according to scientific notation; for example, the value 1234 produce the result "1.234e+03". When the exponent is positive, a plus sign appears after the "e". When the exponent is negative (which is the case for fractional numbers), a minus sign appears after the "e".
E-	This string of control characters functions just as the "E+" string, except that the result never shows a plus sign following the "e".

Pattern Control Characters	Role in formatting results
;	By including a semicolon in your pattern string, you can specify one format for positive numbers and another format for negative numbers. The semicolon should appear after the first set of format characters, and before the second set of format characters. The second set of format characters applies to negative numbers. If the pattern string includes a <i>second</i> semicolon, the third format string (following the second semicolon) will be used to format the special-case value of 0 (zero).
-	When your pattern string includes both positive and negative formats in this fashion, the result does not automatically include a minus sign. When you wish to include a minus sign in the results, you should include a "-" character in the second set of format characters. See examples in next table.
\	When the backslash character appears in a pattern string, MapBasic does not perform any special processing for the character that follows the backslash. This allows you to include special characters (such as the percent sign) in the results, without causing the special formatting actions described above.

In the next table, the left column shows sample strings that you could use as the Format\$() function's *pattern* parameter. The middle column shows sample numbers, such as you might use as the *value* parameter. The right column shows the results that Format\$() would return, given the parameters from the left columns.

Pattern	Value Parameter	Format\$() Returns:
" ,#"	12345	"12,345"
" ,#"	-12345	"-12,345"
"\$#"	12345	"\$12345"
"\$#"	-12345	"-\$12345"

Pattern	Value Parameter	Format\$() Returns:
"\$,#"	12345	"\$12,345"
"\$,#"	-12345	"-\$12,345"
"\$,#.##"	12345.678	"\$12,345.68"
"\$,#.##"	-12345.678	"-\$12,345.68"
"\$,#.##,(\$,#.##)"	12345.678	"\$12,345.68"
"\$,#.##,(\$,#.##)"	-12345.678	"(\$12,345.68)"
",#.####"	12345.6789	"12,345.679"
",#.##"	12345.6789	"12,345.7"
"#.##"	12345.6789	"12345.7"
"#.###E+###"	12345.6789	"1.235e+04"
"#.###E+###"	-12345.6789	"-1.235e+04"
"#.###E+###"	0.054321	"5.432e-02"
"#.###E-##"	12345.6789	"1.235e04"
"#.###E-##"	0.054321	"5.432e-02"
"#%"	0.054321	"5%"

Pattern	Value Parameter	Format\$() Returns:
"#.##%"	0.054321	"5.43%"
"#.##\%"	0.054321	".05%"
"0.##\%"	0.054321	"0.05%"

InStr

Syntax: InStr(*position*, *string*, *substring*)

Action: InStr tests whether or not some *string* has a specific *substring*. MapInfo Pro searches *string* starting at the character position specified by *position*. When *position* is one, MapInfo Pro starts searching at the beginning of *string*. When it has the value 6, MapInfo Pro starts searching at the sixth character in *string*.

When *string* contains *substring*, InStr returns the character position where *substring* starts.

Note: When *string* does not contain *substring*, InStr returns zero.

Example: You are preparing to geocode a file and you want to identify all the entries with Post Office boxes for addresses. That means you want all entries that have the string "box" in their address column. They may also have "P.O.", but you cannot be sure of that. Nor can you be sure of how "box" is capitalized in the entries. Here is your expression:

```
1. InStr(1,UCase$(ADDRESS),"BOX")>0
```

This expression directs MapInfo Pro to search the Address column for the string "BOX". All entries containing this string are selected.

For example, *if* your data looks like this:

"This is a test of the insert function."

You want to find the position of "test." The INSTR function will look like this:

```
INSTR(1,"This is a test of the insert function", "test")
```

When this statement is executed, the value 11 will be returned.

Note: If the string that you are searching for does not exist, the value 0 will be returned.

Int

Syntax: Int(*num_expr*)

Action: Returns the nearest integer that is less than or equal to the specified value (*num_expr*).

Examples: The following table shows how Int treats various values:

Number	Int(Number)
5.2	5
5.999	5
-7.8	-8
-7.2	-8

When you apply Int to a Logical variable type, it will produce a 1 if the Logical value is TRUE, or 0 if the Logical value is FALSE.

It is also possible to evaluate logical expressions with Int. For example:

1. Int(STATE_NAME="Maine")

returns an integer value of 1 if the State_Name column or variable contains the string "Maine", or an integer value of 0 if State_Name contains any other string value.

LCase\$

Syntax: LCase\$(string)

Action: Returns the lower case of the string.

Examples: Consider the following expression:

1. LCase\$(CITY)

The following table shows how LCase\$ converts an input string (from a column in your table) into a returned string:

Input String	Returned String
NEW YORK	new york
New york	new york

Input String	Returned String
new york	new york

Left\$

Syntax: Left\$(*string*, *number*)

Action: Returns a string that consists of the leftmost *number* of characters in *string*.

Examples: Consider the following expression:

1. Left\$(CITY,5)

The following table shows how that expression converts an input string into a returned string:

Input String	Returned String
New York City	New Y
Denver	Denve
Singapore	Singa

Now consider the following expression, where Phone is a column containing telephone numbers prefixed by area codes:

1. Left\$(PHONE,3)="404"

This expression selects all rows where the first three digits of the phone number are "404". Note that the Phone column contains character data and therefore the comparison value, 404, has to be in quotes so MapInfo Pro knows to treat it as a character string.

see also: Right\$, Mid\$

Len

Syntax: Len(*string*)

Action: Returns the number of characters in a string.

LTrim\$

Syntax: LTrim\$(*string*)

Action: LTrim\$ removes any non-printing characters (for example spaces, TABs) from the beginning of *string*.

see also: RTrim\$

Maximum

Syntax: Maximum(num_expr, num_expr)

Action: Maximum returns the larger of two numbers.

Example: To find the highest address number for a street segment in a StreetPro file:

1. Maximum(TOLEFT,TORIGHT)

ToLeft is the highest address number on the left side of a segment and ToRight is the highest address number of the right side of a segment.

Mid\$

Syntax: Mid\$(string, position, length)

string is a character expression

position is an integer indicating a starting position in string

length is an integer indicating the number of characters to extract

Action: Mid\$ returns a string of a set *length*, starting at given *position*, in a specified *string*.

Examples: Consider the following expression:

1. Mid\$(CITY,5,4)

The following table shows how that expression converts an input string into a returned string:

Input String	Returned String
New York City	York
Denver	er
Singapore	apor

Note: The expression only returned two characters from "Denver". That is because "Denver" is too short to have a four-character string starting at its fifth character.

Minimum

Syntax: Minimum(num_expr, num_expr)

Action: Minimum returns the smaller of two numbers.

Examples: To find the lowest address number for a street segment in a StreetPro file:

1. Minimum(FROMLEFT, FROMRIGHT)

FromLeft is the highest address number on the left side of a segment and FromRight is the highest address number of the right side of a segment.

Month

Syntax: Month(*datefield*)

Action: Returns the month of the date as a number, 1 through 12.

Examples: To select all received in August:

1. Month(received)=8

To select all received before August:

1. Month(received)<8

To select all received in August 1990:

1. Month(received)=8 and Year(received)=1990

This expression has two clauses. The first specifies that the month must be August and the second that the year must be 1990. The clauses are connected by the AND operator and so both must be True for a row to be selected.

To select all received in August or September:

1. Month(received)=8 or Month(received)=9

This expression has two clauses. The first selects rows where the month is August and the second selects rows where the month is September. Since the clauses are connected by "or" only one must be True for a row to be selected.

To select all received in August or September:

1. Month(received)=any(8,9)

This expression achieves the same result as 92, but is formulated using the keyword "any".

To select all received in August or September of 1990:

1. Month(received)=any(8,9) and Year(received)=1990

This expression has two clauses. The first selects rows where the month is August or September and the second selects rows where the year is 1990. The clauses are connected by the AND operator and so both must be True for a row to be selected.

ObjectLen

Syntax: ObjectLen(*obj*, *unit*)

Action: Returns the length of lines and polylines. Returns a value of 0 for other objects.

When you choose ObjectLen from a menu place the "obj" keyword between the parentheses along with the current unit in double-quotes. In most cases the current unit is miles. When you want length to be in some other unit, type the unit using double quotes. The units available are:

Unit Name	Unit Represented
"mi"	miles
"km"	kilometers
"in"	inches
"ft"	feet
"survey ft"	survey feet
"yd"	yards
"mm"	millimeters
"cm"	centimeters
"li"	links
"rd"	rods
"ch"	chains
"m"	meters
"nmi"	nautical miles (1 nautical mile = 1852 meters)

Examples: To calculate the length of an object:

1. `ObjectLen(obj, "mi")`

To have the length calculated in kilometers:

1. `ObjectLen(obj, "km")`

To have the length calculated in nautical miles:

1. `ObjectLen(obj, "nmi")`

When you wanted to convert from kilometers to miles you would use a conversion factor of .621.

To select all objects more than 10 miles long:

1. `ObjectLen(obj, "mi")>10`

Perimeter

Syntax: `Perimeter(obj, unit)`

Action: Returns the perimeter of the object for regions, ellipses, rectangles, and rounded rectangles. When you choose Perimeter from a menu the "obj" keyword is placed between the parentheses along with the current unit in double-quotes. In most cases the current unit is miles.

When you want perimeter to be in some other unit, you should type the unit using double quotes. See the table above for the available units.

Examples: To calculate the perimeter of an object:

1. `Perimeter(obj, "mi")`

To calculate the perimeter in kilometers:

1. `Perimeter(obj, "km")`

To calculate the Perimeter in meters"

1. `Perimeter(obj, "m")`

To select all objects with a perimeter greater than 35 miles long:

1. `Perimeter(obj, "mi")>35`

Proper\$

Syntax: `Proper$(string)`

Action: Returns a string that has the first letter of each word capitalized and all other letters lowercase.

Examples: Consider the following expression:

1. `Proper$(CITY)`

This table shows how the Proper\$ function reformats a column in your table:

Original text	Reformatted text
NEW YORK	New York
New yorK	New York
new york	New York
New York	New York

Right\$()

Syntax: Right\$(string_expr, num_expr)

Action: Returns part or all of a string beginning at the right end of the string.

Example:

1. Right\$(CITY, 4)

The following table shows how that expression converts an input string into a returned string:

Input String	Returned String
New York City	City
Denver	nver
Singapore	pore

see also: Left\$, Mid\$

Round

Syntax: Round(number1, number2)

Action: Returns the rounded number1. number2 specifies how to round it.

Examples: Consider the following expression:

1. Round(number1,number2)

The next table gives examples. The first column contains the function arguments (*number1*, *number2*) and the second column contains the rounded result.

Arguments	Rounded Number
14347,10000	10000
14347, 100	14300
14347, 10	14350
12.18353, .1	12.20000
12.18353, .001	12.18400

To select all rows where the median age is 42, you might use the following expression:

1. Round(MED_AGE, 1)=42

Depending on your data, this expression may give better results than one that compares median age directly with a target value (*MED_AGE=42*). The median age column in MapInfo Pro's STATES table has the median age calculated to one decimal place. When we compare those values directly with 42 MapInfo Pro would not select records where the median age is, for example, 41.7, 42.1, or 42.4. Yet we probably want those records. By rounding the median age value to a whole number, we can get those values.

RTrim\$

Syntax: RTrim\$(*string*)

Action: RTrim\$ removes any white-space characters (for example, spaces, and TABs) from the end of *string*.

see also: LTrim\$

Sin

Syntax: Sin(*num_expr*)

Action: The Sin function returns the sine of the value of a numeric expression, where that expression represents an angle expressed in radians.

Str\$

Syntax: Str\$(*expr*)

Action: Str\$ converts a numerical expression into a string that represents it. When the numerical expression is negative the first character in the string will be a negative sign (-). The first character returned for a positive value is the *first number*. If the expression is an object, Str\$() returns a string describing the type of object (for example, "region"). If the expression is a Logical (true/false) value, Str\$ returns "T" for true or "F" for false.

When applied to a Float variable type, Str\$ will produce a text string representing the floating-point number rounded to:

- Seven digits of precision (total of 7 non-zero digits, including any number of leading or trailing zeroes depending on the location of the decimal point) if the number is less than 100,000.
- The nearest hundredth (.01) if the number is greater than or equal to 10,000.

To control the number of digits of accuracy displayed in a string, use the Format\$() function.

UCase\$

Syntax: UCase\$(*string*)

Action: Returns the upper case of the string.

Examples: Consider the following expression:

1. UCase\$(CITY)

This table shows how it converts an input string (from a column in your table) into a returned string:

Input String	Returned String
NEW YORK	NEW YORK
New yorK	NEW YORK
new york	NEW YORK

see *also*: Lcase\$, Proper\$

Val

Syntax: Val(*char_expr*)

Action: The Val function extracts a numerical value from a character expression. It ignores any tabs, spaces, and line feeds at the start of a string and then tries to interpret the first sequence of numeric characters as a numerical value. It stops processing the string as soon as it finds a non-numeric character.

Note: Except that it will also accept a minus (hyphen) sign and a decimal point (period), for example, Val ("-9.9") = -9.9. When the first character after initial tabs, spaces, and line feeds is not a numeric character, Val returns a value of zero.

Examples: The following table illustrates how Val extracts a numerical value from an input string:

char_expr	Val(char_expr)
12 thousand	12
52 - 62 Brunswick	52
Eighteen	0
Box 239	0

Weekday

Syntax: Weekday(*datefield*)

Action: Returns the day of the week from the data. The day is given as a number between 1 and 7. 1 is Sunday and 7 is Saturday.

Examples: To select all rows where the weekday is Wednesday:

1. Weekday(date)=4

To select all rows where the weekday is Wednesday, Thursday, or Friday:

1. Weekday(date)=any(4,5,6)

The "any" keyword directs MapInfo Pro to select any row where the week day is one of the specified days.

To select all rows where the day is Friday and the month is July:

1. Weekday(date)=6 and Month(date)=7

This expression has two clauses. The first clause uses the Weekday function to select records where the day of the week is a Friday. The second clause uses the Month function to select records where the month is July. Since the two clauses are connected by the AND operator, both clauses must be True for a row to be selected.

Year

Syntax: Year(*datefield*)

Action: Returns the year of the date.

Examples: To find all orders received in 1990:

1. Year(date)=1990

To find all orders received in 1990 or 1991:

1. Year(date)=any(1990,1991)

To find all orders received between 1985 and 1990, including those orders received in 1985 and 1990:

1. Year(date)>=1985 and Year(date)<=1990

This expression has two clauses. The first selects all rows where the date is 1985 or greater. The second clause selects all rows where the date is 1990 or less. Both clauses must be satisfied for a row to be selected.

Using Keywords in Expressions

Use the **Expression** dialog box to formulate mathematical and alphanumeric expressions in several MapInfo Pro dialog boxes.

MapInfo Pro supports the use of the keywords "any", "all", "in" and "between". These keywords must be typed into expressions.

Use "any" to select any item in a set of items.

```
ABBR = any("AL", "MN", "TX")
```

Any is true of any record where the state is Alabama, Minnesota, or Texas.

To understand the use of "all" consider this expression:

```
ABBR <> all("AL", "MN", "TX")
```

This statement says: Give me all orders where the state does not equal Alabama, Minnesota, or Texas. It selects all orders except those from Alabama, Minnesota or Texas. Consider what happens when we issue the following:

```
ABBR <> any("AL", "MN", "TX")
```

The following example shows the use of "in":

```
ABBR in("AL", "MN", "TX")
```

In this case "in" is equivalent to "=any" and "not in" is equivalent to "<>all".

Finally, consider these two examples that illustrate "between":

```
PRICE between 50000 and 100000
```

```
(PRICE between 50000 and 100000) or (PRICE between 150000 and 200000)
```

Working with Data in a DBMS

MapInfo Pro lets you access data where it lives, on your machine or on the network, in flat files, such as Microsoft Excel files or MapInfo Pro native (.tab) files, in a Database Management System (DBMS), or from a web service.

This section addresses the special circumstances that surround accessing data from a SQL Server, Oracle Spatial, or PostgreSQL with PostGIS database for use with MapInfo Pro, which requires setting up a database connection.

This section also discusses how to set up your connection to Microsoft Access.

For database versions that MapInfo Pro supports, see the *MapInfo Pro Install Guide*.

Getting Started

To access data from a DBMS, you need to set up a connection to it. In addition, any DBMS tables that contain spatial data that you want to see on a map must have a record created for them in a special table called the MapInfo Map Catalog. This record contains information about the spatial data. The process of creating this record is called "making the table mappable". An overview of the setup process is provided under [Overview of the DBMS Access Setup Process](#).

You can access the following types of spatial database servers. To locate the version numbers that MapInfo Pro supports, see the *MapInfo Pro Install Guide*.

- Microsoft SQL Server (also called SQL Server Spatial)
- Microsoft SQL Server with SpatialWare
- Oracle Spatial
- PostgreSQL with PostGIS

You can work with point and textual data from:

- Microsoft Access
- Any Open Database Connectivity (ODBC) database

This document refers to accessing data from a DBMS or a web service as "remote data access".

Note: You can access ESRI SDE and Geo databases in read-only mode through Universal Data, see [Displaying your ESRI Shapefile Data](#).

Overview of the DBMS Access Setup Process

Install a Database Driver

Access to a database server is through a DBMS driver, which you install on to your machine and is specific to the DBMS you want to connect to. A driver allows MapInfo Pro to connect to the database. Each type of database supplies its own driver. You may need to obtain the driver from your database administrator and have your database administrator help you set up properties for the driver after installing it.

For the version numbers that MapInfo Pro supports, see the *MapInfo Pro Install Guide*.

Prepare your Connection and Database

To work with your DBMS data in MapInfo Pro, you need to set up your database connection by following the steps in the sections:

1. Creating a Data Source Connection

There may be prerequisites, in addition to installing a driver, that you need to connect and work with a database. Each of the following sections provides details:

- [Creating a Data Source Connection to SQL Server](#)
- [Creating a Data Source Connection to PostGIS](#)
- [Creating a Data Source Connection to Oracle](#)

When you connect to a data server, you will have two choices: to use windows authentication or to provide a username and password unique to the data server. Windows authentication is the username and password you use to log in to your network. Depending on how your database server is set up, you may only require your windows authentication to log in. Otherwise, you would provide a username and password that is unique to the server. Your database administrator will tell you whether or not you can use your windows authentication or a username and password specific to the server.

2. Creating a Map Catalog in the DBMS

Your database administrator may need to grant you specific access privileges to the database to work with the data. The following section gives details:

- [Before you Begin Creating a Map Catalog Table](#).

3. Adding a Spatial Primary Key to a DBMS Table

To view your data on a map in MapInfo Pro it must contain geometry data (polygon regions) or X and Y data (coordinates, such as Latitude and Longitude values). This is what displays on the map as regions or points. The geometry column or X and Y columns must have specific names

for MapInfo Pro to recognize them, and the table requires a unique spatial primary key for MapInfo Pro to reference the data on a map.

4. **Making a DBMS Table Mappable to Display it on a Map**

Access your Data

After setting up your database connection, you are ready to work with your data in MapInfo Pro, see [Opening a DBMS Table in MapInfo Pro](#).

For details, see:

- [Working with SQL Server Tables](#)
- [Working with PostGIS Tables](#)
- [Working with Oracle Spatial Tables](#)

If your data includes spatial data, which can be columns holding X and Y values, such as Latitude/Longitude, or a column holding spatial data in the format specified by the database system. With no spatial information, you can work with your data in a table browser (a Browser window) in MapInfo Pro.

If your data does not include coordinate information, then consider geocoding, adding the coordinate information, using a Precisely product, such as MapMarker or Spectrum.

Troubleshoot or Enhance Performance

If you encounter issues, see [Troubleshooting your DBMS Access](#). To improve your data access performance, see [Improving Data Performance to a DBMS](#).

Requirements

When accessing remote data sources:

- The table you access must have a spatial column or two numeric columns to hold X and Y coordinate values.
- The view must have a key column named MI_PRINX to make the view mappable.

PostGIS users: MapInfo Pro treats all views in a PostGIS database as read only, because there is no way to determine if the view can be used for update.

Sharing Data with other Applications

The following sections discuss how to work with data in MapInfo Pro that is shared by other users and applications in your organization.

- [Sharing Data with Autodesk's AutoCAD Map 3D](#)
- [Sharing Custom Symbols in a Workgroup Directory](#)

Creating a Data Source Connection

The first step to working with data in a DBMS is setting up a data source connection on your machine to the DBMS. This is necessary for a DBMS installed on to your machine or on the network. SQL Server and PostGIS require an Open Database Connectivity (ODBC) connection and Oracle Spatial requires an Oracle Call Interface (OCI) connection.

Note: Use an OCI connection to Oracle for spatial data. You can use an ODBC connection to any ODBC compatible database and to older versions of Oracle with non-spatial data.

You must have the ODBC driver or OCI installed on your machine before creating a data source connection. MapInfo Pro installs or updates Windows ODBC drivers if they are older than the version that MapInfo Pro supports. For non-Windows databases, such as Oracle and PostgreSQL with PostGIS, consult with your database administrator for information on how to obtain and install the driver provided with your database.

You can create a data source connection:

- Through MapInfo Pro's interface.
- Through MapInfo EasyLoader's interface, see the *MapInfo EasyLoader User Guide*.
- From your Microsoft Start menu: on the **Start** menu, click **Control Panel**, click **Administrative Tools**, and click **Data Sources (ODBC)**.

You must set up a data source connection for each DBMS that you plan to work with.

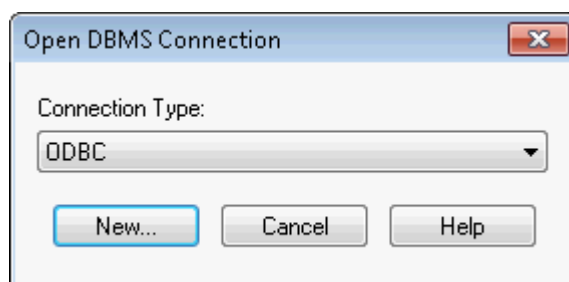
Creating a Data Source Connection to SQL Server

Before you begin, you need a SQL Server driver installed on your machine. Check with your database administrator to install the driver for your database.

You need to know the SQL Server name, and the login ID and password if required.

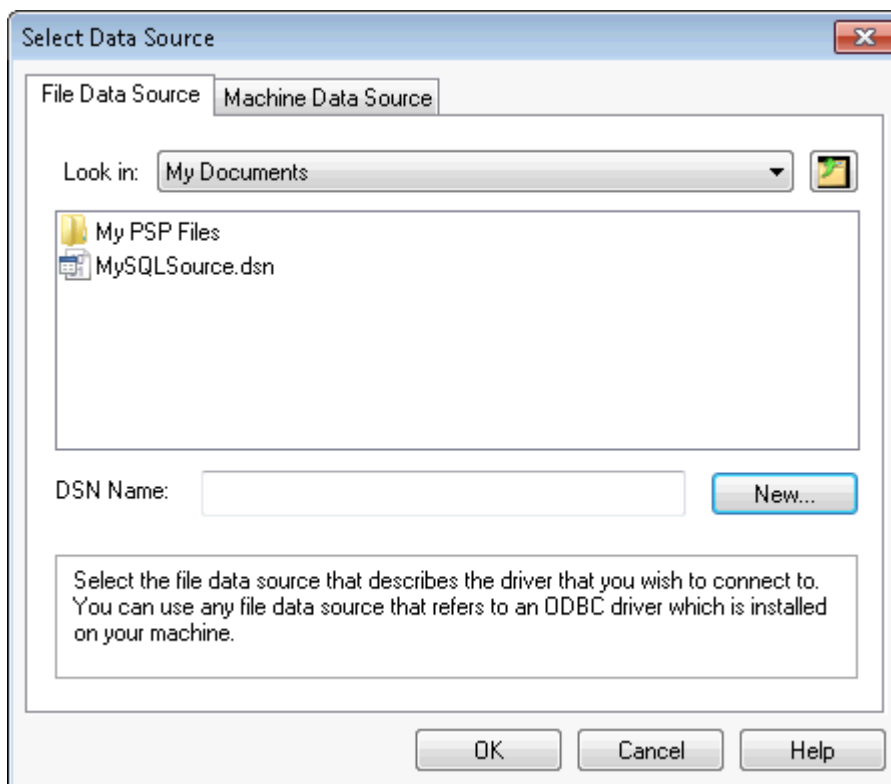
To create a new SQL Server data source connection:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table**. This can also be done from the **TABLE** and **MAP** tabs.
2. If the **Open DBMS Connection** dialog box opens, select **ODBC** from the list and then click **New**.



3. In the **Select Data Source** dialog box, select either the **File Data Source** or the **Machine Data Source** tab and then click **New**.

You can share the connection information for a file data source with other users on the network if they have the necessary drivers, because it is stored in a file. You cannot share the connection information for a machine data source, because it is stored in the registry on the local computer.

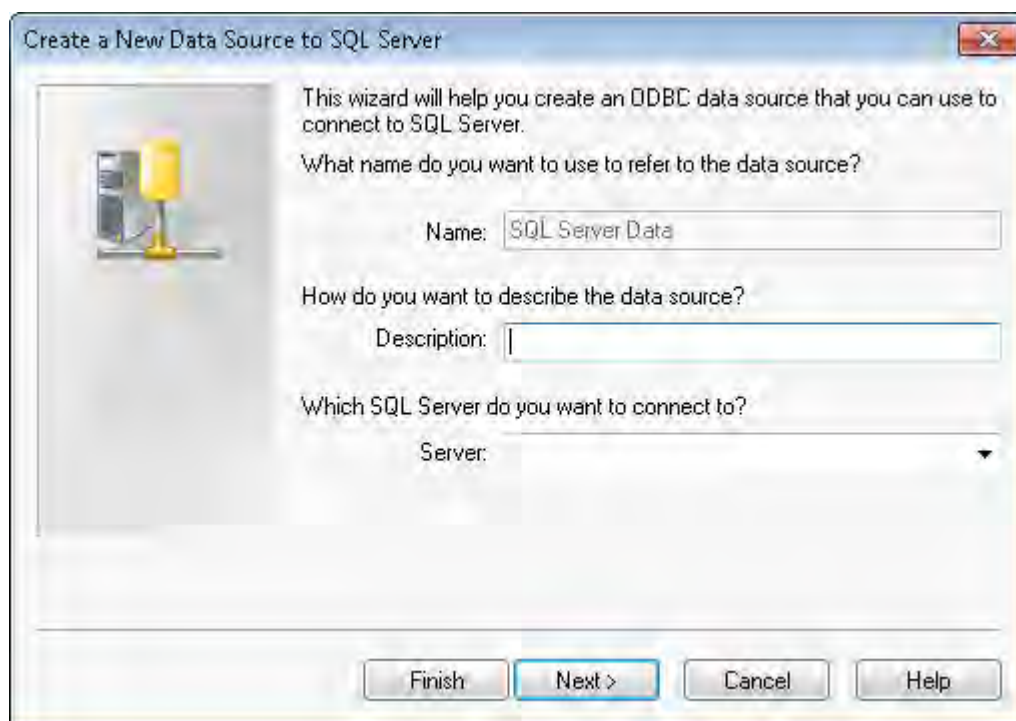


4. In the **Create New Data Source** wizard:
 - a. Select the type of data source to create: **User Data Source** or **System Data Source**. Make a selection to display the description for it in the wizard. Click **Next** to continue.
 - b. From the driver name list, select the **SQL Server** driver you have installed for the database and then click **Next**.
 - c. Click **Finish**.
5. In the **Create a New Data Source to SQL Server** wizard set the following. If you are unsure of the settings to use for your database, consult with your database administrator.
 - a. In the first screen provide the following information:

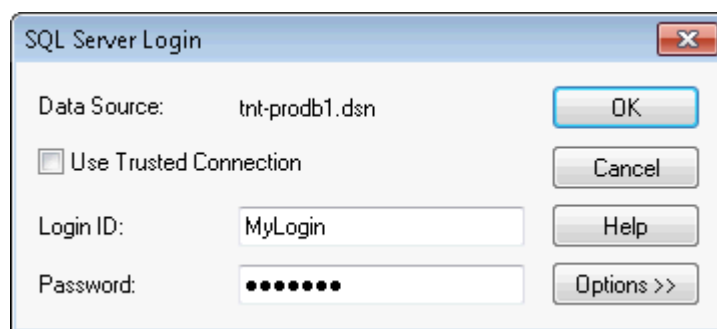
Description - Optionally, type a description if you plan on connecting to more than one database and would like a description for this connection.

From the **Server** list either select from the list or type the name of the SQL Server to connect to.

Click **Next**.



- b. In the next screen, select how SQL Server will verify the authenticity of the login ID.
Optionally select to connect to SQL Server to obtain default settings for more configuration options. Click **Next**.
 - c. Keep the default settings (check with your database administrator) and click **Next**.
 - d. Keep the default settings (check with your database administrator) and click **Finish**.
6. In the **ODBC Microsoft SQL Server Setup** dialog box, click **Test Data Source**.
7. In the **SQL Server ODBC Data Source Test** dialog box, click **OK**.
If there were errors, click **OK** to return to the **ODBC Microsoft SQL Server Setup** dialog box. Click **Cancel** to return to the **Create a New Data Source to SQL Server** wizard and use the **Back** button to view your settings and make changes. Return to [step 5](#).
8. In the **ODBC Microsoft SQL Server Setup** dialog box, click **OK**.
9. In the **Select Data Source** dialog box, under the Machine Data Source tab, your new SQL Server connection displays in the list of available data source connections. Click **OK**.
10. In the **SQL Server Login** dialog box, type your login ID and password if required and click **OK**.



You must now create a map catalog for the database, continue to [Creating a Map Catalog Table Using MapInfo EasyLoader](#).

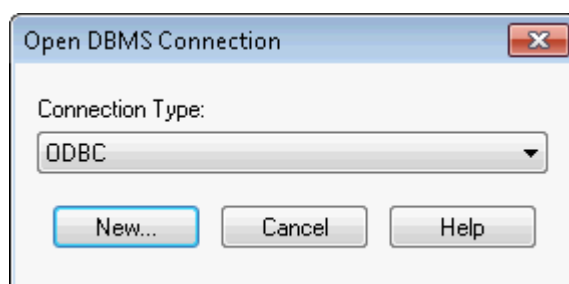
Creating a Data Source Connection to PostGIS

Before you begin, you need a PostgreSQL Unicode ODBC driver (psqlODBC) installed on your machine. Check with your database administrator to install the driver for your database. Ensure that your database administrator adds your machine IP address to the `pg_hba.conf` file for the database you want to connect to.

You need to know the database name, server name, username and password to the database, and whether or not you need a specific SSL Mode or Port number.

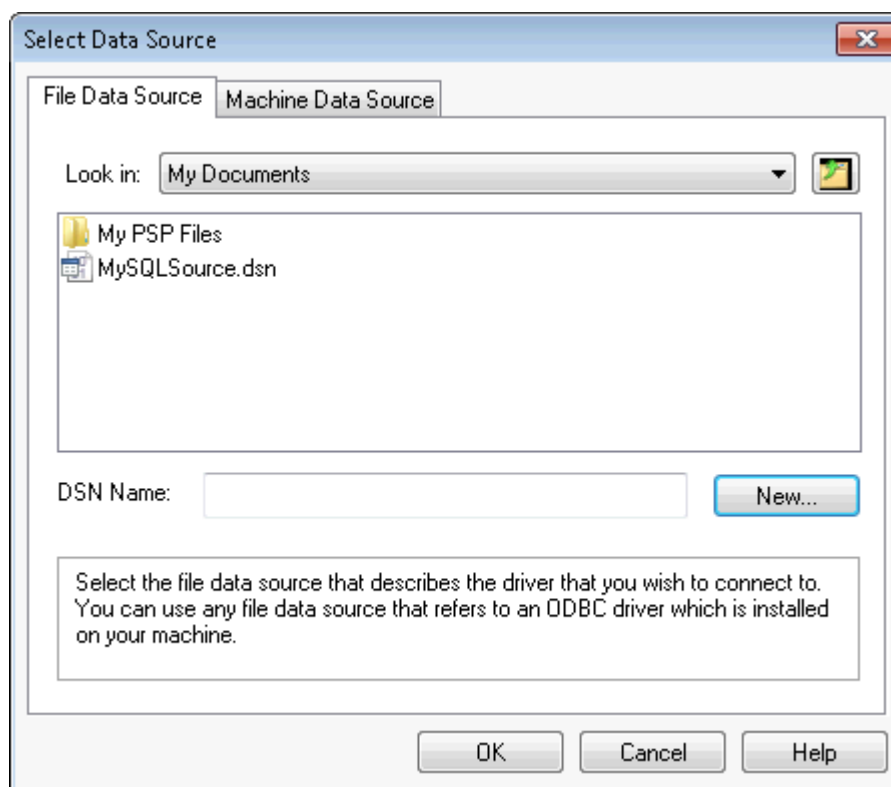
To create a new PostgreSQL PostGIS data source connection:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table**. This can also be done on the **TABLE** and **MAP** tabs.
2. If the **Open DBMS Connection** dialog box opens, select **ODBC** from the list and then click **New**.

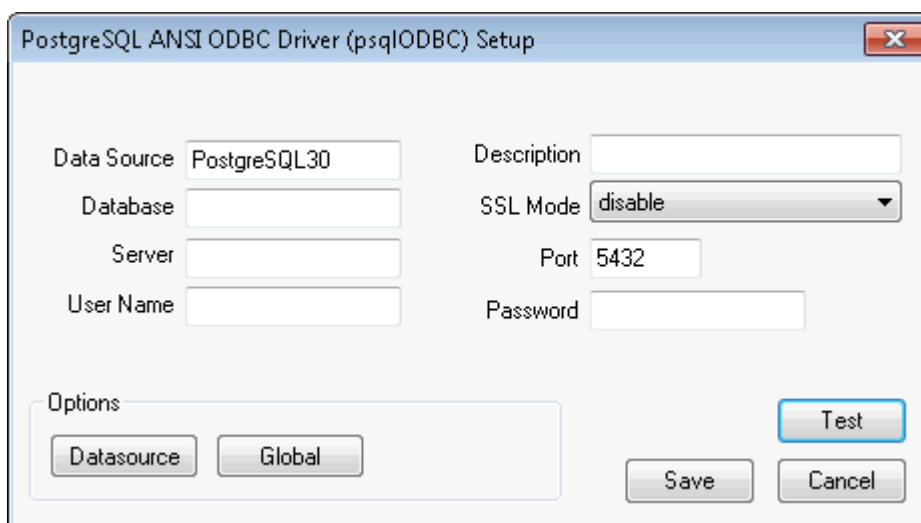


3. In the **Select Data Source** dialog box, select either the **File Data Source** or the **Machine Data Source** tab and then click **New**.

You can share the connection information for a file data source with other users on the network if they have the necessary drivers, because it is stored in a file. You cannot share the connection information for a machine data source, because it is stored in the registry on the local computer.



4. In the **Create New Data Source** wizard:
 - a. Select the type of data source to create: **User Data Source** or **System Data Source**. Make a selection to display the description for it in the wizard. Click **Next** to continue.
 - b. From the driver name list, select the **PostgreSQL Unicode** driver and then click **Next**.
 - c. Click **Finish**.
5. In the **PostgreSQL Unicode ODBC Driver (psqlODBC) Setup** dialog box, set the following. If you are unsure of the settings to use for your database, consult with your database administrator.
 - **Data Source** - Provide a name for this data source. This is the name you will see after setting up this connection in the **Select Data Source** dialog box.
 - **Database** - The name of the PostGIS database that you want to connect to.
 - **Server** - The name of the machine where PostGIS is installed.
 - **User Name** - The username for accessing the database.
 - **Password** - The password for accessing the database.
 - **Description** - Optionally, type a description if you plan on connecting to more than one database and would like a description for this connection.
 - **SSL Mode** - Use the default value.
 - **Port** - Use the default value.



Click **Test** to ensure that your connection works.

Click **Datasource** (or **Connection** depending on the PostGIS driver).

6. In the **Advanced Options** dialog box, select the **Use Declare/Fetch** check box and then click **OK**.

Selecting this option improves the processing time when connecting to larger databases.

7. In the **PostgreSQL Unicode ODBC Driver (psqlODBC) Setup** dialog box, click **Save** to set your connection.
8. In the **Select Data Source** dialog box, under the Machine Data Source tab, your new PostGIS connection displays in the list of available data source connections. Click **OK**.

You must now create a map catalog for the database, continue to [Creating a Map Catalog Table Using MapInfo EasyLoader](#).

Creating a Data Source Connection to Oracle

Before you begin, you will need the following installed on your machine:

- Oracle Client - connects to an Oracle database.
- TCP/IP - a communications protocol required by Oracle Client to communicate on the network
- Oracle SQL*Net - for performing SQL queries to the database (optional).

Have your database administrator check that the:

- `tnsnames.ora` file is correctly configured on your machine for the server you want to connect to.
- Service to the database is configured-they may need to run the Net Configuration Assistant utility that Oracle provides to configure the service.
- TCP/IP working properly (using `ping.EXE`).
- Environment variable **TNS_ADMIN** is correctly set to your client_1 path (the Oracle Client installation directory).

To create a new Oracle Spatial data source connection, set up your Oracle Driver:

1. On the **Start** menu, click **All Programs**, click **Oracle**, click **Configuration and Migration Tools**, and then click **Microsoft ODBC Administrator**.
2. In the ODBC Data Source Administrator, under the **User DSN** tab, click **Add**.
3. In the **Create New Data Source** wizard:
 - a. From the driver name list, select the **Oracle in OraClient** driver and then click **Next**.
 - b. Click **Finish** to install the driver.
4. In the **ODBC Text Setup** dialog box, set the following:
 - **Data Source Name** - Provide a name for this data source. This is the name you will see after setting up this connection in the **Select Data Source** dialog box.
 - **Description** - Optionally, type a description if you plan on connecting to more than one database and would like a description for this connection.

Click **OK**.

To set up your Oracle Spatial connection in MapInfo Pro:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table**. This can also be done on the **TABLE** and **MAP** tabs.
2. In the **Open DBMS Connection** dialog box, select **Oracle Spatial** from the list and then click **New**.
3. In the **MapInfo Oracle Connect** dialog box enter the following information:
 - **User Name** - The username for accessing the database.
 - **Password** - The password for accessing the database.
 - **Server Name** - The name of the Oracle database that you want to connect to.

Optionally, check the **Use Operating System Authentication** check box to use your Windows authentication when accessing this Oracle database.

Click **OK**.

You have an active connection to your Oracle database. You must now create a map catalog for the database, continue to [Creating a Map Catalog Table Using MapInfo EasyLoader](#).

In the **MapInfo Oracle Connect** dialog box, you have the option to check the **Use Operating System Authentication** check box. With OS authentication, your database relies on the underlying operating system to restrict access to database accounts. A database password is not used for this type of login. For additional information, refer to [Oracle Operating System Authentication and Configuration](#).

Creating a Data Source Connection to Microsoft Access

You can work with your Microsoft Access database from MapInfo Pro through an ODBC connection. Microsoft Access does not allow spatial data, but you can display in MapInfo Pro data that has X and Y coordinate values associated with it.

Before you Begin

Before you begin, you must have the Microsoft Access Driver installed on your machine-the driver is installed by default with your Microsoft Access. The driver is necessary for establishing an ODBC connection to the data source.

To check that the driver is installed on your machine, run the ODBC Administrator:

1. Open the Control Panel; on the **Start** menu, click **Control Panel**.
2. In the Control Panel, in the **Classic View**, click **Administrative Tools**, and click **Data Sources ODBC (ODBC)**.
3. In the **Data Sources ODBC Administrator** dialog box, select the **User DSN** tab.
4. In the list, locate and select the **MS Access Database**. Or, if you do not see this name, then under the **Driver** list look for **Microsoft Access Driver(.mdb or .accdb)**.
5. Click **Configure** to ensure that it is properly set up.

If the driver is not there, then click **Add** to check if the Access driver is installed. You may need to install the Microsoft Access drivers. These are included with Microsoft Access, Microsoft Office Professional, ODBC SDK, Visual C++, MapInfo Pro, or purchased separately.

To verify if this is the required version of this driver, select the **Drivers** tab in the ODBC Administrator. Locate the **MS Access Driver** (.MDB or .ACCDB) and check that it is the latest version.

To add a new Microsoft Access Data Source

1. Run the ODBC Administrator.
2. Under the **User DSN** tab, click **Add**.
3. In the **Create New Data Source** wizard, select **MS Access Driver (.MDB or .ACCDB)** from the list and click **Finish**.
4. In the **ODBC Microsoft Access Setup** dialog box, in the **Data Source Name** box, type in a name for the data source. (This is the name that appears in the list when you connect from MapInfo Pro.) Click **Select**.
5. In the **Select Database** dialog box, select the Microsoft Access database you wish to use and then click **OK**.

If you do not select a database for this data source, a prompt displays during the connection to do so. MapInfo Pro provides a sample Microsoft Access database.

Limitation

in Microsoft Access, if the key is set to character, then it does not display rows when the key value is less than the full column width: for example, if the key is set to char(5), then the value `aaaa` looks like a deleted row.

Reconnecting to your Data Source after Startup

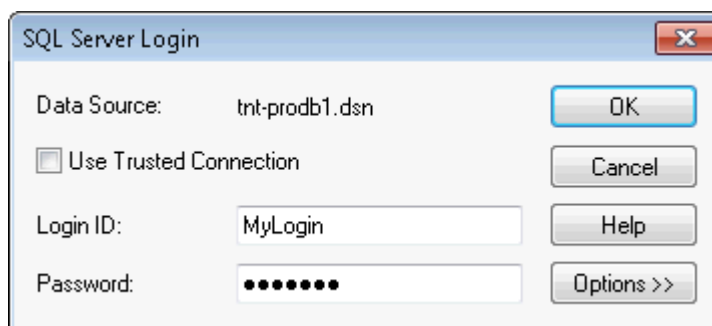
Each time you start MapInfo Pro, you must set the connection to your database before you can work with tables. The connection remains active while MapInfo Pro is open. The connection closes when you exit MapInfo Pro.

The following instructions are applicable to SQL Server and PostGIS users. **Oracle** users, see [Connecting to Oracle after Re-Starting MapInfo Pro](#).

To open a connection to your database:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table**. This can also be done on the **TABLE** and **MAP** tabs.
2. If the **Open DBMS Connection** dialog box opens, select **ODBC** from the list and then click **New**.
3. In the **Select Data Source** dialog box:
 - a. Select the **Machine Data Source** tab.
 - b. From the Data Source name list, select your connection name.
 - c. Click **OK**.

You may see a login dialog box for your database connection. If you see this dialog, then provide the information required, such as user name and password for the database. For example, SQL Server users may see the following:



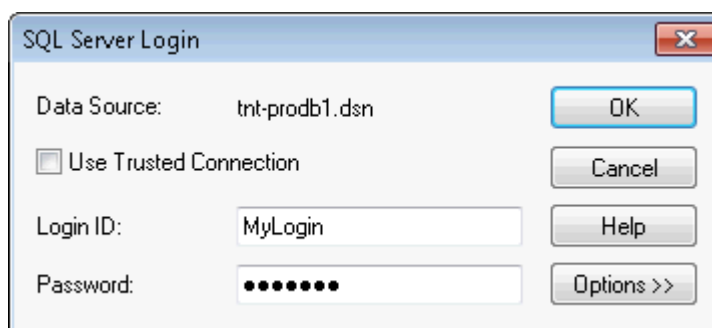
You are now ready to open a table. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** and then from the **Files of type** list, select your data source name from the list to display the table in your database.

Connecting and Opening a Table at the Same Time

To open a connection to your database and then open a table in the database:

1. On the **HOME** tab, in the **File** group, click **Open**, and **Table**.
2. In the **Open** dialog box, select the **Open DBMS Connection** button.
3. If the **Open DBMS Connection** dialog box displays, select **ODBC** from the list and then click **New**.
4. In the **Select Data Source** dialog box:
 - a. Select the **Machine Data Source** tab.
 - b. From the Data Source name list, select your connection name.
 - c. Click **OK**.

You may see a login dialog box for your database connection. If you see this dialog, then provide the information required, such as user name and password for the database. For example, SQL Server users may see the following:



5. In the **Open** dialog box schema and tables in your database display. If you do not see this, then from the **Files of type** list, select your data source name.
6. Select the table to open from the list and click **Open**.

You are now ready to work with your table.

Connecting to Oracle after Re-Starting MapInfo Pro

To open a connection to your Oracle database:


1. On the **HOME** tab, in the **File** group, click **Open**, and **Database Table**.
2. In the **Open DBMS Connection** dialog box, select **Oracle Spatial** from the list and then click **New**.
3. In the **MapInfo Oracle Connect** dialog box enter the following information:
 - **User Name** - The username for accessing the database.
 - **Password** - The password for accessing the database.
 - **Server Name** - The name of the Oracle database that you want to connect to.

Click **OK**.

You are now ready to open a table. To do this, on the **HOME** tab, in the **File** group, click **Open**, and **Table**. In the **Open** dialog box, from the **Files of type** list, select **Oracle** to display the table in your Oracle database.

Connecting to Oracle and Opening a Table at the Same Time

To open a connection to your Oracle database and then open a table in the database:

1. On the **HOME** tab, in the **File** group, click **Open**, and **Table**.
2. In the **Open** dialog box, select the **Open DBMS Connection**  button.
3. In the **Open DBMS Connection** dialog box, select **Oracle Spatial** from the list and then click **New**.
4. In the **MapInfo Oracle Connect** dialog box:
 - **User Name** - The username for accessing the database.
 - **Password** - The password for accessing the database.
 - **Server Name** - The name of the Oracle database that you want to connect to.

Click **OK**.

5. In the **Open** dialog box schema and tables in your Oracle database display. If you do not see this, then from the **Files of type** list, select **Oracle** or your data source name.
6. Select the table to open from the list and click **Open**.

You are now ready to work with your Oracle table.

About Supported DBMS Data Types

This section provides a list of supported data types and any data restrictions for SQL Server, PostGIS, and Oracle.

SQL Server Data Support

Read-Only Support for Spatial Objects in SQL Server with Z and M Values

Spatial data that is stored in SQL Server Spatial Geometry and Geography field types may have Z and M values. MapInfo Pro cannot edit this type of spatial data and ignores the Z and M values, so you must view these tables as read-only in MapInfo Pro. If you edit this type of spatial data in MapInfo Pro, saving the table back to the original SQL Server Spatial table does not preserve the original Z and M values.

The MapInfo_MapCatalog has the following spatial types for tables with Z and M values:

- 20 - Geometry read-only support of objects with Z/M values.
- 21 - Geography read-only support of objects with Z/M values

Supported SQL Server ODBC Data Types

These are the ODBC data types that MapInfo Pro supports:

- SQL_BIT
- SQL_TINYINT
- SQL_SMALLINT
- SQL_INTEGER:
- SQL_REAL
- SQL_BIGINT
- SQL_DECIMAL
- SQL_DOUBLE
- SQL_FLOAT
- SQL_NUMERIC
- SQL_BINARY
- SQL_LONGVARBINARY
- SQL_VARBINARY
- SQL_LONGVARCHAR
- SQL_DATE
- SQL_TYPE_DATE
- SQL_TIMESTAMP
- SQL_TYPE_TIMESTAMP
- SQL_TIME
- SQL_TYPE_TIME
- SQL_CHAR
- SQL_VARCHAR

PostGIS Data Support

Supported PostGIS Column Types

MapInfo Pro supports all data types. Please note that PostGIS is case sensitive.

Oracle Data Support

Working with Oracle Spatial Data

MapInfo Pro uses Oracle Spatial for Oracle tables (XY is supported via OCI). MapInfo Pro does not support HH_CODE (and the old version of SDO index types).

Supported Oracle Data Types

The following lists non-spatial data types from Oracle Spatial and what they are treated as in MapInfo Pro:

From Oracle	to MapInfo Pro
RAW, LONG RAW	BinaryString up to 127 bytes shown as Hex characters
Named type	MIOject
Named Object type (SDO_GEOM)	MIOject
BLOB, CLOB	Not Supported
CHAR, VARCHAR, LONG, LONG VARCHAR	Character
Number, Decimal	if no scale or precision: Float else Decimal
INTEGER	Integer
FLOAT	Float
DATE	Date

MapInfo Pro captures many Oracle data types and translates them into MapInfo native types. When the column is updated, Oracle data makes sure that the data being bound is translated into the column format (for example, MapInfo Pro can bind a character as a long and send it through to Oracle and on the other end it will be translated into a long number in the table).

Spatial Object Types from Oracle Spatial to MapInfo Pro

From Oracle: GTYPES	to MapInfo Pro
0 UNKNOWN_GEOMETRY (Spatial ignores this geometry.)	NULL
1 POINT Geometry contains one point.	Point

From Oracle: GTYPES

to MapInfo Pro

2 LINESTRING Geometry contains one line string.	Line (if only 2 pts) or Polyline if > 2 pts)
3 POLYGON Geometry contains one polygon.	Region
4 Collection Geometry is a heterogeneous collection of elements.	Collection
5 MULTIPOINT Geometry has multiple points.	MultiPoint
6 MULTILINESTRING Geometry has multiple line strings. Poly-line	Region
7 MULTIPOLYGON Geometry has multiple polygons (more than one exterior boundary).	Region

Geometry Conversions from Oracle Spatial to MapInfo Pro

The following lists Oracle Spatial geometry types and what they convert to in MapInfo Pro.

Geometry Type	Converted to MapInfo Type	Comments
Circular Arc	Polyline	Circular Arcs are made up of three coordinates, starting point, any point on the arc, and ending point. MapInfo Pro will use these three points to form a polyline representing the arc.
Circle	Region	Circles are made up of three coordinates on the circumference of the circle. MapInfo Pro will use these three points to form a circular region.
Rectangle	Region	

Geometry Type	Converted to MapInfo Type	Comments
MULTIPOINT	Multipoint	
COLLECTION {Point (cluster), Line String, Multiple Line String, Polygon, Multiple Polygon}	Collection {Multipoint, Polyline, Region}	
Unknown or invalid geometries or user defined.		Oracle currently does not have a mechanism to check the validity of objects. MapInfo Pro will perform some geometry checks. If MapInfo Pro detects an invalid or an unknown geometry, it will return a null object to prevent errors. No error message will display to notify users of the null geometries.

MapInfo Pro can download some or all of an Oracle Spatial table through either a spatial query or attribute query.

Note: To select a Multipoint object within a region (for example, Select Object within Selection), the first point of the Multipoint object must be within the region. Otherwise, the Select statement fails. The same rule applies to Collections containing Multipoint objects. Lines and Polygons in Collections should work correctly.

SQL Server and PostGIS to MapInfo Pro Data Type Information

In Microsoft SQL Server and PostgreSQL PostGIS, each column, local variable, expression, and parameter has a related data type, which is an attribute that specifies the type of data (integer, character, money, and so on) that the object can hold.

SQL Server supplies a set of system data types that define all of the types of data that can be used with SQL Server. The set of system-supplied data types is shown in this section along with information for PostgreSQL / PostGIS.

SQL Server Data Type Equivalence Table

User-defined data types, which are aliases for system-supplied data types, can also be defined. For more information about user-defined data types, see `sp_addtype` and Creating User-defined Data Types.

When two expressions that have different data types, collations, precision, scale, or length are combined by an operator:

- The data type of the resulting value is determined by applying the rules of data type precedence to the data types of the input expressions. For more information, see [Data Type Precedence](#).
- If the result data type is char, varchar, text, nchar, nvarchar, or ntext, the collation of the result value is determined by the rules of collation precedence. For more information, see [Collation Precedence](#).
- The precision, scale, and length of the result depend on the precision, scale, and length of the input expressions. For more information, see [Precision, Scale, and Length](#).

SQL Server provides data type synonyms for SQL-92 compatibility. For more information, see [Data Type Synonyms](#).

SQL Server 2000

Data Category	SQL Server 2000	MapInfo Pro
Integers	bigint Integer (whole number) data from -2^{63} (-9223372036854775808) through $2^{63}-1$ (9223372036854775807).	LargeInt
	int Integer (whole number) data from -2^{31} (-2,147,483,648) through $2^{31} - 1$ (2,147,483,647).	Integer
	smallint Integer data from 2^{15} (-32,768) through $2^{15} - 1$ (32,767).	Small Integer
	tinyint Integer data from 0 through 255.	Small Integer
Bit	bit Integer with a 1 or 0 value.	Logical

Decimal and Numeric	decimal Fixed precision and scale numeric data from $-10^{38} + 1$ through $10^{38} - 1$.	Decimal
	numeric Functionally equivalent to a decimal	Decimal
money and smallmoney	money Monetary data values from -2^{63} ($-922,337,203,685,477.5808$) through $2^{63} - 1$ ($+922,337,203,685,477.5807$), with accuracy to a ten-thousandth of a monetary unit.	Float
	smallmoney Monetary data values from $-214,748.3648$ through $+214,748.3647$, with accuracy to a ten-thousandth of a monetary unit.	Decimal
Approximate Numerics	float Floating precision number data from $-1.79E + 308$ through $1.79E + 308$.	Float
	real Floating precision number data from $-3.40E + 38$ through $3.40E + 38$.	Float
datetime and smalldatetime	datetime Date and time data from January 1, 1753, through December 31, 9999, with an accuracy of three-hundredths of a second, or 3.33 milliseconds.	Date
	smalldatetime Date and time data from January 1, 1900, through June 6, 2079, with an accuracy of one minute.	Date

Character Strings	<p>char</p> <p>Fixed-length non-Unicode character data with a maximum length of 8,000 characters.</p>	Char
	<p>varchar</p> <p>Variable-length non-Unicode data with a maximum of 8,000 characters.</p>	Char
	<p>text</p> <p>Variable-length non-Unicode data with a maximum length of $2^{31} - 1$ (2,147,483,647) characters.</p>	Char(256) Read Only
Unicode Character Strings	<p>nchar</p> <p>Fixed-length Unicode data with a maximum length of 4,000 characters.</p>	Not supported
	<p>nvarchar</p> <p>Variable-length Unicode data with a maximum length of 4,000 characters. sysname is a system-supplied user-defined data type that is functionally equivalent to nvarchar(128) and is used to reference database object names.</p>	Char Read only
	<p>ntext</p> <p>Variable-length Unicode data with a maximum length of $2^{30} - 1$ (1,073,741,823) characters.</p>	Not supported

Binary Strings	binary Fixed-length binary data with a maximum length of 8,000 bytes.	Char Read only
	varbinary Variable-length binary data with a maximum length of 8,000 bytes.	Char Read only
	image Variable-length binary data with a maximum length of $2^{31} - 1$ (2,147,483,647) bytes.	Char(256) Read Only
Other Data Types	sql variant A data type that stores values of various SQL Server-supported data types, except text, ntext, timestamp, and sql_variant.	Via SpatialWare support for St_Spatial
	timestamp A database-wide unique number that gets updated every time a row gets updated.	Char Read only
	uniqueidentifier A globally unique identifier (GUID).	Not supported

SQL Server 2005

For SQL Server 2005, refer to the [SQL Server 2000](#) server data type equivalence table with the following addition:

Data Category	SQL Server 2005	MapInfo Pro
XML	XML The SQL Server 2005 XML data type implements the ISO SQL-2003 standard XML data type.	Not Supported

SQL Server 2008

For SQL Server 2008, refer to the [SQL Server 2000](#) and [SQL Server 2005](#) server data type equivalence tables with the following additions:

Data Category	SQL Server 2008	MapInfo Pro
Spatial	geometry Supports planar, or Euclidean (flat-earth), data, and conforms to the Open Geospatial Consortium (OGC) Simple Features for SQL Specification version 1.1.0.	MapInfo Map Object
	geography Stores ellipsoidal (round-earth) data, such as GPS latitude and longitude coordinates.	MapInfo Map Object
Date	Date	Date
	TIME Similar to the Date datatype. Used to store only time information.	Time
	DATETIMEOFFSET Saving the date and time in a column does not indicate time zone information.	Character Read Only
	DateTime2 A date/time datatype with larger fractional seconds and year range than the existing DATETIME datatype.	DateTime

PostgreSQL / PostGIS Data Type Equivalence Table

Data Category	PostgreSQL/PostGIS	MapInfo Pro
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Integers

bigint Integer (whole number) data from -2^{63} (-9223372036854775808) through $2^{63}-1$ (9223372036854775807).	LargeInt
Double Precision double precision floating-point number	Float
int2 Integer data from 2^{15} (-32,768) through $2^{15} - 1$ (32,767).	Small Integer
int4 Integer (whole number) data from -2^{31} (-2,147,483,648) through $2^{31} - 1$ (2,147,483,647).	Integer
int8 Integer (whole number) data from -2^{63} (-9223372036854775808) through $2^{63}-1$ (9223372036854775807).	Float
int Integer (whole number) data from -2^{31} (-2,147,483,648) through $2^{31} - 1$ (2,147,483,647).	Integer
Serial/Serial4 auto incrementing four-byte integer	Integer
Serial8 auto incrementing integer (whole number) data from -2^{63} (-9223372036854775808) through $2^{63}-1$ (9223372036854775807).	Float
	Small Integer

	<small>int</small> Integer data from 2^{15} (-32,768) through $2^{15} - 1$ (32,767).	
Bit	<small>bit</small> Integer with a 1 and 0	Character
	<small>bit varying</small> Integer of 1 and 0	Character
	<small>Varbit</small> Integer of 1 and 0	Character
Decimal and Numeric	<small>decimal</small> Fixed precision and scale numeric data from $-10^{38} + 1$ through $10^{38} - 1$.	Decimal
	<small>numeric</small> Functionally equivalent to a decimal	Decimal
Money	<small>money</small> Monetary data values from -2^{63} (-922,337,203,685,477.5808) through $2^{63} - 1$ (+922,337,203,685,477.5807), with accuracy to a ten-thousandth of a monetary unit.	Float

Approximate Numerics	Float4 Single precision floating-point number	Float
	Float8 double precision floating-point number	Float
	real Floating precision number data from -3.40E + 38 through 3.40E + 38.	Float
Date and Time	date Date and time data from January 1, 1753, through December 31, 9999, with an accuracy of three-hundredths of a second, or 3.33 milliseconds.	Date
	Time Time of day	Time
	Timestamp Date and time	Date/Time

Character Strings	Bytea binary data ("byte array")	Character
	Character varying variable-length character string	Character
	Character fixed-length character string	Character
	char fixed-length character string	Character
	text variable-length character string	Character
	varchar variable-length character string	Character
Boolean	Boolean A field of 1 for true, 0 for false or T o F	Character (1)
Other Data Types	uuid A globally unique identifier (GUID).	Not supported

Creating a Map Catalog in the DBMS

MapInfo Pro stores information about spatial tables and views in the database. It stores this information in a file called `MAPINFO.MAPINFO_MAPCATALOG` (the Map Catalog) as a special table on the DBMS you are accessing.

The `MAPINFO_MAPCATALOG` is a registry table for databases that stores metadata about spatial tables and views in the database. Using the tablename and ownername as the key, the `MAPINFO_MAPCATALOG` identifies the spatial type, spatial columns (if there is more than one),

projection, data bounds, and rendition information. The `MAPINFO_MAPCATALOG` is used by a number of MapInfo products, including MapInfo Pro, that access map data from databases.

There must be one catalog per database, which is required before mapping any tables on that database in MapInfo Pro.

Before you Begin Creating a Map Catalog Table

You will use MapInfo EasyLoader to create a Map Catalog table in the database you wish to work with. MapInfo EasyLoader installs with MapInfo Pro.

Note: MapInfo EasyLoader is also available as a free download from the Precisely website. If you download a copy of MapInfo EasyLoader, then you must ensure that you have the same version of MapInfo EasyLoader as MapInfo Pro to use them together.

Before you begin, you must alert your database administrator to the following:

- You require administrator privileges to read and write to the database server. Even if you only read tables on the server, you still require write access to have MapInfo EasyLoader create and then have MapInfo Pro write to the Map Catalog table.
- MapInfo EasyLoader creates a MAPINFO schema at the server level while creating the Map Catalog table.
- MapInfo EasyLoader creates a MAPINFO user for the database.


Your database administrator may want to manually set up your database access, thus bypassing the need to use MapInfo EasyLoader. If your database administrator wants to create the Map Catalog table manually.

Instructions are available under [Manually Creating a MapInfo_MapCatalog](#).

Creating a Map Catalog Table Using MapInfo EasyLoader

MapInfo EasyLoader installs with MapInfo Pro as a tool, but you can run it separately from MapInfo Pro. It lets you create a data source connection and create a map catalog in the database.

To create a Map Catalog table using MapInfo EasyLoader, you must first load the MapInfo EasyLoader tool into MapInfo Pro:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**.
2. In the **Tools Manager**, on the **Registered** tab, locate MapInfo EasyLoader in the list, and then click **Load Tool** .

To have the tool load automatically every time you start MapInfo Pro, select the **Autoload** check box next to the tool.

If you do not see MapInfo EasyLoader on the **Registered** tab, see *Working with MapInfo Pro Tools* in the MapInfo Pro *Help System*.

3. Click **OK**.

Run MapInfo EasyLoader from the Tools Manager, by double clicking on it on the **Running** tab (on the **HOME** tab, in the **Tools** group, click **Tool Extensions**). Proceed to the following section that applies to you.

For a summary of the MapInfo EasyLoader window and options, see [MapInfo EasyLoader](#). For information about how to use MapInfo EasyLoader, refer to the *MapInfo EasyLoader Help*.

If the Map Catalog is present and there are no entries in it, the **Catalog** check box beside the table name in MapInfo EasyLoader does not enable.

Adding a Spatial Primary Key to a DBMS Table

After establishing a data source connection to your DBMS you must add a geometry reference to the tables you wish to work with on a map in MapInfo Pro. Each table that you want to work with must contain geometry, such as regions, or X,Y point data, with correctly named columns and a unique primary key column that is indexed and defined with a specific name.

If you attempt to work with a DBMS table that does not contain a spatial primary key column and does not have geometry and X,Y columns correctly labeled, then you may see the following error:

Unable to download only the OBJECT from a DBMS table. Select an additional attribute column.

To have MapInfo Pro prepare a table for you:

1. Open the table in MapInfo Pro, on the **HOME** tab, in the **File** group, from the **Open** list, click **Table** and then locate and select the table in the **Open** dialog box.
2. on the **HOME** tab, in the **File** group, click **Save Copy As** and save a copy back to the DBMS.

This saves a copy of the table with a unique primary key column that is indexed and in the correct format. This process also asks you for your spatial geometry column or your X,Y columns in the table and then renames these columns, so that MapInfo Pro can work with them.

You are now ready to begin working with the data in MapInfo Pro in tabular form (in a Browser window). For details on what changes are made to column names, see [Adding a Spatial Primary Key Manually](#).

If you want to convert your table to the MapInfo Pro native .TAB format to work with it, then use EasyLoader, which will also rename your geometry or point columns and add a spatial primary key column to the table.

Adding a Spatial Primary Key Manually

To have full control over renaming geometry or point columns and add a spatial primary key column to one or more tables, you can do this manually. If you choose to update your tables yourself, then you must make the following changes:

Geometry Data Tables

If you are working with a spatial table containing geometry (such as regions), the geometry column must be named SP_GEOMETRY. The following table is a summary of what is required for geometry data tables (note that Microsoft Access does not support geometry data, only point data):

DBMS or Data Source	Primary Key Column	Geometry Column Name
Oracle, PostGIS, SQL Server Spatial	MI_PRINX	SP_GEOMETRY

- If working with a **database table**, then MapInfo Pro finds the correct primary index column (this column must be a numeric type).
- If working with a **database view**, then it must have a column named MI_PRINX that is unique and numeric.

X,Y Point Data Tables

If you are working with a spatial table containing X,Y data (such as Latitude and Longitude), the X and Y columns must be named MI_SQL_X and MI_SQL_Y. The table must also have a unique primary key column that is indexed and named MI_SQL_REC_NUM.

DBMS or Data Source	Primary Key Column	X Column Name	Y Column Name
Access, Oracle, PostGIS, SQL Server Spatial, SQL Server with SpatialWare	MI_SQL_REC_NUM	MI_SQL_X	MI_SQL_Y

To use different names for these columns, specify the name of the X, Y and spatial object columns in the MapCatalog.

SQL Server with SpatialWare Tables

If you are working with SQL Server with SpatialWare installed, the column naming convention is different from other spatial DBMS tables. You must use SW_MEMBER for the unique primary key column that is indexed, and SW_GEOMETRY for the geometry column.

DBMS or Data Source	Primary Key Column	Geometry Column Name
SQL Server with SpatialWare	SW_MEMBER	SW_GEOMETRY

If your table contains X,Y data, then the column names must be MI_SQL_X and MI_SQL_Y.

Making a DBMS Table Mappable to Display it on a Map

After establishing a data source connection to your DBMS and adding a geometry reference to the tables you wish to work with, you can begin working with the data in MapInfo Pro in tabular form (in a **Browser** window). To view the data on a map in MapInfo Pro, you must correctly name the spatial data geometry or X,Y columns and then make the table mappable.

Before making a table mappable, review the instructions under [Creating a Map Catalog in the DBMS](#) and [Adding a Spatial Primary Key to a DBMS Table](#).

MapInfo Pro's Make Table Mappable command makes a database table (DBMS table) viewable on a **Map** window in MapInfo Pro. Any table may display in a **Browser** window, but only mappable tables can display in a **Map** window.

Making a table mappable provides MapInfo Pro with information about the table:

- The column containing the spatial data (not applicable to relational Oracle SDO)
- The projection system of the table
- The symbol to use for all objects without a per row style
- The column in the table to use for per row styles
- The object type
- The table bounds, which informs MapInfo Pro of the entire extent of the data (used by View and Entire Layer for example)

MapInfo Pro takes this information and stores it in a table called the MapInfo_MapCatalog. Every time you use a DBMS table MapInfo Pro checks the catalog to see if the table is mappable. As a result, you only have to make a DBMS table mappable once. It will always remain mappable.

Making a Table Mappable

Use the Make Table Mappable command only for tables that you did not previously upload with MapInfo EasyLoader, or save to the database through MapInfo Pro.

Before you begin, you must have a data source connect to the database containing the table to map. For instructions, see [Creating a Data Source Connection](#).

To make a table mappable:

1. On the **TABLE** tab, in the **Maintenance** group, click **Database**, and **Make DBMS Table Mappable**.
2. In the **Select DBMS Table** dialog box, select the DBMS table you want to make mappable and click **Open**.
3. In the **Make Table Mappable** dialog box, select from the options and then click **OK** to make the table mappable. For option descriptions, see [Make Table Mappable dialog box Options](#).
4. A message dialog displays to tell you that the table has been made mappable. Click **OK**.
5. The **Select DBMS Table** dialog displays. Select the table to make mappable and click **Open**. Click **Cancel** if you do not want to make tables mappable.

After making a table mappable, you are ready to begin working with it in MapInfo Pro. Continue to:

- [Working with SQL Server Tables](#)
- [Working with PostGIS Tables](#)
- [Working with Oracle Spatial Tables](#)

Make Table Mappable dialog box Options

Index Type

Select the spatial index type of the column that has the spatial information in the DBMS table. The spatial index provides a fast way for MapInfo Pro to access the spatial data in the table. The seven index types to choose from are SpatialWare, Oracle Spatial, Oracle Annotation Text, SQL Server Spatial, PostGIS Spatial, MapInfo Pro, and XY Coordinates. (You use the XY Coordinates option when there is no index.)

Index Column

Required for all index types except **XY Coordinates**. Choose the name of the spatial column, or in the case of a MapInfo Pro index type, choose the name of the MICODE column.

X Coordinate, Y Coordinate

Required only if you chose the XY Coordinate or MapInfo Pro index type. Choose the X and Y columns that contain the point data you wish to map.

Object Type

For spatial databases, select point, linear, or region object types. (Defaults to point object type for **MapInfo Pro** and **XY Coordinates** index types.)

Point: indicates the table only can contain point objects

Linear: indicates the table can only contain lines and polylines

Region: indicates the table can only contain region objects

Per Row Styles

Activates per row styles for the table, which enables you to use different object styles on the remote table. You can modify the styles of individual objects or groups of objects and save them to the DBMS table.

This option is only available when the MapInfo_MapCatalog has the structure to support styles; it contains the columns RENDITIONTYPE, RENDITIONCOLUMN, and RENDITIONTABLE, and when the table has a minimum of one Char (character) column.

Style Column

When the "Per Row Style" check box has been selected, you must also pick a **Style Column** from the drop-down list of candidate columns. Any column that is a character column is a candidate. Since this column will be overwritten with the style when tables are modified within MapInfo Pro, do not select a column that contains information.

Once this is done, the table is enabled for per row styles. If none were previously loaded into the tables column, the default style stored in the MapInfo_MapCatalog SYMBOL column will be used. You may set new styles simply by modifying the style in the Map window and saving the table.

Note: If the chosen column is read-only (it holds more than 254 characters for example), then your map data is read-only.

Object Style

Depends on the object types that the mappable table can contain. You can set the default style that the objects will use for display when they are downloaded.

Symbol: Displays the **Symbol Style** dialog box where you can select a default symbol for the point data.

Line: Displays the **Line Style** dialog box where you can select a default symbol for the line data.

Region: Displays the **Region Style** dialog box where you can select a default symbol for the region data.

Projection

Opens the **Choose Projection** dialog box. Specify the projection for the DBMS table. The projection must match the projection used by the corresponding remote database table.

If the Projection button is disabled, the application has read the projection information from the Oracle metadata and will use that projection to display the file.

Table Bounds

Opens the **Set Table Bounds** dialog box, which lets you choose the options that determine how your default view and your entire view table bounds are calculated. The bounds options you specify in this dialog box define both views. Select one of these options and click **OK** to implement those bounds options.

Use Data Bound: By default MapInfo Pro calculates the bounds as the minimum bounding rectangle of all the data in the layer. This requires scanning the table and calculating this value. This process can take some time, so a progress bar displays showing you the progress of this operation. You can cancel it, if necessary.

Use CoordSys Bounds: You can use the coordinate system bounds, but usually we do not recommend it. The coordinate system bounds are usually much larger than the actual data bounds,

which may make finding your displayed data difficult. You are usually zoomed out too far to be able to locate your data easily.

Use Custom Bounds: Set your own custom bounds based on the size and location of your data. Click this option to modify or set the bounds of your data.

About Updating Data Bounds in the MapInfo_MapCatalog

The MapInfo_MapCatalog contains the bounds of the data within the table. This determines the map view when opening the table as the first map in a window. The bounds are set either by EasyLoader when loading the data, or from MapInfo Pro's Set Minimum Bounding Rectangle tool.

The bounds automatically adjust when inserting or updating spatial objects. If the object is outside the Minimum Bounding Rectangle (MBR), MapInfo Pro expands the MBR and updates the MapInfo_MapCatalog. Deleting objects from the table does not alter the bounds.

Deciding to work with Linked or Live Access Tables

There are two ways in which you can work with your data tables: live (or live with caching) and linked. If you are not working with very much data, a small data table size, then it does not matter if you choose to work with live or linked access.

About Live Access Tables

You can access remote data as a live access table using MapInfo Pro. It is called a live access because there is no local copy of the data, that is, all operations against the data go directly to the server. This differs from linked tables, which download a snapshot from the remote database into a native MapInfo Pro table.

You can perform most operations on a live access table that you do for a regular MapInfo Pro table. For example, you can view, edit, copy, and save a live access layer just as you can a regular MapInfo Pro table. However, you cannot pack or modify a live access table's structure.

Live with cache is the preferred way to access live tables. MapInfo Pro provides smart caching to improve performance of live data access from remote databases. During a pan operation, MapInfo Pro retrieves map data from a cache rather than retrieve it from the server every time. Only when the pan requires map data not already contained in the cache, does it go to the server. Closing or refreshing the table clears the cache.

When the live access table is creating a new **Map** window, the initial view is determined by the entry in the MapInfo_MapCatalog table. The values in the VIEW_* columns, if they exist, describe a rectangular area that is the initial map display. If the live access table is being added as a layer to an existing **Map** window, the layer will be fit to that **Map** window.

MapInfo Pro stores information about a live access table in a TAB file. This information is known as metadata. MapInfo Pro uses metadata to store information about the live access table that is needed

to manage transactions between MapInfo Pro and the server database. Two of the most important kinds of information stored in the metadata include the connection string and the query you build from the DBMS Table Wizard, or **Expert** dialog box.

About Linked Tables

A linked table is a MapInfo Pro table that is a replica of a table downloaded from a remote database and retains links to its remote database table. (The remote database table is known as a DBMS table.) When MapInfo Pro downloads a table, it copies the entire contents of the table to the local machine. Any changes you make to the copy can be committed to the server table at any time.

Linked tables can be used stand-alone or remain linked to the original server database. You can refresh linked tables to rerun queries on a regular basis on the **TABLE** tab, in the **Maintenance** group, click **Database**, and **Refresh DBMS Table**. After editing data in a linked table, MapInfo Pro saves it to the RDBS in a manner that resolves any multi-editing conflicts. Saving the edits made to a linked table commits them to the server database as well as to the linked table.

Comparing and Contrasting Live and Linked Access to a Table

Use the following information to decide whether to work with your remote data tables live or linked.

	Linked Table	Live Table
Definition	A full replica of the DBMS table is downloaded to the client machine. The local replica retains reference to the remote data source (ODBC/OCI Connection parameters); The downloaded copy is retained across sessions of MapInfo Pro.	Data is read from the DBMS Server as required. When the data is locally cached, the life of the cache is limited to the current session.
Suitability	Linked tables are suitable for backdrop display data, or data that does not change much. Linked tables are editable, as long as the base tables they are based on are editable.	Live tables are suitable for reading and editing dynamically changing data; or data sets that do not fit within the limits of 2 GB per data file. Live tables are recommended if you want to maintain data security (the data must remain only in a single secure location).
Performance Factors	As the data is entirely local, there is a one-time cost of downloading the data, but subsequent access is fast, comparable to native table access, since the user does not incur the cost of network traffic every time the data needs to be accessed for mapping, or for analysis.	The cost of data transfer is incurred a little bit at a time. Live tables are accessed real time from the database, as required. Optionally, records from the live table can be locally cached for the length of the MapInfo Pro session. Caching enhances performance, because the data is not fetched multiple times as the user, zooms, pans, or browses around the data.

	Linked Table	Live Table
Limitations	Linked tables are limited to 2 GB per data file; Linked tables are not refreshed unless the user explicitly refreshes the table. You cannot pack a linked table. You cannot modify the table structure of a linked table. For details, see File Size Exceeds 2 GB .	This is a network intensive option.

For more information, see [Improving Live Access Performance](#).

Opening a DBMS Table in MapInfo Pro

After completing the instructions in the following sections:

- [Creating a Data Source Connection](#)
- [Creating a Map Catalog in the DBMS](#)
- [Making a DBMS Table Mappable to Display it on a Map](#)

you are ready to connect to your data sources and the database tables you want to work with. If you are not familiar with the details of your remote database type, discuss your requirements with your database administrator to find out the basic information necessary to connect to your database.

Options for Opening Tables

When opening DBMS tables, there are a number of options for:

- Which tables in the database to open or select to open all of the available tables.
- Whether to open the tables live or linked. If selecting linked, you can open them with caching. You can set this option individually for a table to override what is set for all the tables you will open.
- How you want the data to display on the map by selecting point, line, and region style options. You can change: symbol type, color, and size, as well as the label font; line color and pattern; region fill color and pattern, and border color and pattern.
- Column and row filters on tables. Filters let you reduce the amount of information that you will work with and reduce the time it takes to fetch and save the data.
- A directory where the MapInfo TAB file (with the same name as the table) will be saved.

You can apply these selections to all of the tables you will open and also select overrides for individual tables.

Performing Queries on Tables

When performing a query on a table the query executes when:

- **Linked tables:** Opening the table for the first time, and when refreshing the table.
- **Live with cache:** Adding the table to the map, and zooming or panning in the map.
- **Live without cache:** Adding the table to the map, zooming or panning in the map, and clicking in the map with the **Select** or **Info** commands.

You can specify which records to retrieve from the database by attribute or by geography. The query syntax is specific to the database that you are accessing. MapInfo Pro translates some expressions when passing a query to the database, such as **Object**, **Within**, **Selection**, and **Current_Mapper**. You may save your queries, so that you can reuse them.

Tables and Metadata

MapInfo Pro stores information about a table in the .TAB file's metadata, which is not displayed on the map. MapInfo Pro uses metadata to manage transactions between MapInfo Pro and the server database. Two of the most important kinds of information stored in the metadata include the connection string and the query you build from the DBMS Table Wizard, or **Expert** dialog box.

Opening a DBMS Table

This section describes how to open a DBMS table.

The connection to your DBMS must be open before you can open a table. If you have not yet opened a connection or if you have restarted MapInfo Pro (and must re-open a connection), see [Reconnecting to your Data Source after Startup](#).

To open a database table:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table**.
2. In the **Open** dialog box, from the **Files of type** list, select the DBMS connection to work with.

The DBMS connections that you created previously (as described under [Creating a Data Source Connection](#)) are at the bottom of the **Files of type** drop-down list. If you have more than one connection, then the connection name contains a sequential number indicating the order in which the connection was added.

The **Select One or More Tables to Open** dialog box opens.

3. In the **Database Tables** list, select a table to open by adding a check mark beside the table name.

You can select one or more tables. Only the tables that have a check mark beside them will open.

4. Optionally, select how you want the data to display on the map by selecting (highlighting) the table name and clicking **Style**.

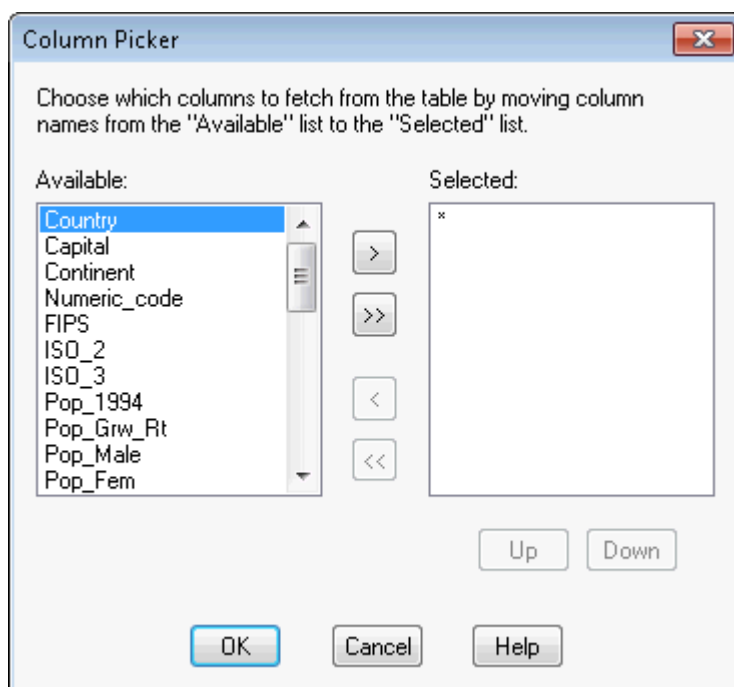
This opens the **Change Table Object Style** dialog box where you can specify the display style for geometry (spatial object types), such as symbols, lines, and regions in the table. The custom styles that you set only apply to the table that you highlighted (whether it has a check mark beside it or not).

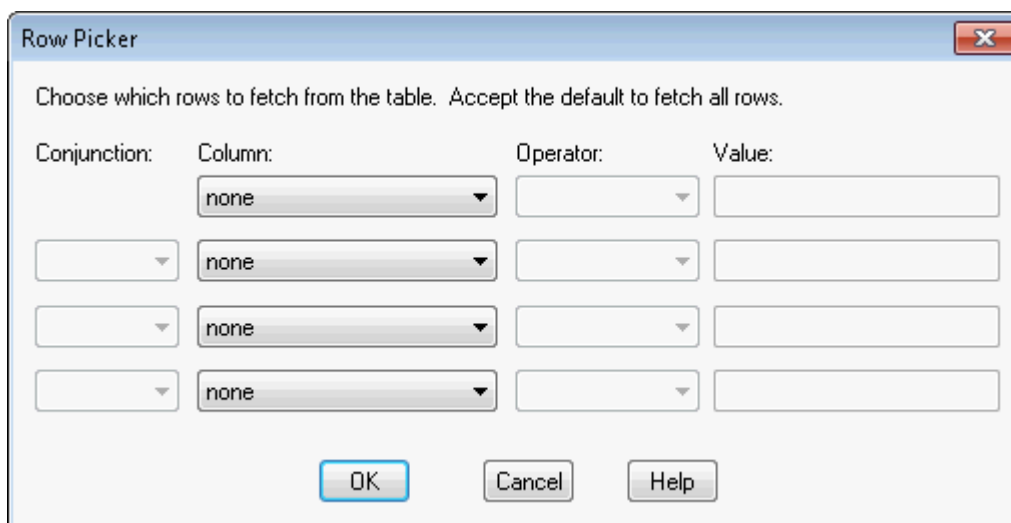
To select more than one table, press **Ctrl** while selecting table names. Your style choices are made to all of the tables that you select (that are highlighted in the **Database Tables** list).

5. From the **Preferred View** drop-down list, select the view you want of this data. MapInfo Pro remembers your selection and uses it for every subsequent selection until you change it.
 - **Automatic** - MapInfo Pro chooses the most appropriate view. If the data is mappable, such as when graphic objects are attached to the data, MapInfo Pro opens the table in a **Map** window. If you have a **Map** window displayed and the table you want to open is mappable, MapInfo Pro automatically opens the table in the current **Map** window. If the data is not mappable, MapInfo Pro will attempt to open the table in a **Browser** window. If the table cannot be mapped or browsed, MapInfo Pro opens the table using the **No View** option (no data is displayed).
 - **Browser** - MapInfo Pro attempts to open the table in a **Browser** window.
 - **Current Mapper** - MapInfo Pro attempts to add your data to the current **Map** window.
 - **New Mapper** - MapInfo Pro attempts to open the table in a new **Map** window.
 - **No View** - MapInfo Pro opens the table making the data available for other uses, but no data is displayed. You will see it in the **Tables** list in the **Explorer** window.
6. Click **OK**.

If a MapInfo message dialog displays asking if you want to overwrite the existing file, click **OK**. You have previously opened this file and there is a temporary copy of the file on your machine. MapInfo Pro will overwrite this temporary copy.

The table, or tables, from your selection open in a **Map** window (or in a Table browser if the data is not mappable).





Applying Custom Options when Opening Database Tables

When opening a database table, you can select custom options for display styles, filters, and how to access the data (with live or linked access). The options you select are specific to how the table opens in MapInfo Pro and they override any common options set for opening database tables.

When working with a database table in MapInfo Pro, you make display style changes on the map, but you cannot save these changes back to the database table. The only way to set how table data displays on a MapInfo Pro map is to set custom display options when opening the database table.

To apply custom options to a database table, open the **Select One or More Tables to Open** dialog box (on the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table** and selecting the database to open). Highlight the table name and then click **Style** or **Options**. You can apply the following types of custom options to the table:

- To customize how the geometry (spatial object types, such as symbols, lines, and regions) in the table display on a map, click **Style**. This opens the **Change Table Object Style** dialog box where you can choose the display styles for symbols, lines, and regions. You can change: symbol type, color, and size, as well as the label font; line color and pattern; region fill color and pattern, and border color and pattern.
- To set filters to fetch specific columns and rows from a table, click **Options**. In the **Open DBMS Table Options** dialog, choose column and row filters on the table. Filters reduce the amount of information that you will work with and reduce the time it takes to fetch and save the data. For more information, see [Opening Database Tables Using Column and Row Filters](#).
- To select how to access the table data, by using live access or linked access, click **Options**. In the **Open DBMS Table Options** dialog, choose either **Download Data (Linked Table)** or **Live Access**. (The selection you make here overrides the common options made for tables.) For information about the linked, live, and cached options, see [Setting Live or Linked Access when Opening Database Tables](#).
- To select the character set of the table data, click **Options**. In the **Open DBMS Table Options** dialog, select the character set of the data file from the **Charset** list.

If opening a large table, more than 2GB in size, click **Options**. In the **Open DBMS Table Options** dialog, select **MapInfo Extended** from the **Format** list. The default **Format** and **Charset** settings are software preferences, see [Setting Your Language Preferences](#).

After applying custom options to a table, the table name display with an asterisk (*) beside it. When you move the mouse over the table name, it displays a summary of the custom options applied to it.

To select multiple tables, press **Ctrl** while selecting table names in the **Select One or More Tables to Open** dialog box. To select all of the tables, click **Select All**.

Changing the Folder Location of the MapInfo TAB File for a Database Table

When MapInfo Pro opens a database table for the first time, it creates a MapInfo TAB file (with the same name as the table) where it stores information about how to display the database table. The custom options that you select when opening a database table save to the TAB file. MapInfo Pro reads the TAB file every time you open the database table and applies the custom options that you set for the table.

The TAB file for a database table saves to the Windows **%UserProfile%\My Documents** folder. The **%UserProfile%** folder is set by default to:

```
C:\Users\<username>
```

When opening a database table, you can set where to save the TAB file for the table. To do this in the **Select One or More Tables to Open** dialog box, select the table name to highlight it and then click **Folder**. The **Browse for Folder** dialog box opens where you can browse for a new folder location to save the TAB file to. The new folder location displays under the **Folder** button in the **Select One or More Tables to Open** dialog box.

Setting Live or Linked Access when Opening Database Tables

When opening a database table (on the **TABLE** tab, in the **Content** group, on the **Open** list, click **Database Table** and select the database to open) you can select **Live** or **Linked** options for the connection type. By default, the table opens in MapInfo Pro with live access with caching turned on, so that you access it directly from its source location with the additional speed that caching provides. To change how you access an already open table, you must close it and open it again.

Note: For a description of when to choose a Linked table (Download Data) versus Live Access (with or without cache), see [Deciding to work with Linked or Live Access Tables](#).

Working with Live Access Database Tables

By default, MapInfo Pro opens database tables using live access. A live connection to a table lets you read data from the database as required. This is helpful when sharing the data with another application, to ensure that you are always working with the latest updates.

You would consider choosing the Live option for accessing a table when:

- Reading and editing dynamically changing data.
- You want to maintain data security (the data must remain only in a single secure location).

For a full list of considerations, see [Comparing and Contrasting Live and Linked Access to a Table](#).

To improve the data access speed with live access tables, you can specify that data be locally cached. MapInfo Pro then reads the table data from the cache. The life of the cache is limited to the current session. Access time to data is faster, but you are not working with the most current version. The table refreshes when you zoom, pan, or select the table data in a Map window, or when you edit the data in a Browser window.

Working with Linked Access Database Tables

You have the option to open a database table as a linked access table. A linked table is a MapInfo Pro table that is a replica of a table downloaded from a remote database and retains links to its remote database table. (The remote table is the database table.) When MapInfo Pro downloads a table, it copies the entire contents of the table to the local machine. Any changes you make to the copy can be committed to the database table at any time. Linked tables can be used stand-alone or remain linked to the original database. After editing data in a linked table, MapInfo Pro saves it to the database in a manner that resolves any multi-user editing conflicts. Saving the edits made to a linked table commits them to the database as well as to the linked table.

You would consider choosing the Linked option for accessing when:

- Using the table contents as backdrop display data, or data that does not change much. Linked tables are editable, as long as the base tables they are based on are editable.
- Tables are very large. As the data is entirely local, there is a one-time cost of downloading the data, but subsequent access is fast, comparable to native table access, since the user does not incur the cost of network traffic every time the data needs to be accessed for mapping, or for analysis.

Linked tables are limited to 2 GB per data file.

Caching Data from Database Tables

By default, data caching is turned on for linked tables. Data caching is not applicable for live access tables.

When caching data, MapInfo Pro opens a database table and keeps the attributes and objects that have been read in memory. This saves time redrawing the map and processing the data when performing an operation, such as zooming in or out on a map, because the attributes do not need to be fetched from the database.

When caching data from a linked table, MapInfo Pro looks in memory for a record, so you may not see the latest updates made to the database table. Another user's updates may not appear until the cache is invalidated by a pan or zoom out operation.

When not caching data from a linked table, MapInfo Pro retrieves all of the data from the database whenever it is needed. This provides the most current data but it is less efficient than caching the data.

You can turn caching off for linked tables in the **Select One or More Tables to Open** dialog box:

- For multiple tables, select the tables that you want to open and then click **Cached** (so that the button in the Select One or More Tables to open dialog box is not selected). This turns off caching for all of the selected tables, except for tables that have override settings.
- For a single table, highlight the table name in the list and then click **Options**. In the **Open DBMS Table Options** dialog, clear the **Cache** check box. This setting is specific to this table and overrides the setting made by clicking **Cached** in the **Select One or More Tables to Open** dialog box.

Opening Database Tables Using Column and Row Filters

You can apply column and row filters on a database table before opening it in MapInfo Pro. Filters let you choose which columns and rows to fetch from the data source. You would do this to reduce the amount of information that you will work with and reduce the time it takes to fetch and save the data.

To apply column and row filters on a database table when opening it:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table**.
2. From the **Files of type** list, select the database to work with. The **Select One or More Tables to Open** dialog box opens.
3. In the **Database Tables** list, select a table to open.
4. Click **Options**.
5. In the **Open DBMS Table Options** dialog box, select **Standard Mode** to open particular rows or columns of the selected table and then click **Column Filters**.

The **Column Picker** dialog box opens.

6. Choose which columns to fetch from the table and then click **OK**.

For information about setting column filters, see [Setting a Column Filter](#).

7. Select **Row Filter**.
8. In the **Row Picker** dialog box, choose which rows to fetch from the table and then click **OK**.

For information about setting row filters, see [Setting a Row Filter](#).

9. If working with large data files, larger than 2GB, then under **MapInfo TAB File** select **MapInfo Extended** from the **Format** list. You can also select the character set of the data file from the **Charset** list.

Note: The default **Format** and **Charset** settings are software preferences, see [Setting Your Language Preferences](#).

10. Click **OK** to close the **Open DBMS Table Options** dialog box.
11. From the **Preferred View** list, select how you want to open the tables.

Select **New Mapper** or **Current Mapper** to open them in a Map window, or **Browser** to open them in a Browser window to see the table contents.

For more details, see this step in the instructions under [Opening a DBMS Table](#).

12. Click **OK**.

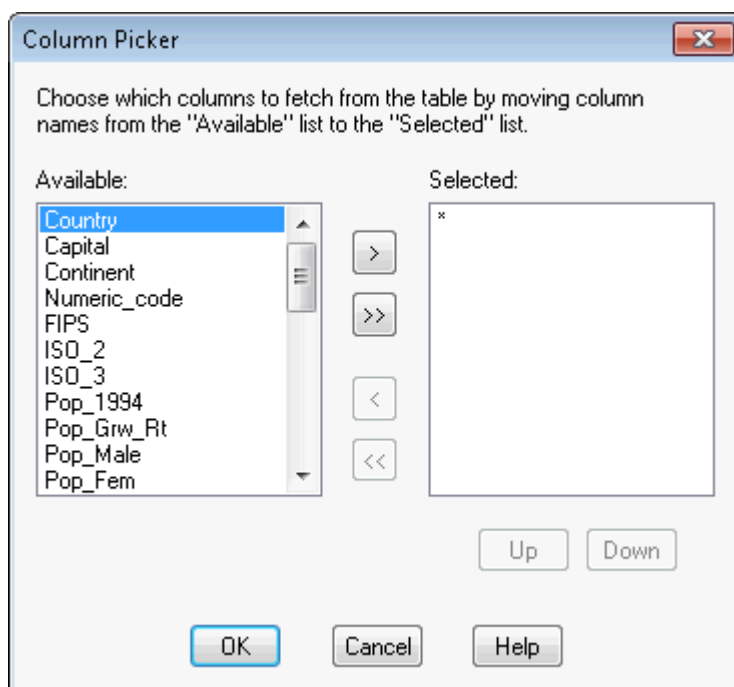
If a MapInfo message dialog displays asking if you want to overwrite the existing file, click **OK**. You have previously opened this file and there is a temporary copy of the file on your machine. MapInfo Pro will overwrite this temporary copy.

The table opens in MapInfo Pro with only the columns and rows that you selected to fetch.

To create your own table filter in standard SQL syntax, see [Creating Your Own Table Filter](#).

Setting a Column Filter

To specify the columns to download in the **Select One or More Tables to Open** dialog box, click **Options** and then click **Column Filter**. This opens the **Column Picker** dialog box.



When the **Column Picker** dialog box first opens, an asterisk (*) displays in the **Selected** list. If you leave the asterisk, MapInfo Pro retrieves all the columns in the table from the remote database.

To select which columns to retrieve:

1. Move the columns you want to display from the table from the **Available** group to the **Selected** group using the arrow buttons. The single arrow keys move one selected column at a time. The double arrow buttons move all the columns at once from one list to the other. You can also double click the column to move it from one list to another.

2. Change the order of the selected columns in the **Selected** list by highlighting the column you want to move and clicking **Up** and **Down** until the column is positioned correctly.
3. Click **OK** to complete your selections.

If the table is mappable, the **Available** list displays an additional column called OBJECT, which refers to the spatial column:

- DBMS users can select it to download point objects from the table. If the table is spatial, MapInfo Pro downloads lines, points, and polygons depending on what the table contains.
- SQLite users can select it to download spatial objects from the SQLite database table.

Setting a Row Filter

In the **Select One or More Tables to Open** dialog box, click **Row Filter** to select the row data that you want MapInfo Pro to download. This opens the **Row Picker** dialog box.

Conjunction:	Column:	Operator:	Value:
	none		
	none		
	none		
	none		

OK Cancel Help

To retrieve all of the rows pertaining to the columns you selected, leave this dialog box as is.

To select the column, operator, and value entries that match the data you want to retrieve from the selected table:

1. In the **Column** list, choose the column(s) from which you want to filter rows. (This is the same as specifying the WHERE clause in a SQL query.) If you are filtering rows for one column, select a column, operator, and value. If filtering rows on more than one column, select a column from the next drop-down list. This also activates the next row of fields for data entry.
2. Use the **Operator** and **Value** boxes to choose how you would like to filter the rows.

For more information about how to complete these entries, see [Notes for Completing the Row Picker Query](#).

3. Click **OK** when you have finished filtering the rows.

Notes for Completing the Row Picker Query

The Operator list boxes contain all supported operator symbols for their corresponding selected column. The list of operators will vary depending on the type of the selected column. For example, the operators <, >, and = (among others) will be available for numeric columns, but object columns will have only the operator WITHIN.

The type of the Value control also varies depending on the column type. For object columns, this control will be a list box containing the values CURRENT_MAPPER and SELECTION. For all other column types, this control will be an edit box, allowing the user to enter the proper type of data.

If you select an object column using the 'within' operator, MapInfo Pro returns only the objects from the server that are within the selection. Multiple objects are automatically combined into a single object before performing the spatial query, which returns the correct results. The object is stored in the .TAB file so that it is re-used the next time you open the .TAB file to the remote database.

There are two wildcard characters that can be used with the LIKE operator: '%' and '_'. The '%' wildcard character matches zero or more characters. The '_' wildcard character matches only one character.

When rows are being filtered from more than one column, Conjunction becomes available. Choose one of these Boolean operators: **AND**, **OR**, **AND NOT**, **OR NOT**.

Creating Your Own Table Filter

To create your own filter when opening database tables,

1. Open a database on the **HOME** tab, in the **Open** list, click **Table**, and then selecting a database to open from the **Files of Type** list.
2. Click **Open** to open the **Select One or More Tables to Open** dialog box.
3. Select the table that you want to open from the list of database tables.
4. Click **Options** to open the **Open DBMS Table Options** dialog box.
5. Select **Expert Mode**.
6. Click **SQL View** to open the **Enter SQL Query** dialog box.
7. In the **SQL Query** field, enter your query in standard SQL syntax, or click **Load** and open a SQL Query (*.sql) file.

To type in multi-line formatted SQL do the following:

- To get a new line press **Enter**.
 - To tab, press **Ctrl+Tab**.
 - To cut and paste from the clipboard, press **Ctrl+X** to cut, **Ctrl+C** to copy, and **Ctrl+V** to paste.
8. Click **OK** to apply your query and close the dialog boxes.

Opening a Connection and a DBMS Table at the Same Time

To open a DBMS table:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table** to open the **Open DBMS Connection** dialog box.
2. Choose either **ODBC** or **FDO (SQLite)** from the Connection Type drop-down list. If only one driver type is available the control is disabled.
3. Click the **New** button to open the **Select Data Source** dialog box.
4. Locate and choose the desired data source.
5. Click **OK** to open the **Select One or More Tables to Open** dialog box.
6. Choose the desired file and click **Options** to open the **Open DBMS Table Options** dialog box.

If working with large data files, larger than 2GB, then under **MapInfo TAB File** select **MapInfo Extended** from the **Format** list. You can also select the character set of the data file from the **Charset** list.

Note: The default **Format** and **Charset** settings are software preferences, see [Setting Your Language Preferences](#).

7. Click **OK** to initiate the opening of the selected DBMS table.

Message: Unsupported data type for column(s)

When you display annotation text, you cannot also display other spatial column data from the same table. If you try to open an Oracle table with Annotation Text and other spatial columns, you may see the following error:

```
Unsupported data type for column(s): TEXTOBJ Unable to fetch
records into table.
```

Use the **Column Picker** dialog box to specify which columns to open to avoid this error.

Using the Find Menu Option for Remote Tables

The **Find** command (located on the **TABLE** tab, in the **Selection** group) is available for both live and linked remote tables, regardless of whether they are indexed. Neither the table nor a column in the table needs to be indexed for the **Find** command option to be available.

If the selected column in the search table does not have an index, then clicking **OK** in the **Find** dialog box creates an index. For native tables and linked remote tables, this new index is permanent. For live remote tables and read-only native tables, the index is temporary.

Using a Join Query in Remote Tables

MapInfo Pro is unable to process an INNER JOIN or JOIN query to an ODBC table when the table is mappable. As a workaround, use the Where clause instead of using INNER JOIN or JOIN to join two tables.

For example:

```
SELECT t1.c1, t2.c2 FROM t1 INNER JOIN t2 ON (t1.c1 = t2.c2)
```

May be modified to:

```
SELECT t1.c1, t2.c2 FROM t1, t2 WHERE t1.c1 = t2.c2
```

If there are conditions in the Where clause, then use **AND** to join conditions. For example:

```
SELECT t1.c1, t2.c2
FROM t1 INNER JOIN t2 ON (t1.c1 = t2.c2)
where t1.c1 > 2 or t2.c2 < 100
```

May be modified to:

```
SELECT t1.c1, t2.c2
FROM t1, t2
WHERE t1.c1 = t2.c2 AND (t1.c1 > 2 or t2.c2 < 100)
```

Setting up a DBMS Table for Per Row Object Styles

Per row object styles lets you use different object styles on a remote database table, similar to what you can do with a native map table. You can modify styles on individual or groups of objects and save the styles to the DBMS table. Before you can use this feature, the DBMS table must be set up correctly.

To set up the DBMS table:

1. The `MapInfo_MapCatalog` must contain the new columns, which control the use of styles. They are `RENDITIONTYPE`, `RENDITIONCOLUMN`, and `RENDITIONTABLE`.
If MapInfo EasyLoader created the `MapInfo_MapCatalog`, this was been done for you.
2. The map table itself must have a character column wide enough to store the complete style string. Style strings vary in width. We recommend a minimum of 50 characters be provided, 200 characters if you plan to use custom symbols which use much longer strings.
3. The entry for the table in the `MapInfo_MapCatalog` must be set correctly. This means that the `RENDITIONTYPE` is 1, and the `RENDITIONCOLUMN` contains the name of the column that will contain the style string. This entry is set by MapInfo EasyLoader when the `MapInfo_MapCatalog` contains the new columns, or it may be set using the **Make Table Mappable** function.

Making a DBMS Table Mappable for Geocoding

Your data must include X and Y point data (a Z column is optional). To display your data on a map the X and Y data must be coordinate data, such as Latitude/Longitude. If your data does not include coordinate information, then consider geocoding (adding the coordinate information) using a Precisely product, such as MapMarker or Spectrum.

To make a DBMS table mappable for geocoding purposes:

1. Add two numeric columns in the table on the database server to hold the X and Y coordinates.
2. In MapInfo Pro, on the **TABLE** tab, in the **Maintenance** group, click **Database**, and **Make DBMS Table Mappable**. Select the table you want to make mappable. The **Make Table Mappable** dialog box displays.
3. Choose **XY Coordinates** for the Index Type, X column for the X Coordinate and the Y column for the Y Coordinate.

If your MapInfo_MapCatalog has the capability to support styles, you can set up the table to use per row styles. Select the **Per Row Styles** check box and choose the column that you want to obtain the style attributes. The only column types available for use with the Per Row Styles option are character or varchar columns. This option is only available when the MapInfo_MapCatalog has the structure to support styles. It must contain the columns: `RENDITIONTYPE`, `RENDITIONCOLUMN`, and `RENDITIONTABLE`.

4. Open the remote table in MapInfo Pro; go to the **HOME** tab and click **Open**. You will get a blank Map window. On the **SPATIAL** tab click **Create** to geocode your records.
5. Once you have completed geocoding, on the **TABLE** tab, click **Save Table** to save the changes to the remote database.
6. Answer "Yes" to Refreshing the table in order to see your points.

Using the Geocode Menu Option in Remote Tables

The **Geocode** command (located on the **SPATIAL** tab, in the **Create** group) is available for tables regardless of whether they are indexed. Neither the table nor a column in the table needs to be indexed for the **Geocode** command to be available.

If the selected column in the search table does not have an index, then clicking **OK** in the **Geocode** dialog box creates the index. For native tables and linked remote tables, this new index is permanent. For live remote tables and read-only native tables, the index is temporary.

Additional Notes

The **Find** and **Geocode** dialog boxes both contain the following design elements:

- Indexed tables and columns are shown with an asterisk at the end of their names in the Search Table and for Objects in **Column** drop-down lists. There is a reminder in each dialog box about what the asterisk means.
- The tables in the **Search Table** drop-down list are listed in alphabetical order.
- The width of the list boxes adjusts dynamically to fit the longest table or column name.

Creating a New DBMS Table

1. On the **TABLE** tab, in the **Content** group, click **New Table**.
2. In the **New Table** dialog box:
 - a. Specify how you want the table opened: **Browser**, **Mapper**, or **Current Mapper**.

- b. Specify whether you want the table structure to be based on an existing table or you want MapInfo Pro to create a new table structure.
 - c. Click **Create**.
3. In the **New Table Structure** dialog box specify the field name, field type, number of characters (width), and whether or not to index for each field in your new database. Click **Create**.

If you are using the structure from another mappable table, then MapInfo Pro sets the new table projection to the projection of the source table. Collectively, this information is the structure of your database.

Note: You indicate whether the table is mappable by associating graphic objects with records and, if so, whether the map is to be an earth or a non-earth map.

4. In the **Create New Table** dialog box, from the **Save as type** drop-down list, select a DBMS type. The dialog box displays DBMS connection controls.

In the **File name** box, type a file name and click **Save**.

Depending on the database type that you selected, the new table opens in MapInfo Pro or the **New DBMS Table Options** dialog box opens. If you see the **New DBMS Table Options** dialog box then continue to the next section.

Setting New DBMS Table Options

To set new DBMS table options, follow the instructions under **Creating a New DBMS Table**. Depending on the database type that you select, the **New DBMS Table Options** dialog box opens. This dialog box has three tabs, **General**, **Spatial**, and **Styles**. Refer to the following sections for information about each tab of options.

If you cleared the **Make Table Mappable** check box in **Create New Table** dialog box, then the **DBMS Table Options** dialog box shows only the **General** tab.

General Tab

Under the **General** tab complete the appropriate selections:

- **TAB file location** - Displays the name and path of the .TAB file that will be created. You can manually type a filename or use the **Save As** dialog box (via **Browse** button) to choose a filename. MapInfo Pro uses the last directory where you saved a DBMS .TAB when constructing the default filename full path. If this directory does not exist, then the Remote Tables preference directory is used. The filename part of the default path is based on the name of the specified DBMS table name.
- **Browse (...) button** - Displays the **Save As** dialog box so the user can choose a .TAB filename. Initialized with the text in the .TAB filename edit box.
- **Primary Key Column** - Lets you specify a key column for the new table. Without a key column a DBMS table cannot be open as live access and can only be opened read only as Linked.

If the **Primary Key Column** check box is selected, then the corresponding combo box is enabled. You can either choose a column that was specified in the **New Table Structure** dialog box or specify a new column by typing into the combo box's edit control.

By default the **Primary Key Column** check box is selected and a new column is specified. The default name of the new column depends on the DBMS connection: **MI_PRINX** for Oracle Spatial, **SW_MEMBER** for all others.

- **Download Data (Linked Table)** - Select to establish a linked connection to this table.
- **Live Access** - Select to access this table with a live connection.
- **Cache** - Select to save the table to the local buffer and then read the table data from the buffer. Access time to data is faster but you are not working with the most current version. Refresh occurs when you zoom, pan, or select. Unselect to read the table directly from the data source, which is the current version.

The **Cache** check box enables after selecting the **Live Access** option.

Spatial Tab

Click the **Spatial** tab and specify the index type and coordinate column selections:

- **Index Type** - This setting determines the type of spatial indexing used on the table. Types MapInfo (MICODE) and XY are always available. Server specific types may also be listed. The index type selection affects the state of the other three controls in this tab.
- **Index Column** - Specify the primary spatial index column from the list. This option is always available, except when the index type is XY.
- **X Coordinate** - Specify the X or longitude column in the database from the list. This is only available for MapInfo (MICODE) or XY types. You can either choose a float column that was specified in the **New Table Structure** dialog box or specify a new column by typing into the combo box's edit control.
- **Y Coordinate** - Specify the Y or latitude column in the database from the list. This is only available for MapInfo (MICODE) or XY types. You can either choose a float column that was specified in the **New Table Structure** dialog box or specify a new column by typing into the combo box's edit control.

Styles Tab

Click the **Styles** tab and complete the appropriate selections:

- **Per Row Style** - Check the **Per Row Style** check box to enable per row symbology. The style information for each object is maintained in a character column of the table. If unchecked, then the style of all objects in the table is determined by the default object styles maintained in the Map Catalog.


If **Per Row Style** is checked, then the **Style Column** combo box is enabled. By default **Per Row Style** is checked and a new column named **MI_STYLE** is specified.

- **Style Column** - Select from the list a character column that was specified in the **New Table Structure** dialog box or a new column by typing into the combo box's edit control.

- **Default Object Styles** - The default object styles are used when **Per Row Style** is not turned on for a table, or the style info for a particular object does not exist (the style column for that row is empty). The default style information specified here is entered into the map catalog. The default symbol, line, and region settings within MapInfo Pro are used to initialize these controls.

Refreshing Live and Linked Remote Tables

If the table you are working with is linked, then refresh it to update your data with changes from the remote database. If the table is live, MapInfo Pro reads the latest data from the table.

When you open a remote table, MapInfo Pro enables the **Refresh DBMS Table**  command so you can refresh the data in that table. Refreshing a table:

- Checks the database for changes.
- Reapplies any query conditions (these are static).
- If filtering using the current map or selection, then the filter always applies to the table. To set a different map extent, reopen the table from the database.

To refresh a linked or live table:

1. Do one of the following:
 - On the **TABLE** tab, in the **Maintenance** group, click **Database**, and **Refresh DBMS Table**.
 - Press **Ctrl+D** in an active **Browser** window (clicking on a **Browser** window makes it active)
2. In the **Refresh Table** dialog box, select the table to refresh and then click **OK**.

The specified table refreshes.

Unlinking a Table from a Remote Database

You can unlink a table from its remote database using the **Unlink DBMS Table** command option. Unlinking a table removes the link to the remote database. This does not work if edits are pending on the linked table, you must first update any pending edits with the **Save Table** command. The end product is a normal MapInfo Pro base table without table linkages and non-editable fields made editable.

To unlink a table:

1. On the **TABLE** tab, in the **Maintenance** group, click **Database**, and **Unlink DBMS Table** to open the **Unlink Table** dialog box.
2. Select the name of the table to unlink and then click **OK**.

The specified table unlinks.

Saving a DBMS Table

You save changes to a MapInfo Pro linked or live table the same way you save a regular MapInfo Pro table, with the **Save Table** command (on the **TABLE** tab, in the **Content** group, click **Save**, and **Save Table**).

Saving a linked or live table saves the records on the remote database. Before MapInfo Pro updates records from a linked or live table, it evaluates the records in a process called conflict resolution.

If MapInfo Pro finds conflicts between the data on the remote database and records in the linked table, since the time of its download, the **Resolve Conflicts** dialog box displays. Use this dialog box to resolve conflicts.

Saving Changes Made to a DBMS Table

To save changes made to a table:

1. On the **TABLE** tab, in the **Content** group, click **Save Table** to open the **Save Table** dialog box.
2. Select the table you want to save from the drop-down list.
3. Click **OK**.

The edits are saved and the table remains open for continued use.

Note: Before MapInfo Pro allows these records to be updated, it evaluates the records in a process called conflict resolution.

If MapInfo Pro finds conflicts between the data on the remote database and any records in the linked table since it was downloaded, the **Resolve Conflicts** dialog box automatically appears. Use this dialog box to resolve conflicts.

Note: SQL Server Spatial uploading data with invalid geometries into a GEOGRAPHY field will see an error message that the specified input does not represent a valid geography.

Conflict Resolution when Multiple Users Access a Remote Table

Other users may change or delete records in a table on the remote database after it was downloaded into MapInfo Pro. As a result, conflicts may exist between the data residing on the remote database and the new data that you want to upload to the remote database.

If there are changes to records in the original data source when saving a table back to a remote database, a **Resolve Conflicts** dialog box opens. A conflict exists when the original state of the record does not match the server state. This implies that another user has updated this database since it was extracted by MapInfo Pro.

In the **Resolve Conflicts** dialog box, you can choose the fields to use from the conflicting records to update the database with. There are three considerations when updating a record:

- The original server state of the record (the record as it appeared when initially extracted from the database).
- The current local state of the record (the record as it appears in the session of MapInfo Pro making the update, possibly after editing by the user).
- The current server state of the record (the record as it appears in the database at the time of the update).

The **Resolve Conflicts** dialog box opens once for each conflicting record. At any point in this process, you may choose to leave this interactive mode and have the rest of the conflicts resolved automatically. In that case, you can use all local values or all server values to resolve the conflicts in the records.

For each conflict found during a commit, a modal dialog box opens. This box displays enough information for you to decide which data values to use to update the row in question.

Type of conflict	Default resolution
Value changed on server, local value <i>unchanged</i>	Use server value
Value changed on server, local value <i>changed</i>	Use local value

The dialog box provides you with the following options:

Column

Shows the name of the column in the record that has data which is in conflict and needs to be resolved. If the column name is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value displays in the **Column** field.

Original DBMS

Shows the original data as it appeared when extracted from the database. If the original data is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value can be displayed in the **Original** field.

Current MapInfo Pro

Shows the data as it appears in the MapInfo Pro linked table you are trying to save. The MapInfo Pro field will be blank if the record has been deleted from the MapInfo Pro database. If the data from the MapInfo Pro linked table is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value can be displayed in the **MapInfo Pro** field.

Current DBMS

Shows data as it appears in the remote database at the time of the update. (This data might have been changed by another user since it was downloaded into an MapInfo Pro linked table.) The **Current** field will be blank if the record has been deleted on the remote database, after being downloaded into an MapInfo Pro linked table. If the current data from the remote database is too long and does not fit into the list box, a truncated representation will be shown instead. Its full value can be displayed in the **Current** field.

Current MapInfo Pro

Select this check box to update the remote database with the value from the MapInfo Pro linked table. If the current record on the database or the MapInfo Pro record was deleted, then this check box is not available. Instead, you must use the **MapInfo Pro** or **Current** button.

Current DBMS

Select to retain the current value on the remote database. If the current record on the database or the MapInfo Pro record was deleted, then this check box is not available. Instead, you must use the **MapInfo Pro** or **Current** button.

MapInfo button

This button selects all the MapInfo Pro values. If the record you are trying to resolve was deleted from the MapInfo Pro database, selecting the **MapInfo** button will delete the record from the remote database. If the record you are trying to resolve was deleted from the remote database, selecting the **MapInfo** button will insert the new record into the remote database.

Current button

This button selects all the current DBMS values. If the record you are trying to resolve was deleted from the MapInfo Pro database, selecting the **Current** button will ignore the deletion and retain the current record in the remote database. If the record you are trying to resolve was deleted from the remote database, selecting the **MapInfo** button will insert the new record into the remote database.

Column

Shows the full name of the column highlighted in the list box.

Original DBMS

Shows the full value of the original data highlighted in the list box.

Current MapInfo

Shows the full value of the MapInfo Pro data highlighted in the list box.

Current DBMS

Shows the full value of the current remote database data highlighted in the list box.

Stop Commit

The **Stop Commit** button terminates the entire update. A second dialog box confirms that this is what you really want.

Automatic

The **Automatic** button causes the interactive conflict resolution to end. A dialog box opens to select the automatic conflict-resolution modes you want to use for the remainder of this update. You can select one two automatic modes from the dialog box. You can accept MapInfo Pro values, or the values currently residing on the remote database.

Saving a Copy of a Table to a DBMS Server

You cannot save point data to a server in such a way that X and Y values are stored in separate columns.

To save a copy of a table to a DBMS server:

1. Choose a source table by doing one of the following:
 - If you have only one table open, on the **HOME** tab, in the **File** group, click **Save Copy As**.
 - If you have several tables open, on the **HOME** tab, in the **File** group, click **Save Copy As**. In the **Save Copy As** dialog box, choose a table from the drop-down list and then click **Save As**.
2. In the **Save Copy of Table As** dialog box, from the **Save as type** list, choose a destination for the table by selecting an open DBMS connection. The **Save Copy of Table As** dialog box automatically goes into DBMS Connection Mode (DBMS specific controls are displayed).
3. In the **File name** field, type the name of the table.
4. Click **Save**.

SQL Server Spatial users may see the **Select SQL Server Spatial Type** dialog box. This dialog box displays when saving a table that is in a Latitude and Longitude coordinate system and when that coordinate system has a valid EPSG code. If you see this dialog box, choose store the data as one of the following and then click **OK**.

- SpatialWare

Select to store data as a SQL Server SpatialWare table.

- SQL Server Spatial

Select to store data as a SQL Server Spatial table, and then select to save objects as:

Geometry - The SQL Server data type that represents information in a uniform 2-dimensional plane.

Geography - The SQL Server data type that uses Latitude and Longitude angles to identify points on the Earth. If the data is not valid for saving as Geography and you select Geography, then an error message displays and the table does not save.

5. In the **Save As** dialog box, specify a location for the .TAB file associated with the DBMS table.
6. Click **Save** to save the table to the specified location.

Disconnecting from a Remote Database

Disconnecting from a remote database server is a simple operation.

To disconnect from a remote database server:

1. On the **HOME** tab, click **Close DBMS**.
2. In the **Close DBMS Connection** dialog box, the **Connection** list displays all the open connections. Select the connection(s) you want to close and click **OK**.

The selected connection(s) close.

Note: You cannot disconnect if you have a live table open using the connection you are trying to close.

Removing an ODBC Data Source

To remove a ODBC data sources:

1. Open the Control Panel; click the **Start** menu, and then **Control Panel**.
2. On the **Control Panel**, in the **Classic View**, click **Administrative Tools** and then **Data Sources ODBC (ODBC)**.
3. In the **Data Sources ODBC Administrator** dialog box, select the **User DSN** tab. From the **User Data Sources** list, highlight the ODBC data source to remove and then click **Remove**.
4. Click **OK** to close the dialog box.

Working with Styles in DBMS Tables

A table may use one style for all objects within a table, or contain different styles for each row, called per row styles (per row style is optional). There are two requirements for setting up per row styles:

- A row must exist in the DBMS table
- You must set up a map catalog entry to activate the row style.

Using Per Row Styles for DBMS Table Layers

Per Row Styles allows the use of different object styles on a remote database. You can modify the styles of individual objects or groups of objects and save them to a DBMS table. To use **Per Row Styles**, the DBMS table must be set up correctly, and your `MapInfo_MapCatalog` must have the appropriate structure:

- The `MapInfo_MapCatalog` must contain columns that support the use of styles. They are: `RENDITIONTYPE`, `RENDITIONCOLUMN`, and `RENDITIONTABLE`.
- The map table itself must have a character column wide enough to store the complete style string. Style strings vary in width. We recommend a minimum of 50 characters be provided. If you plan to use custom symbols, which use much longer strings, allow 200 characters.
- The entry for the table in the `MapInfo_MapCatalog` must be set correctly. This means that the `RENDITIONTYPE` is 1, and the `RENDITIONCOLUMN` contains the name of the column that will contain the style string. This entry is set by MapInfo EasyLoader if the `MapInfo_MapCatalog` contains the new columns, or it may be set using the **Make Table Mappable** function.

Changing the Symbol Style in a Mappable DBMS Table

The **Change DBMS Table Symbol** command option allows you to change the symbol attributes for the point objects in a mappable DBMS table.

1. On the **TABLE** tab, in the **Maintenance** group, click **Database**, and **Change DBMS Table Symbol** to open the **Select DBMS Table** dialog box.
2. Select a table. Only mappable DBMS tables display.
3. In the **Change Table Object Style** dialog box, specify new style attributes for the objects in the selected table.

4. Refresh the linked table for the style change to take effect.

Working with Remote Tables from Specific Databases

You can specify whether to load and work on an entire table or only specific columns or rows from a table.

Working with SQL Server Tables

Converting Unsupported Geometries in SQL Server and SQL Server SpatialWare

Some times when you are creating a Map in MapInfo Pro and you are storing the results in SQL Server you create maps which use geometries that are not supported:

- **SQL Server Spatial** does not support arcs, and lines that do not have distinct points.
- **SQL Server SpatialWare** does not support arcs, ellipses, and rounded rectangles.

Note: If you have created a map you do not want to lose but cannot save to the DBMS of your choice due to unsupported geometries, then use the **Save Copy As** command option and save the map without the unsupported geometries.

If you try to save a map with unsupported spatial geometry types in SQL Server Spatial or SQL Server SpatialWare, these are the results:

- **Spatial Geometry Types with All Unsupported Objects:** If you have created a map that might contain all of the unsupported objects and you are trying to save to SQL Server Spatial or SQL Server SpatialWare, this message displays:

```
Table has unsupported objects (rounded rectangles, ellipses or arcs).
Convert to regions and/or polylines?
```

Click **Yes** to convert the unsupported objects to regions or polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the SQL Server Spatial or SQL Server SpatialWare database.

- **Spatial Geometry types with Region Objects Only:** If you have created a map that contains region objects only and you are trying to save to SQL Server Spatial or SQL Server SpatialWare, this message displays:

```
Table has unsupported objects (rounded rectangles or ellipses). Convert
to regions?
```

Click **Yes** to convert the unsupported objects to regions; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the SQL Server Spatial or SQL Server SpatialWare database.

- **For Spatial Geometry types with Line Objects Only:** If you have created a map that contains line objects only and you are trying to save to SQL Server Spatial or SQL Server SpatialWare, this message displays:

Arc is an unsupported object. Convert to polylines?

Click **Yes** to convert the unsupported objects to polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the SQL Server Spatial or SQL Server SpatialWare database.

Working with SQL Server with SpatialWare Tables

SpatialWare is a Precisely product that helps users store, access, manage, and manipulate spatial data as a standard part of their business data. You can query both spatial and non-spatial data within a single SQL Server query using SpatialWare. All of the strengths of SQL Server as a relational database are extended to spatial data using SpatialWare. Spatial data may for example be directly managed and edited by many different users simultaneously.

Cannot Upload Object

If you edit a mappable SpatialWare table and try to insert MapInfo Ellipse, Rounded Rectangle, or Arc objects into it, the following message displays:

Cannot Upload. Object format is not supported in SpatialWare (Ellipse, Rounded Rectangle, or Arc)

This is because you are trying to insert objects that are not supported. To fix the problem, delete these objects from the table or transform them to polylines or regions. To determine which objects have to be deleted or transformed, run a query in the **SQL Select** dialog box and specify "obj" in the Select Column clause. The resulting query will tell you the types of objects in the table. Select the objects you wish to delete or transform and display the selection in an editable layer in a Map window. To delete the objects, use the **Cut** command (located on the **SPATIAL** tab, in the **Clipboard** group). To transform the objects, use the **Convert to Regions** or **Convert to Polylines** commands (located on the **SPATIAL** tab, in the **Create** and **Edit** groups). For best results, transform ellipse and rounded rectangles into regions, and transform arcs into polylines.

If you make a SpatialWare table mappable with the Object Type default of Point and try to insert a line or region object into it, the same message Cannot Upload Object format is not supported in SpatialWare (Ellipse, Rounded Rectangle, or Arc) displays. This is because you are trying to insert objects other than a point. You need to make the table mappable with the Object type specified as **ALL**. To fix the problem, delete the table from the Map Catalog using MapInfo EasyLoader. Then re-add the table to the Map Catalog with an object type of **ALL** using the **Make Table Mappable** option.

Working with PostGIS Tables

Some times when you are creating a map in MapInfo Pro and you are storing the results in PostGIS you create maps which use geometries that are not supported: PostGIS does not support arcs, ellipses, rectangles, and rounded rectangles.

Note: If you have created a map you do not want to lose but cannot save to the DBMS of your choice due to unsupported geometries, then use the **Save Copy As** command and save the map without the unsupported geometries.

If you try to save a map with unsupported spatial geometry types in PostGIS, these are the results:

- **Spatial Geometry Types with All Unsupported Objects:** If you have created a map that might contain all of the unsupported objects and you are trying to save to PostGIS, this message displays:

```
Table has unsupported objects (rounded rectangles, ellipses or arcs). Convert to regions and/or polylines?
```

Click **Yes** to convert the unsupported objects to regions or polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the PostGIS database.

- **Spatial Geometry types with Region Objects Only:** If you have created a map that contains region objects only and you are trying to save to PostGIS, this message displays:

```
Table has unsupported objects (rounded rectangles or ellipses). Convert to regions?
```

Click **Yes** to convert the unsupported objects to regions; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the PostGIS database.

- **For Spatial Geometry types with Line Objects Only:** If you have created a map that contains line objects only and you are trying to save to PostGIS, this message displays:

```
Arc is an unsupported object. Convert to polylines?
```

Click **Yes** to convert the unsupported objects to polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the SQL Server Spatial database.

- **For Spatial Geometry of type Rectangle:** If you have created a map that contains rectangle objects and you are trying to save to PostGIS, this message displays:

```
Cannot upload Object - Rectangle object type is not supported in this table. Operation canceled.
```

Click **OK**. You cannot save the map you have created to the PostGIS database.

Working with Oracle Spatial Tables

Oracle Spatial is an implementation of a spatial database from Oracle Corporation. MapInfo Pro supports simultaneous connections to Oracle Spatial through the Oracle Call Interface (OCI) and to other databases through ODBC.

Supported Object Types

The Multipoint and Collection object types are translated into the Spatial Objects Oracle `MULTIPOINT` and `COLLECTION`, respectively, via Oracle OCI and vice versa. However, Oracle's `COLLECTION` object is broader in scope than MapInfo Pro's Collection, which only allows one `REGION`, one polyline and one multipoint. Therefore, conversion from MapInfo Pro object to Oracle objects and the conversion from Oracle objects to MapInfo Pro objects may not be a one-to-one translation.

The following table shows the relationship between MapInfo Pro objects and Oracle objects.

Oracle Spatial Objects	MapInfo Pro Objects
MULTIPOINT	Multipoint
COLLECTION	Collection
Point (cluster)	Multipoint
Line String	Polyline
Multiple Line String	
Polygon	REGION
Multiple Polygons	

The table indicates how Oracle Spatial objects are translated into MapInfo Pro objects. All point elements in an Oracle `COLLECTION` will be translated into one multipoint in a MapInfo Pro Collection; all Oracle Line objects (including single and multiple) will be translated into one MapInfo Pro polyline; and all Oracle Polygons (including single and multiple) will be translated into one MapInfo Pro `REGION`. Therefore, when an Oracle `COLLECTION` is modified and then saved back into Oracle

Server by using MapInfo Pro, the original structure of the Oracle `COLLECTION` object may be changed if it is more complicated than the MapInfo Pro Collection.

Oracle Spatial Requirements

If you are connecting to an Oracle Spatial database, the spatial schema supports points, lines, and polygon spatial types.

Before connecting to Oracle Spatial from MapInfo Pro, ensure that you are working with a compatible version of Oracle. For a list of supported database versions, see the *MapInfo Pro Install Guide*.

Primary Key used for New Table Creation or When Saving a Remote Copy

An Unique key ensures that an entry does not match any other entry from a different record. If a record does not contain any value, no error is reported. A Primary key requires that every record contains a unique value in that field. By making these values Primary keys, we enforce that every record has a value in this field.

Primary Key Auto-Increment for Oracle Databases

The Primary auto-increment feature manages the Primary key value for you. When you add a new record to a remote Oracle table, MapInfo Pro locks the table, checks for the highest value of the Primary key of the table, increments it by one (1), and then puts that value in the Primary key field. SQL Server Spatial users do not require this feature as the server-side software manages the Primary key automatically.

Use the Auto Key check box in the **Open DBMS Table Option** dialog box to enable this feature. When you select the Auto Key check box, the Primary key field is not editable and the Unique key is automatically incremented. If you do not select this check box, the Primary key field remains editable.

To access this feature:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Database Table** and select an Oracle database from the **Files of Type** drop-down list. Click **OK** to open the **Open DBMS Table Options** dialog box.
2. Select the **Auto Key** option to increment the Primary key of the selected table automatically for any new records.
3. Click **OK** to continue.

Oracle Object Map Verification Supporting Object/Map Validation

The **Check Regions** command (located on the **SPATIAL** tab, in the **Edit** group) removes region line segments that intersect each other. You can also think of this as nodes within a single polygon of a region where the polygon intersects itself, as when a node has more than 2 line segments emanating from it.

These cases can be broken down into two other instances:

- If a polygon has 2 looped sections, and the path traced by the nodes of the polygon follow a cursive figure 8 pattern, then we call this a Figure 8 polygon.
- If the same 2 looped polygon can trace its path as a cursive capital letter B, then we call this a Bow Tie polygon.

We think of the Figure 8 as worse than Bow Tie because the area of a Figure 8 is always incorrect, while the area of a Bow Tie can be correct and accurate. Both Figure 8's and Bow Ties are detected.

Creating Legends from/for a Live Table

You can retrieve unique styles from the table using the **Create Legend** wizard. You can retrieve styles from the map catalog, if performance is your primary concern, but if you prefer a more visually descriptive and appealing spatial representation of the unique map styles in your live table, you can create legends from a live table instead.

When are unique map styles available for a live table?

In general, remote databases have no consistent way of storing styles for geographic data. MapInfo Pro gives you two different ways of associating styles with geographic data for remote databases. The first way is to specify a common style for a database table in the map catalog, which is used for all records in that database table. The second way is to have an additional column for the database table that specifies a style for each record in that table. (MapInfo Pro uses the map catalog to keep track of the style column for a database table.) Unique map styles are available for a database table when it has this designated style column.

To see this functionality:

1. Open a remote DBMS connection and select a live table for display.
2. On the **MAP** tab, in the **Content** group, click **Add to Map**, and click **Legend** from the list to open the **Create Legend - Choose Layers** dialog box.
3. Select a layer to create a legend from and click **Next** to open the **Create Legend - Legend Default Properties** dialog box.
4. Click **Next** to open the **Create Legend - Frame Properties** dialog box.
5. In the **Styles from** box, there are three options. The first option, **map catalog**, provides the existing support and is still the default for live tables.
 - Select **map catalog** to retrieve the default styles for the selected legend frame from the map catalog. Use this option when you are concerned with performance. Retrieving map styles from live tables on a remote database can take a long time, but retrieving a default style from the map catalog can be significantly faster. Remember that styles in the map catalog may not be as visually descriptive as the other options. This is the default option for live tables, but is disabled for other types of tables.
 - Select **unique map styles** to retrieve all unique object styles for the live access table for a visually appealing legend. For extremely large tables, this option can take longer than the first option. This option is selected by default when the legend frame is not a live access table.

- Select **unique values in a column** to retrieve the styles associated with the values saved in a particular column in the database table for a visually appealing legend. For extremely large tables, this option can take longer than the first option.
6. Click **Save frame setting to Metadata** to preserve the choice you made in this dialog box. When you re-open this dialog box the settings from the metadata are used as default values instead of the system set default values.
 7. Click **Finish**.

See [Troubleshooting your DBMS Access](#)

MapInfo Pro does not Maintain the Curve Type in Oracle Data

When reading Oracle tables, MapInfo Pro changes records containing geometries that do not directly translate to MapInfo Pro geometry types. This happens when working with lines and polygon boundaries containing segments that are curve types or circles. MapInfo Pro does not support the curve type, so it converts these to polylines. MapInfo Pro also converts circles into regions. When saving these records back to the database, you may lose some topological information as a result. This is something to be aware of when sharing your Oracle data with other applications, such as Autodesk's Map3D.

MapInfo Pro shows a message before saving data back to the Oracle database when that data contains curved geometries. The message is as follows:

The Oracle table you are updating contains one or more geometry types that MapInfo Pro does not support, so the geometry type has been converted to a supported type. Saving these geometries may introduce topological errors into your database. Click Yes to continue, or No to discard changes that were made to unsupported geometries. Edits to attribute data save in either case.

Note: When executing the MapBasic Commit statement, the prompt displays only when it contains the Interactive keyword.

Converting Unsupported Geometries in Oracle

Some times when you are creating a map in MapInfo Pro and you are storing the results in Oracle you create maps which use geometries that are not supported: Oracle does not support arcs, ellipses, rectangles, and rounded rectangles.

Note: If you have created a map you do not want to lose but cannot save to the DBMS of your choice due to unsupported geometries, then use the **Save Copy As** command and save the map without the unsupported geometries.

Oracle Geometry Conversion Behavior

If you try to save a map with unsupported spatial geometry types in Oracle, these are the results:

- **Spatial Geometry Types with All Unsupported Objects:** If you have created a map that might contain all of the unsupported objects and you are trying to save to Oracle, this message displays:

```
Table has unsupported objects (rounded rectangles, rectangles,
ellipses or arcs). Convert to regions and/or polylines?
```

Click **Yes** to convert the unsupported objects to regions or polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Oracle database. A confirmation message explains that the operation is canceled.

- **Spatial Geometry types with Region Objects Only:** If you have created a map that contains region objects only and you are trying to save to Oracle, this message displays:

```
Table has unsupported objects (rounded rectangles, rectangles, or
ellipses). Convert to regions?
```

Click **Yes** to convert the unsupported objects to regions; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Oracle database.

- **For Spatial Geometry types with Line Objects Only:** If you have created a map that contains line objects only and you are trying to save to Oracle, this message displays:

```
Arc is an unsupported object. Convert to polylines?
```

Click **Yes** to convert the unsupported objects to polylines; you would select **No** to decline to convert the unsupported objects. If you decline, you cannot save the map you have created to the Oracle database.

Oracle Operating System Authentication and Configuration

When you choose OS authentication for a user, the user account is maintained by the Oracle database, but password administration and user authentication is performed by the Operating System (OS). With OS authentication, your database relies on the underlying operating system to restrict access to database accounts. A database password is not used for this type of login.

By default, Oracle allows operating-system-authenticated logins only over secure connections, which precludes using Oracle .NET and a shared server configuration. This default restriction prevents a remote user from impersonating another operating system user over a network connection.

Setting REMOTE_OS_AUTHENT to TRUE in the database initialization parameter file forces the RDBMS to accept the client operating system user name received over a non-secure connection and use it for account access.

Any change to this parameter takes effect the next time you start the instance and mount the database. Generally, user authentication through the host operating system offers faster and more convenient

connection to Oracle without specifying a separate database user name or password. Also, user entries correspond in the database and operating system audit trails.

Setting Prefix for OS Authenticated User

Set the initialization parameter `OS_AUTHENT_PREFIX`, and use this prefix in the Oracle database user names. The `OS_AUTHENT_PREFIX` parameter defines a prefix that the Oracle database adds to the beginning of every user's operating system account name. When a user attempts to connect, Oracle compares the prefixed user name with the Oracle user names in the database.

For example, assume that `OS_AUTHENT_PREFIX` is set as follows:

`OS_AUTHENT_PREFIX=OPS$`

Note: The initialization parameter `OS_AUTHENT_PREFIX` is case-sensitive in some operating systems. Refer to your operating system specific Oracle documentation for more information about this initialization parameter.

If a user named `tsmith` is to connect to an Oracle database installation and be authenticated by the Operating System, then the Oracle database checks whether a corresponding database user `OPS$tsmith` exists. If so, the user will connect. All references to a user authenticated by the Operating System must include the prefix, `OPS$`, as seen in the example `OPS$tsmith`.

The default value of this parameter is `OPS$` for backward compatibility with previous versions of Oracle databases. However, you might prefer to set the prefix value to some other string or a null string (an empty set of double quotes: `""`). Using a null string eliminates the addition of any prefix to operating system account names, so that Oracle user names exactly match operating system user names.

After you set `OS_AUTHENT_PREFIX`, it should remain the same for the life of a database. If you change the prefix, then any database user name that includes the old prefix cannot be used to establish a connection, unless you alter the user name to have it use password authentication.

Creating a User who is Authenticated by the Operating System

The following statement creates a user who is identified by Oracle and authenticated by the operating system or a network service. This example assumes that `OS_AUTHENT_PREFIX = ""`.

```
CREATE USER scott IDENTIFIED EXTERNALLY;
```

Using `CREATE USER <user name> IDENTIFIED EXTERNALLY`, you create database accounts that must be authenticated by the operating system or network service. Oracle will then rely on this external login authentication when it provides that specific operating system user with access to the database resources of a specific user.

See the *Oracle Database Advanced Security Administrator's Guide* (http://docs.oracle.com/cd/B19306_01/network.102/b14268/toc.htm) for more information about external authentication.

Improving Data Performance to a DBMS

Considerations when Working with Linked Tables

The following conditions must be met to edit a linked table:

- You must select from a single table.
- You must have update access to the table.

Some fields in a table may be read-only. In mappable linked tables, you can edit the objects

- The table must have a unique index or a primary key constraint defined.

These are the primary key or unique index columns. They enable updates to be reliably committed to the server table. If you insert a new row or edit an existing row, the value in these fields must be unique within the ODBC Database table or you will receive an error during the commit.

- You must include at least one editable field in the column selection list.

Extra fields may be included in the linked table for updates.

A field in an ODBC Linked table is not editable when:

- It is a read-only column in the result set (as indicated by the ODBC Data Source).
- It is a long character data type in the ODBC Database (width > 254).
- It is a BINARY data type in the ODBC Database (returned as a string of Hexadecimal characters).
- It is a TIME data type in the ODBC Database (returned as a MapInfo Date, displayed as blank).

If the total number of rows stored in the `MapInfo_MapCatalog` is out of sync with the actual number of rows in the table, some things may not work correctly. The map will always include all of the map objects, but the following could occur:

- The row count displayed in the **Browser** is incorrect.
- The MapBasic statement to fetch last does not return the correct row.
- Thematic maps, particularly ranged thematic maps, may be wrong.

Troubleshooting your DBMS Access

Getting good live access performance is an important issue with large DBMS tables. This section covers this issue as well as some explanation about when DBMS tables are read only and when DBMS spatial objects are read only.

My Open DBMS Connection is Grayed Out

If your connection in the **Open DBMS Connection** dialog box is grayed out, then you need to install the ODBC or OCI support, see [Creating a Data Source Connection](#).

I get a Read-Only Message when Opening a DBMS Table

If you see a read-only message when opening a DBMS table, then ensure that you have write permission for the table to work with it. The table may also require a unique primary key-for views, this column must be named MI_PRINX.

I do not see the Open DBMS Connection Dialog to Select Oracle Spatial

The **Open DBMS Connection** dialog box displays when you have both Oracle Spatial (OCI) and ODBC connections set up. If you do not see this dialog box, then check that you have an Oracle Spatial (OCI) connection, see [Creating a Data Source Connection to Oracle](#), and that you have installed an Oracle Client.

I cannot display Data on the Map from my DBMS Table

If you cannot display data from the DBMS table that you are accessing on the map, then ensure that the table is mappable, see [Making a DBMS Table Mappable to Display it on a Map](#).

A Mappable Table does not Display on a Map

If after making a table mappable it still does not display on the map, then reopen the table in MapInfo Pro. MapInfo Pro reads the mapping information each time you open a mappable table. Your table data should then display on the map.

File Size Exceeds 2 GB

File size in the cache cannot exceed the system limit of 2GB. Unlike the DBMS, MapInfo Pro does not manage file sizes. To work around this, a large file must be split in two and you must then use a JOIN query in MapInfo Pro.

A DLL Warning Message Displays

Necessary resources must be in place to access the remote data from MapInfo Pro. If it is not, then warning messages display when you try to connect to this data to explain that you do not have the required DLL files.

When Is a DBMS Table Read-Only?

The DBMS table can be read-only under any of the following circumstances:

- The data downloaded from the server database is not editable.
- There are no editable columns in the data downloaded from the server database.
- The data downloaded from the server database does not contain a primary index.

If the data downloaded from the server database does not contain a primary index, you can create one. Then the table will become editable. The next section explains how to create a primary index on a remote table from MapInfo Pro.

When Is a DBMS Spatial Object Read-Only?

The spatial object itself may not be editable.

A DBMS table's spatial objects may not be editable under the following circumstances:

- Spatial data is not actually stored in a column on the table. This would happen if a function were used on the spatial data that generated spatial data, such as buffering the object on the server.
- Spatial data is three-dimensional.
- When the column holding the per row style is read-only.

How do I open Large DBMS Tables Faster

This method applies to opening large tables of a quarter million or more rows and will virtually eliminate the initial startup time on the table.

To open large DBMS tables faster:

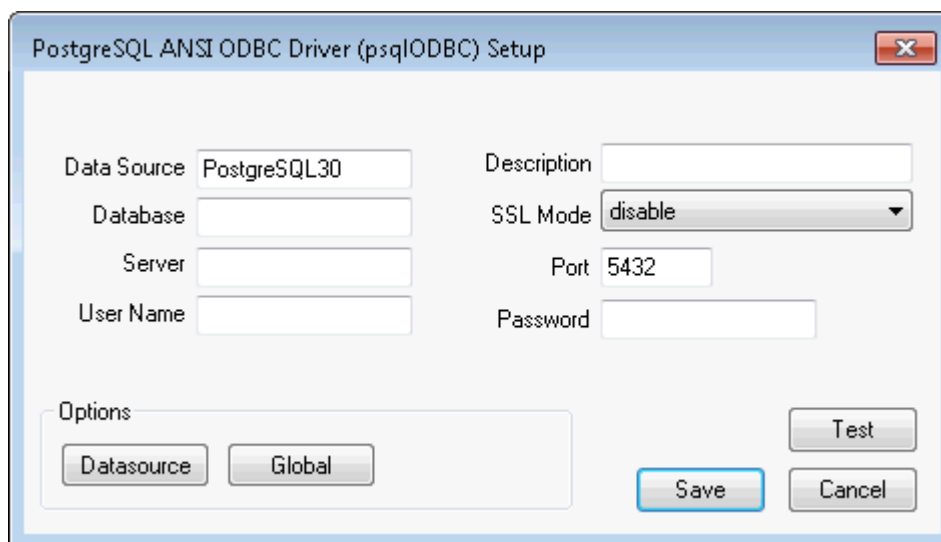
- Modify the `MapInfo_MapCatalog` definition to include a new column, `NUMBER_ROWS` that is an integer column.
- When the count of the number of rows does not change dramatically, run the tool `MiRowCnt` to determine the row count and store it in the `MapInfo_MapCatalog`.

PostGIS users can improve how fast large PostGIS tables open by setting the **Use Declare/Fetch** option in the PostgreSQL Unicode driver's connection properties. For instructions on how to do this, see [How do I Open Large PostGIS Tables with an Out of Memory Message](#).

How do I Open Large PostGIS Tables with an Out of Memory Message

If you receive an out of memory message while opening a large PostGIS table, then you must enable the **Use Declare/Fetch** setting in the PostgreSQL Unicode driver's connection properties.

You can locate your ODBC drivers in the Windows **Control Panel** in **Administrative Tools**. Select **ODBC Data Sources (64-bit)** to open the ODBC Data Source Administrator. On the **User DSN** tab, double-click the **PostgreSQL Unicode** driver from the list. The **PostgreSQL Unicode ODBC Driver Setup** dialog box opens. Click **Datasource** to open the **Advanced Options** dialog box and select the **Use Declare/Fetch** check box.



How Do I Improve Performance Connecting to SQL Server

To improve performance when accessing large SQL Server tables, add a Multiple Active Result Sets (MARS) connection setting to the connection string in the live access .TAB file. The connection attribute to update is **\DATA LINK\ConnectionString**, for example:

```
"\DATA LINK\ConnectionString" =
"DSN=local-native10;UID=username;Trusted_Connection=Yes;APP=MapInfo
Pro;WSID=hostname;DATABASE=test;MARS_Connection=Yes;"
```

You may also add the MARS connection setting to the connection string of MapBasic `Server_Connect()` command.

Note that a MARS connection:

- Does not work for SpatialWare tables.
- Only applies to SQL Native Client or SQL Server Native Client 10. Other connection types so not benefit from this setting.

Advanced Topics for Managing Data Sources

Managing Data Sources with the ODBC Administrator

The **ODBC Administrator** is a utility freely distributed by Microsoft for managing your ODBC drivers and data sources. You can run this utility from your Windows `windows\system` directory `ODBCADM.EXE` or from **Administrator Tools** on the Windows **Control Panel**.

If you require additional setup for your data source and driver, contact your Database Administrator (DBA) for assistance. They will understand the setup requirements for the data source you wish to access.

Message: The setup routines for the <driver name> driver could not be loaded

If you try to add a new data source with a driver that requires additional software that is not installed you get the message:

The setup routines for the <driver name> driver could not be loaded. You may be low on memory and need to quit a few applications.

This means that the driver DLL could not be loaded, most likely because it could not load dependent DLLs. To get a useful message indicating which DLL is required but not found, try `DLLMGR.EXE`, or double-check that you have properly installed all required drivers and your path is set correctly.

Support for DBMS

Support for DBMS is in two DLL files, `midlodb.dll` and `midloci.dll`. You can copy these files to the MapInfo Pro folder (under `C:\Program Files\MapInfo\Professional` for example) to prepare a MapInfo Pro installation for DBMS support. These files are not specific to a MapInfo Pro version.

After copying these files, they will not uninstall along with MapInfo Pro.

Registering Raster Images

Raster images can provide context to your maps by giving them detail and definition. This chapter reviews the details of registering and working with raster image files.

Working with Raster Images

There are a number of ways you can obtain raster image files. If you have a scanner and scanner software, you can use the scanner to create raster image files. MapInfo Pro can read and display the raster image files created with the scanner software.

Some graphics software packages let you save or export images into raster file formats, such as TIFF (Tagged Image File Format). So if you can create a TIFF file with your draw or paint package, you can display it in MapInfo Pro.

You can also purchase raster images from MapInfo Pro or other commercial vendors. Some data vendors also offer scanning services.

Determining Map Coordinates

When registering your raster image, you need to know the map coordinates that correspond to your image. If your raster map image shows a graticule (a grid of longitude/latitude lines), you can determine map coordinates by noting the longitude/latitude labels along the graticule.

If your map does not show a graticule, you may be able to determine map coordinates by locating prominent map features, for example, the Northwest corner of a region, and then using another MapInfo Pro table as a reference to determine the coordinates of those prominent features.

For a discussion of this process, see [Choosing Control Points from an Existing Map](#).

An Introduction to Raster Image Registration

What Is a Raster Image?

A raster image is a type of computerized image that consists of row after row of tiny dots (pixels). If you have a scanner and scanner software, you can create a raster image by scanning a paper map. After you scan a map image and store the image in a file, you can display the file using MapInfo Pro.

There are many different raster image file formats. For a list of the raster image files that MapInfo Pro can read, see *MapInfo Pro Data File Support* in the *MapInfo Pro Install Guide*.

What Does It Mean To Register a Raster Image?

When you register a raster map image, you enter map coordinates (e.g. longitude/latitude degrees), and you indicate which locations on the raster image correspond to those coordinates. You must register each raster image before displaying the image in MapInfo Pro, so that MapInfo Pro can perform geographic calculations, such as distance and area calculations, when displaying the raster map.

The first time you open a raster image file in MapInfo Pro, MapInfo Pro will ask you if you want to register it or use it simply for display. Click the Register button to open the **Image Registration** dialog box. By completing this dialog box, you tell MapInfo Pro how to register the raster image and determine the coordinate system for the image. MapInfo Pro stores the raster image's registration information in a table file for future re-use. The next time you run MapInfo Pro, you can re-open the raster table without repeating the registration process. Thus, you only need to register each raster image once.

Raster image files provided by MapInfo Pro are already registered. You do not need to perform the registration process when you display the sample raster data included with MapInfo Pro.

Understanding Raster Images in MapInfo Pro

Using raster image files, you can bring paper maps, photographs, and other graphic images into MapInfo Pro. For example, if you work with paper maps, you probably want to use those paper maps

as the foundation for the maps you create in MapInfo Pro. Once you scan your paper map into a raster image file, you then can display it in a Map window.

Using Raster Images as a Backdrop for MapInfo Pro Maps

Using a raster image as the base layer of your map gives you a detailed backdrop for your other map layers. You can easily change the size, scale, or center point of the displayed image. For example, if you want to enlarge part of the image, use the **Zoom In** command. Keep in mind, however, that as you increase the image's size, the display will become grainier if you exceed a 1-1 pixel ratio. Each pixel in the image becomes more distinct, causing the image to look more like a series of blocks instead of the intended picture.

Using Raster Images as a Stand-Alone Image

You may have a satellite image of topography that would be impossible to duplicate as a vector image that you want to use for a presentation. You can display the image in MapInfo Pro and then incorporate it into a page layout.

Map Editing with Raster Images

Once you have superimposed map layers on top of your raster image, you can use the raster image as a reference while you edit your map layers. The process of editing based on a screen image is known as *heads-up digitizing*. (To minimize image distortion, only digitize from map images with known projections or rectified aerial photographs.)

Placing a Logo on a Page Layout with Raster Images

Most raster images displayed in MapInfo Pro are images of paper maps or aerial photographs, but almost any image can be scanned and made into a raster image. For example, with an image like your company logo, you can open and display the raster file in MapInfo Pro without registering it because control point coordinates are irrelevant. You can then place it in a frame in a layout window and incorporate the logo into your page layout.

Raster Image Format Details

There are many different raster image file formats. For a list of the raster image files that MapInfo Pro can read, see *MapInfo Pro Data File Support* in the *MapInfo Pro Install Guide*.

MapInfo Pro also supports:

- Map Tile Server raster images. For more information, see [Introduction to Mapping Tile Servers](#).
- AirPhotoUSA raster images taken at different elevations for particular areas in the United States. The AirPhotoUSA map handler allows MapInfo Pro users to open and display the imagery contained in AirPhotoUSA Map files as a layer. MapInfo Pro treats these images like any other raster file. The `MAPINFOW.PRJ` file has been updated to accommodate the AirPhotoUSA changes.

Note: The maximum supported raster image varies by raster handler.

ARC Grid Format Support

MapInfo Pro uses the Arc Grid Handler to use and display ESRI grid files. You will see the file extension options in the **Open Table** dialog box when you choose the **Files of Type** option **Grid Image**. This allows you to open both ASCII and Binary Continuous and Classified grid formats but you can only hillshade the Continuous grid files. These types of data files are available from the USGS Seamless Data Distribution System.

Note: The Arc Grid Handler does not support the Arc Grid Export format (*.e00 extension) in MapInfo Pro.

Color Options for Raster Images

MapInfo Pro can read the following types of raster images:

- **Monochrome images:** Each pixel in a monochrome image can be displayed using two colors, usually black and white. These images take up the least amount of space and will display the fastest.
- **8-bit gray-scale images:** Each pixel in a gray-scale image can be black, white, or a shade of gray. These pixel colors are stored in a palette of up to 256 different shades of gray.
- **8-bit color images:** Each pixel in a color image can be any color from a palette of available colors. The set of available colors depends in part on the image file format and the source of the image. An 8-bit image contains eight bits, or one byte, of information from a palette of 256 different colors.
- **24-bit color images:** Each pixel contains twenty-four bits, or three bytes, of information per pixel. The 3 bytes represent the red, green and blue color components, which means that the image can contain any of over 16 million different colors.
- **32-bit color images:** Each pixel contains 32 bits, or four bytes, of information per pixel. These bytes represent the red, green, blue and alpha color components. This allows the image to have variable amounts of transparency or translucency per pixel.

For best results when viewing a raster image, we recommend using a high resolution video display.

32 BPP Raster Image Support

MapInfo Pro raster image support now includes the ability to load images using 32-bits per pixel (bpp) and honor per pixel transparency or translucency. This is also referred to as *alpha-blending*. This improves the appearance of image layers and maps. It is especially noticeable for **WMS** and **WMTS** servers that produce images with transparent backgrounds. Previously, the image was converted to 24 bpp on the fly and sometimes this resulted in the transparent pixels being displayed as black.

Raster Transparency Improvements

The raster transparency support has been extended to automatically detect transparency of an image background and still allow the user to select one more colors to make transparent in the image. This means that the Adjust Image Styles dialog will no longer disable the transparent color controls and the user can choose a color to make transparent in the image layer.

Opening a Raster Image

When you open a raster file you need to register it to identify coordinate point references for the image. Using a vector map as a reference, you identify the coordinates of the vector map and match them with equivalent points on the raster image. This coordinate information allows MapInfo Pro to determine the position, scale and rotation of the image so that you can overlay vector data on top of the image. The coordinate information is stored in a TAB file created during the registration process. The TAB file enables you to re-open the raster file in MapInfo Pro format.

You usually register the image the first time you open it. However, you do not need to register the image if you do not plan to use vector data with it, or if it already contains georegistration information.

Raster images usually fall into one of three categories:

- A fully registered image, containing control points and a projection (for example, GeoTIFF file).
- A partially registered image containing control points, but missing a projection (for example, an image with an associated World file).
- An unregistered image missing control points and a projection.

Once the image is registered, opening it again requires a slightly different procedure. Opening both unregistered and registered images is explained in the next section.

Opening a Registered Raster Image

You only have to register a raster image once. Each subsequent time you open the file, it can be opened like any other MapInfo Pro table.

The sample raster image files included with MapInfo Pro have already been registered (contain a TAB file). If you purchased a raster image from another source, it may already have a TAB file attached. You will not need to register these images either.

To open a registered raster image:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. Choose the table file (such as `PARCELS.TAB`) from the list in the dialog box. (The TAB file contains the control point information supplied during the registration process.)
3. Leave the File Format as it is (MapInfo Pro). The registration process already created a MapInfo Pro readable file (TAB file).
4. Click **Open**.

MapInfo Pro opens the raster image table and displays the image in a **Map** window.

Opening an Unregistered Raster Image

In MapInfo Pro, you can open an unregistered raster image and display it directly in a **Map** window without manually registering the image. This is useful whenever accurate control point coordinates are unnecessary, such as when the image is not a map (for example, a logo) or when you are using a stand-alone image.

To open an unregistered raster image without manually registering it:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **List Files of Type** drop-down list, choose **Raster Image**.
3. Choose the file you want to open, and click **Open**.

A dialog box displays asking you if you want to display or register the image.

4. Choose **Display**.

The image displays in a **Map** window.

A TAB file is created for the image using non-earth coordinates. MapInfo Pro uses dummy registration points to position the image.

If you decide later that you want to use the image with a vector map, you can re-register the image. Follow steps 1 and 2 above. Since a TAB file has already been created for the image, MapInfo Pro will tell you that a table definition already exists and ask you if you want to overwrite it. Choose **Yes** to proceed to the **Image Registration** dialog box and register the image.

Opening a Georeferenced Raster Image

MapInfo Pro includes support for the direct opening of georeferenced raster images. Georegistration information consists of three or more control points and a projection. Any raster image that contains complete georegistration information can be opened directly in MapInfo Pro using the Open command.

If the raster handler for the image can return all the georegistration information, a .TAB file can automatically be created. For example, MapInfo Pro's tiff.rhl raster handler can return georegistration information for GeoTIFF files.

To open a georeferenced image:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **List Files of Type** drop-down list, choose **Raster Image**.
3. Select the file you want to open, and choose **Open**. Your image displays in a **Map** window.

Additional support has also been included for World files (*.TFW). World files contain control point information, but no projection. When you open a raster image that does not contain registration information, the raster engine will search for a World file associated with it to obtain control points for the image. MapInfo Pro will then display the **Choose Projection** dialog box, where you can specify a projection and open the image.

If there is no registration information and no World file associated with the image, the **Display/Register** dialog box displays. You can either display the unregistered image, or register it. As explained above, when opening unregistered images, the **Display** option creates a .TAB file for the image using a non-earth projection and dummy control points. The **Register** option displays the **Image Registration** dialog box, where you register the image.

Raster File Search When Opening Tables

When you open a MapInfo Pro table that contains a raster or grid file, MapInfo Pro searches for the file if it cannot find it immediately. For example, the search capability can simplify opening tables if your .TAB file refers to an image that resides on a DVD drive, and different letters are used to designate the DVD drive on different systems.

MapInfo Pro uses the following search order:

1. Search for the file where specified by the **FILE** tag in the .TAB file.
2. Search for the file in the same directory as the .TAB file.
3. Search for the file in the **Table Search** path specified on the **PRO** tab, by clicking **Options**, and **Directories**.

MapInfo Pro either opens the table as though it found the file in the specified location, or it will report an error because the file could not be found in any location.

Registering the Coordinates of a Raster Image

Before you can overlay vector data on top of a raster image, you must first register the raster image so that MapInfo Pro can position it properly in a **Map** window. In the **Image Registration** dialog box, you can identify control point coordinates and specify the appropriate projection for the raster image.

Control points are the coordinates you identify on the raster image that MapInfo Pro can use later to match up to other layers. It is very important to provide accurate control point information when registering a raster image, so MapInfo Pro can display raster images without distorting or rotating them. Later, when you overlay vector data, MapInfo Pro distorts and rotates the vector data so both layers can line up properly. Identifying significant control points makes this match up process easier. We suggest you use highway/street intersections and prominent landmarks as control points, as they rarely move.

Specifying the correct projection of the raster image is also important for accurate display. Images that do not have known projections, such as unrectified aerial photographs, are less suitable for use with vector data.

There are two ways to register a raster image in MapInfo Pro. Each involves specifying the map coordinates of control points on a reference map and matching them with equivalent points on the raster image. To determine map coordinates, you can:

- Identify a point's coordinates from the paper map.
- Determine a raster images control point coordinates on screen and automatically transfer the information to the **Image Registration** dialog box.

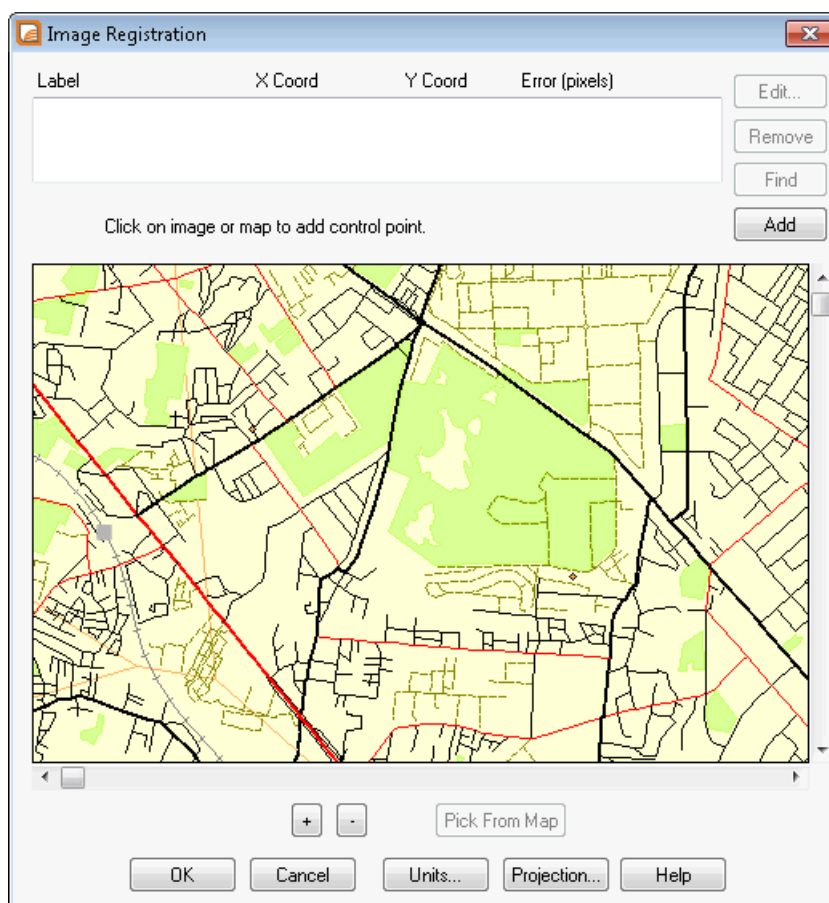
Note: If you scanned in the image from a paper map, the map most likely contains a graticule (latitude and longitude grid). You can choose those coordinates for prominent features and enter them in the **Image Registration** dialog box.

To register the coordinates of a raster image and create a .TAB file from the raster image:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box.
2. In the **Files of type** drop-down list, select the **Raster Image** file format.
3. Choose a raster image file, and click **Open**.

The **Display/Register** dialog box displays.

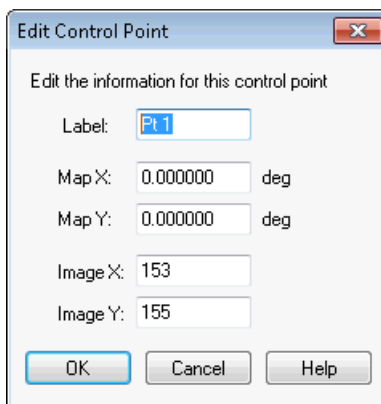
4. Click **Register** to display the **Image Registration** dialog box. This dialog consists of a Control Points list box and a preview of the raster image.



5. Choose the **Projection** button to specify the raster image's projection. It is easier to match up the maps if you select the same projection for the raster image as the vector images (layers) you want to use. Choosing the same projection minimizes image distortion when overlaying the vector map layers. You cannot change the projection from the **Map** window.

Note: If you do not set the projection, MapInfo Pro defaults to Longitude/Latitude or to the default table projection set by using the map window preferences you set.

6. You can set the units for the control point entries by clicking the **Units** button.
7. To select the actual coordinates to register in the raster image, either:
 - Click the **Add** button to add a new entry into the **Control Points** list box and then double click the new entry.
 - Click on the image or map to add a control point to open the **Add Control Point** dialog box.



8. Specify the coordinates from the paper map in the dialog box. The location of each point is marked on the preview image with a "+" symbol. You can change the Label to something more meaningful to you, such as US85/LA132, to describe an intersection in the raster map. You might also select a prominent building or other very specific address that is easily identifiable in both maps.

Note: If you have a MapInfo Pro map layer of the same area and projection, you can open it in a separate **Map** window on the **TABLE** tab, in the **Maintenance** group, click **Raster**, and **Select Control Point**.

1. Repeat this process (**step 6** and **step 7**) until you have registered at least three or four points on the raster image. Try to vary the position of these control points to better define the map. If too many points are in a straight line, an error displays.

If you are working with an image for which you do not know the projection (such as an aerial photograph), enter at least three control points to improve accuracy.

2. When you have completed your control point entries, click **OK**. The raster image displays as a .TAB file.

Use the **+** and **-** buttons to zoom in and out of the raster image. Zooming in on the image may help you obtain greater accuracy in control point location. If you are having difficulty finding a control point in the Image Registration image, click the control point entry in the Image Registration list and click the **Find** button to display the point in the image.

When you complete the **Image Registration** dialog box, MapInfo Pro saves the registration information in a table (.tab) file. In later MapInfo Pro sessions, you can re-open the table (on the **HOME** tab, in the **File** group, on the **Open** list, click **Table**), without repeating the registration process, and without having to choose **Raster Images** as the file type in the **Open** dialog box.

Choosing Control Points from an Existing Map

To transfer the coordinates automatically from a vector map to a raster image, you need a vector map of the same image. Then, you display the vector map side by side with the **Image Registration** dialog box, which shows a preview of the raster image. Click a prominent feature in the vector map to determine its coordinates and transfer this control point to the **Image Registration** dialog box.

To register the vector map control points to the raster image:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box. Select the **Raster Image** file format.
2. Choose the raster image file and choose **Open**. The **Display/Register** dialog box displays.
3. Select **Register**. The **Image Registration** dialog box displays. Choose the **Projection** button to specify the image's projection, if necessary.
4. To add control points, click the **Add** button to add a control point entry to the **Control Points** list.
5. Click the **Pick from Map** button. The **Edit Control Point** dialog box displays with the new control points in the **Map X** and **Map Y** fields. Click **OK** to save these entries.
6. Double click this entry in the **Control Point** list and click the matching control point location in the image pane. MapInfo Pro updates Image X and Image Y coordinates in the **Edit Control Point** dialog box with the selected coordinates.
7. Click **OK** to save these entries.

Note: Remember to type a meaningful description of this location in the **Label** field.

8. Repeat this process until you have identified three or four non-linear points in the preview pane of the **Image Registration** dialog box.
9. After you have defined all of the control points, click **OK** in the **Image Registration** dialog box. The raster image displays in the **Map** window under the vector layer.

Note: You can modify these entries on the **TABLE** tab, in the **Maintenance** group, by clicking **Raster** and **Modify Image Registration**.

Reprojecting a Raster Map

From time to time, you will need to use a raster map registered in one projection in another map in different projection. You can reproject the raster image, that is, change the coordinate system and the way the raster image displays to accommodate the new vector map. Typically, the open map dictates the projection of the successively displayed images. You can also reproject the raster using the projection of a vector table.

Reprojecting a Raster based on a Vector Map

If you are working with registered raster data such as satellite and aerial photo images, scanned maps, grids, seamless tables, WMS, or WMTS data, you might want to reproject that raster data to accommodate a vector map.

MapInfo Pro performs the raster reprojection when you open a registered raster image inside of an existing Map window with a different projection or when you change the projection of a Map window. During the raster reprojection process, MapInfo Pro recalculates the pixel values of the source image to make them display correctly in the destination image. In this resampling process, MapInfo Pro tries to restore every pixel value of the image based on the pixels around it. In MapInfo Pro there are two methods for calculating the pixel values of the destination image: Cubic Convolution and Nearest Neighbor. These are industry-standard terms used by GIS professionals all over the world. These methods are described later in this section.

Due to this feature, these are the precedence rules for Map window projection.

Both vector and raster layers have "equal rights", that is, every new layer (without regard for type) is reprojected into the current Map window's projection. That is, which ever map is opened first takes precedence for projection.

Note: You can change the projection of a Map window containing a mix of raster and vector layers by setting the image processing reprojection preference to *Always* or *Optimized*.

MapInfo Pro does not let you change the projection or image processing/reprojection of a map that displays raster images from a tile server, because this would create inaccuracies in your map. The projection system of the data may vary between tile servers. For this reason, we do not recommend displaying tiles from different tile servers in the same map unless the tile servers use the same projection system.

When you are working with palette raster images (like a scanned map), an image might contain all 256 colors. If you display this image in the **Adjust Image Styles** dialog box and clear the Transparent check box, the color "white" becomes transparent. If you do not want this display behavior, select the Transparent check box and choose another transparent color (using Select Color).

Transferring Vector Map Coordinates Directly to a Raster Map

To transfer the coordinates automatically from a vector map to a raster image, you need a vector map of the same image. Then, you display the vector map side by side in the **Image Registration** dialog box, which shows a preview of the raster image. Click a prominent feature in the vector map to determine its coordinates and transfer this control point to the **Image Registration** dialog box.

To transfer a vector map's coordinates to a raster image:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Table** to open the **Open** dialog box. Select the **Raster Image** file format.
2. Choose the raster image file and click **Open**. The **Display/Register** dialog box displays.
3. Click **Register**. The **Image Registration** dialog box displays. A preview of the raster image appears in the lower half of the dialog box.
4. Choose the **Projection** button to specify the image's projection. If you do not set the projection, MapInfo Pro defaults to Longitude/Latitude or to the default table projection set in the Map Window Preferences.
5. To add control points, click the **Add** button to add a control point entry to the **Control Points** list.

- Click the **Pick from Map** button and select a location in the Map window that matches a location in your raster image. MapInfo Pro updates the Map X and Map Y fields in the **Edit Control Point** dialog box with the new coordinates. Click **OK** to save this entry and close the dialog box.

Note: When the **Pick from Map** button is disabled, you can select locations directly from the open map. If a map is not open, you can select another command (like the **Select** command) and use that command instead of the **Pick from Map** functionality.

- Highlight the entry in the **Control Points** list and click the matching control point location in the image pane. The **Edit Control Point** dialog box displays showing the control point's location in pixels in the Image X and Image Y fields. Click **OK** to save these entries.

Note: Remember to type a meaningful description of this location in the **Label** field.

- Repeat this process until you have identified three or four non-linear points in the preview pane of the **Image Registration** dialog box.
- After you have defined all of the control points, click **OK** in the **Image Registration** dialog box. The raster image displays in the Map window under the vector layer.

Use the Layer Control feature to position the raster map appropriately with your vector layers.

Raster Image Registration Error Value

After you register the image, the **Image Registration** dialog box may display an error value in pixels for a control point. This value is the difference between the control point location on the image and the X and Y coordinates you specified in the **Add Control Point** dialog box. It is important to keep the error value as small as possible. A large error value will cause the raster image to line up improperly with the vector overlays. Make sure that you are as precise as possible with your control point choices. You should display your image using a high resolution for best results. You can add more control points to improve the registration.

To add more control points to improve the registration:

- On the **TABLE** tab, in the **Maintenance** group, click **Raster** , and **Modify Image Registration**.
- Choose the **Add** button from the **Image Registration** dialog box and choose another point.
- Click **Pick from Map** to select an equivalent point in the Map window and to transfer the coordinates to the **Registration** dialog box. We recommend adding points near the center of the raster image and in areas where the match is the poorest.
- Click **OK** to save the new control points.

You can use an optional large crosshair in the Raster Image Registration window, which enables you to select points with which to register the raster image more accurately. As in the regular interface, press the **C** key while the Raster **Image Registration** dialog box is displayed to display the large crosshair instead of a cursor. The resulting dialog box shows the raster image and allows you to choose points with your cursor. Press **C** once to enable the large crosshairs. Press **C** again to disable the crosshairs and restore the regular small cross cursor.

Modifying Control Points for Raster Images

If you must adjust the coordinates of a control point because the error is unacceptable, highlight the point in the **Image Registration** dialog box and choose another location for it in the **Map** window. To delete control points, click the point and choose the **Delete** button.

Raster Image Display Options

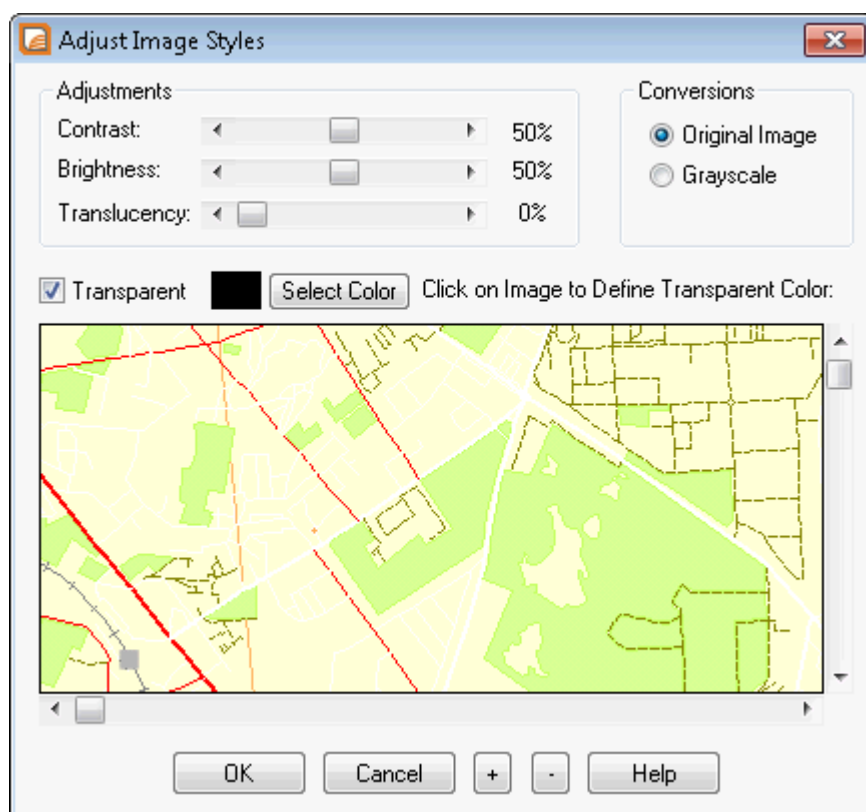
You can display more than one raster image in a window at a time. This is limited only by your computer's memory. However, if you want to digitize from the raster image, it is best to use only one image in a **Map** window. This is because two raster images will probably have slightly different rotations.

When using two raster images with different projections, keep in mind that MapInfo Pro will use the projection of the image that is opened first. This means that the second image is only positioned approximately.

Color (Raster Image)

Once you have displayed a raster image file in a **Map** window, you can make adjustments to the colors in the image. On the **TABLE** tab, in the **Maintenance** group, click **Raster**, and **Adjust Image Styles** to change the settings for that .TAB file. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window, and then double-click on the layer name in the window to open the **Layer Properties** dialog box. On the **Layer Display** tab, select the **Style Override** check box and click the **Style** button to adjust the raster style only in this **Map** window.

The **Adjust Image Styles** dialog box lets you set the contrast and brightness of the image, set translucency, display color raster images in shades of gray, and make one color in the image transparent.



Using the **Adjust Image Styles** dialog box does not modify the raster image file; instead, it changes the way MapInfo Pro *displays* the raster image file. If you change an image's display style, MapInfo Pro records the new display style in the table file (for example `PARCELS.TAB`) or in the workspace for per layer styles, but MapInfo Pro does not alter the contents of the raster image file (`PARCELS.GIF`) in any way.

If you change an image's display style and choose **OK**, the new display style is applied immediately. It will also affect all **Map** windows in which the image is displayed if on the **TABLE** tab, in the **Maintenance** group, you click **Raster**, and **Adjust Image Styles**. You do not need to choose **Save** to save the changes.

Contrast and Brightness (Raster Image)

Adjusting a raster image's contrast and brightness can help make your map more readable. When you overlay additional map layers on top of your raster image, you may find it hard to tell which lines are part of the raster image and which lines are part of the additional layers. Changing the contrast and brightness can make it easier to differentiate the separate layers.

To soften the appearance of a raster image:

1. On the **TABLE** tab, in the **Maintenance** group, click **Raster**, and **Adjust Image Styles** to open the **Adjust Image Styles** dialog box.
2. Set the **Contrast** scroll bar to a low setting, such as 30%. (The default Contrast setting is 50%.)

3. Set the **Brightness** scroll bar to a high setting, such as 70%. (The default Brightness setting is 50%.)
4. Examine the image preview in the lower half of the dialog box. If the new display style suits your needs, choose **OK**. If you want to go back to the previous display style, choose **Cancel**.

Color to Gray-scale (Raster Image)

To change a color raster image to gray-scale, click the **Grayscale** button in the Conversions group of the **Adjust Image Styles** dialog box. To change it back, click the **Original Image** button.

Transparent Color (Raster Image)


You can also make one color in the image transparent. Making a color transparent will make the parts of the map displayed under that color visible. In the **Adjust Image Styles** dialog box, check the Transparent box to activate the **Select Color** button. Click **Select Color**. To select the color you want to be transparent, click the color in the preview image. The color you selected appears in a box next to the left of the **Select Color** button. The transparent color will display as white in the preview image. When you redisplay the image in the **Map** window, the selected color will be transparent.

Translucent Color (Raster Image)

MapInfo Pro provides the ability to display a translucent raster image. Translucent images allow you to partially see through them, enabling you to lay translucent raster images over other layers so that details of the layers below are partially visible. An image set to 0% translucency is completely opaque; an image set to 100% translucency is completely transparent.



Style Override for Raster Images

MapInfo Pro provides the ability to change the display style for raster and grid images on a per-layer basis through the **Layers** window. The **Style Override** option for raster images works the same way as it does for other map layers. In the **Layers** window select a raster layer in the list. Click the **Layer Properties**  button. The **Layer Properties** dialog box displays. On the Layer Display tab, select the **Style Override** check box and click the **Style** button. The **Adjust Image Styles** dialog box displays. You can change any of the raster image style settings.

Zoom Layering for Raster Images

Zoom layering for raster images controlled from preferences (on the **PRO** tab, click **Options**, and **Map Window**, and then select **Automatic Raster Zoom Layering**). To change the zoom layering

setting for a raster layer that you are currently working with, go to the **Layer Properties** dialog box (On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window, and then double-click on the layer name in the window) to either activate or turn off zoom layering. The setting is turned on by default.

Limitations in Using Raster Images

Many of MapInfo Pro's features cannot be applied to raster image tables. As a general rule, you cannot use MapInfo Pro to modify a raster image file. Specific limitations of raster tables include:

- **No Data Saved with Raster Images:** A raster table does not have columns, therefore, you cannot attach text or numeric data directly to a raster table, and you cannot perform queries, such as Find, on a raster table. You can, however, overlay a conventional (vector-based) MapInfo Pro table on top of the raster image, and attach data to the conventional table.
- **Map Projections and Reprojections with Raster Images:** When a raster image file displays in a **Map** window, the file that is opened first determines the projection of the map. If two raster images in a **Map** window use different map projections, MapInfo Pro will use the projection of the map that is opened first. The **Map** window will redraw slowly when you overlay other map layers on top of a raster image. The map redraws slowly because MapInfo Pro is re-calculating map coordinates so that the vector map objects conform to the projection of the raster image.

Adjusting the Contrast or Brightness of a Raster Image

The **Adjust Image Styles** dialog box lets you control how a raster image appears but does not modify the raster image file; instead, it changes the way MapInfo Pro *displays* the raster image file.

Every raster image table consists of two files: a raster image file (for example, `PHOTO.GIF`), and a table file (for example, `PHOTO.TAB`). When you change the image display styles, MapInfo Pro stores the new style settings by modifying the table file. MapInfo Pro does not modify the raster image file in any way.

If you change the display options and choose **OK**, MapInfo Pro stores the new display styles immediately; you do not need to click **Save** on the **HOME** tab.

For instructions, see *Adjusting the Contrast or Brightness of a Raster Image* in the *Help System*.

To adjust the image style:

1. Open one or more raster image tables.
2. On the **TABLE** tab, in the **Maintenance** group, click **Raster**, and **Adjust Image Styles** to open the **Adjust Image Styles** dialog box. Use this dialog box to adjust an image's contrast and brightness settings and you can set a color image to display in color.
3. Click **OK**.

Note: These settings become your default settings. You can override the default setting and adjust translucency per layer.

To adjust the image style per layer:

- Check the **Style Override** box and click **OK**.

Adjusting the Translucency of a Raster Image

You can adjust the percentage that layers show through raster images. A translucent image allows you to partially see through the image. Translucent images can be layered on top of other layers so that the lower layers are partially visible through the image.

To adjust translucency of a Raster Image:

1. Open a raster image table.
2. On the **TABLE** tab, in the **Maintenance** group, click **Raster**, and **Adjust Image Styles**.
3. If the **Choose Raster Table** dialog box opens, select the raster file to adjust and click **OK**.
4. In the **Adjust Image Styles** dialog box. Use the **Translucency** slider control to adjust the percentage that layers show through the raster image.

Translucency can be set between 0-100%. An image with 0% translucency is completely opaque (or cannot be seen through). An image with 100% translucency is completely transparent (or completely invisible).

5. Click **OK**.

This setting becomes your default setting for the raster table (TAB file). You can override the default setting by adjusting translucency per layer on a map.

Adjusting the Translucency of a Raster Layer on the Map

You can adjust the translucency on a per layer basis for your map. This overrides, but does not change, the default translucency setting for a layer (set for the TAB file). This is useful when you want to see the layers of your map under a raster overlay, but you do not want to change the translucency set for the raster file.

To adjust the translucency of a raster layer on your map:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

If you have the **Explorer** window open, you can use the layers list in it.

2. Double-click on the layer name in the **Layer** list to open the **Layer Properties** dialog box.
3. On the **Layer Display** tab, use the **Translucency** scale bar to adjust the translucency level of the raster image.

For more adjustments, including translucency, check the **Style Override** check box and then click the **Style** button. This opens the **Adjust Image Styles** dialog box where you can make contrast, brightness, greyscale, and translucency adjustments, and you can make the layer transparent.

4. Click **OK** to save your changes and close the dialog.

Registering SPOT Images

This section describes how to use information in SPOT and Geospot files to register the image in MapInfo Pro. The advantage of using this information in this way is the increased accuracy that can be achieved over manually aligning the image with vector data.

About Registering SPOT Images

SPOT images are satellite (raster) images of the earth. SPOT Image Corporation offers these images under the name SPOTView™. SPOT images work well with MapInfo Pro and are particularly useful when scant vector data is available for a geographic region, or when you want to super-impose vector data on top of a highly accurate raster backdrop. Additionally, MapInfo Pro works with the Geospot™ format.

This section assumes you have some familiarity with manually registering raster images. If the subject is new to you, see [Registering the Coordinates of a Raster Image](#) in this user guide.

The process described here is not foolproof. Because of inaccuracies in the header file settings or problems in companion vector data, you may occasionally need to manually readjust the control points using the **Register Raster Image** dialog box. Refer to *Register Raster Image*.

Part of registering a SPOT image is assigning the proper coordinate system. The standard coordinate systems for most US SPOT images are Universal Transverse Mercator and State Plane. But in other cases a SPOT image may use a different coordinate system and may even require that you add a new coordinate system to MapInfo Pro. This section will help you identify what settings to use for a SPOT image, as well as when to add a coordinate system to MapInfo Pro, should you need to. A SPOT image consists of several files, not all of which are required by MapInfo Pro. Here are the files that MapInfo Pro uses:

- .HDR file - A header file in ASCII form that contains information about the image's size, coordinate system, (SPOTView™ only) and location on the earth.
- .BIL file - A binary file that contains the image's raw raster data.
- .CLR file - A palette file that contains a list of suggested colors to be used with the image. This file is only provided with color images, and MapInfo Pro reads the contents of this file when present.

A report (.REP) file in ASCII form also accompanies each Geospot™ product. Although MapInfo Pro does not read this file, you may find that it too contains useful information for registering the image, particularly image rotation and coordinate system information.

Gathering Coordinate System and Control Point Information

Like other raster images, registering a SPOT image involves choosing a coordinate system and assigning at least three control points in the **Register Raster Image** dialog box. Before doing so, you must gather the appropriate information from settings in the image's .HDR/.REP files.

If you open a SPOTView™ image's .HDR file using an ASCII editor, you'll see that it contains settings like the following. The settings for your image will likely differ.

SPOTView™ Settings

```
! GIS FORMAT HEADER FILE
! IDENTIFICATION BLOCK
PRODUCT_NAME SPOTView Custom Frame Special Change Detection

FORMAT_VERSION 1.5
MAP_FRAME 22' X 30'
SCENE_ID 2_595272_910701_165923_2X
! 2_595272_930410_171958_2P
! 2_595272_930729_170345_2X
IMAGE_DATE 01 JUL 91
! 10 APR 93
! 29 JUL 93
CORRECTION_LEVEL TER
! IMAGE INFORMATION BLOCK
NCOLS 4276
NROWS 4251
ULXMAP 522147
ULYMAP 4086917
MAPUNITS Meters
XDIM 10.00
YDIM 10.00
NBANDS 3
NBITS 8
LAYOUT BIL
BYTEORDER I
SKIPBYTES 0
BANDROWBYTES 4276
TOTALROWBYTES 12828
BAND_RGB 321
! MAP INFORMATION BLOCK
MAP_NAME St Louis, MO Change Detection
UL_LON/LAT
LR_LON/LAT
PROJECTION Albers Equal Area
ORIGIN_LON W 96,30,00
```

```

ORIGIN_LAT N 00,00,00
STD_PARALLEL_1 N 36,36,00
STD_PARALLEL_2 N 43,00,00
DATUM NAD27

```

Geospot Settings

The Geospot™ .HDR and .REP files will contain settings similar to these.

(.HDR file contains the following)

```

! GIS FORMAT HEADER FILE
! COORDINATE BLOCK
PRODUCT_NAME          SPOTView Custom Frame Special Change
Detection
FORMAT_VERSION        1.5
MAP_FRAME              22' X 30'
SCENE_ID               2_595272_910701_165923_2X
! 2_595272_930410_171958_2P
! 2_595272_930729_170345_2X
IMAGE_DATE             01 JUL 91
! 10 APR 93
! 29 JUL 93
CORRECTION_LEVEL      TER
! IMAGE INFORMATION    BLOCK
NCOLS                  4276
NROWS                  4251
ULXMAP                 522147
ULYMAP                 4086917
MAPUNITS               Meters
XDIM                   10.00
YDIM                   10.00
NBANDS                 3
NBITS                  8
LAYOUT                 BIL
BYTEORDER              I
SKIPBYTES              0
BANDROWBYTES           4276
TOTALROWBYTES          12828
BAND_RGB               321
! CARTOGRAPHIC PARAMETER BLOCK (REP file)
(not in .REP file)
MAP_NAME               St Louis, MO Change Detection
UL_LON/LAT
LR_LON/LAT
PROJ_ID                Albers Equal Area
PROJ_MERIDIAN           W 96,30,00
PROJ_PARALLEL          N 00,00,00
STD_PROJ_PARALLEL_1    N 36,36,00

```

```
STD_PROJ_PARALLEL_2      N 43,00,00
DATUM      NAD27
```

Coordinate System Information (SPOTView Only)

The first step in registering a SPOTView™ SPOT image is assigning the appropriate coordinate system. The image's .HDR file should contain all the information you need to determine the proper coordinate system.

Occasionally you will want to open a SPOT image that uses a coordinate system not currently supported in MapInfo Pro. When this is the case, you'll need to modify MapInfo Pro's list of supported coordinate systems by adding a new line to the `MAPINFOW.PRJ` file; this is an ASCII file that can be easily modified with a text editor. [Adding Projections to the MAPINFOW.PRJ File](#) gives a complete description of how to edit this file and what elements to use within a line for a given coordinate system.

For example, in the sample .HDR files settings above, the PROJECTION and DATUM settings might lead you to believe that one of MapInfo Pro's standard Albers Equal-Area Conic coordinate systems would be appropriate for the sample SPOT image. But if you examine the `MAPINFOW.PRJ` file, you'll see that the Albers Equal-Area Conic coordinate system lines look like this.

```
"--- North American Coordinate Systems ---"
"Albers Equal-Area Conic (North America)", 9, 62, 7, -96, 23, 20, 60,
0, 0
"Albers Equal-Area Conic (Continental US)", 9, 62, 7, -96, 23, 29.5,
45.5, 0, 0
"Albers Equal-Area Conic (Alaska)", 9, 63, 7, -154, 50, 55, 65, 0, 0
"Albers Equal-Area Conic (Hawaii)", 9, 62, 7, -157, 3, 8, 18, 0, 0
```

Comparing the origin and standard parallel settings (arguments 4 through 7) to the `ORIGIN_LON`, `ORIGIN_LAT`, `STD_PARALLEL_1`, and `STD_PARALLEL_2` settings in the .HDR file shown above, you will see that they do not match up. In this case, you would need to add a line like this to the `MAPINFOW.PRJ` file:

```
"Albers Equal-Area Conic (St. Louis)", 9, 62, 7, -96.5, 0, 36.6, 43, 0,
0
```

Note that when adding a new coordinate system for an image, if a required setting is missing from the .HDR file, enter zero in its place. In the sample line above, for example, zero was used for the False Easting and False Northing settings-the final two arguments on the line.

Control Point Information

ULXMAP, ULYMAP, XDIM, and YDIM are the settings within the .HDR file that are used for determining a SPOT image's three control points. PIXEL_ROTATION_SIN and PIXEL_ROTATION_COS are optional rotation settings within the image's .REP file; this file is only present with Geospot products. If a .REP file is not present or the .REP file does not contain any PIXEL_ROTATION_SIN and PIXEL_ROTATION_COS settings, here are the values to use for these settings when calculating control points:

```
PIXEL_ROTATION_SIN = 0
```

```
PIXEL_ROTATION_COS = 1
```

The following table shows the pixel coordinates and corresponding equations for determining the three control points. The column on the right of the table shows the results of calculating the control points using the sample data from above. In this case, the image has no .REP file.

Image X,Y	Equation	Example
0,0	ULXMAP, ULYMAP	522147,4086917
1,0	ULXMAP + PIXEL_ROTATION_COS * XDIM, ULYMAP + PIXEL_ROTATION_SIN * XDIM	522157,4086917
0,1	ULXMAP + PIXEL_ROTATION_SIN * YDIM, ULYMAP - PIXEL_ROTATION_COS * YDIM	522147,4086907

Notice that the control points are at the top left corner of the image (0,0), one pixel to the left (1,0), and one pixel below (0,1); no additional accuracy is gained by choosing control points that are any further apart. Here are the settings you would enter in the **Register Raster Image** dialog box when registering the sample SPOT image:

Label	Map X	Map Y	Image X	Image Y
Pt 1	522147 m	4086917 m	0	0

Label	Map X	Map Y	Image X	Image Y
Pt 2	522157 m	4086917 m	1	0
Pt 3	522147 m	4086907 m	0	1

See [Registering the Coordinates of a Raster Image](#) if it is unclear to you where to enter this information.

Note: For more information on SPOT images and the SPOTView product line, contact **SPOT Image Corporation** directly.

Digitizing Maps

Sometimes the only way to bring a map into MapInfo Pro is to trace the map by hand. Using MapInfo Pro's digitizing feature, you can trace the details of a paper map with a puck and a digitizing tablet and record the tracings as a vector image (object with geographic coordinates) that can then be displayed in MapInfo Pro as a map layer. Since they are vector images, digitized maps allow you to use all of MapInfo Pro's powerful functionality with them.

Digitized Maps vs. Raster Images

While digitizing is a time-consuming process, it has some advantages over scanned raster images, particularly if you want to use the map for geographic analysis.

Digitizing a map creates a vector image that is just like any other MapInfo map layer. Each feature you digitize becomes a map object that you can edit, move, customize, or attach data to. You can include as much detail as you want to trace from the paper map.

A raster map, on the other hand, is simply a graphic image that is used for display purposes only. You cannot edit or attach data to it. It is used as a backdrop for other map layers. Its main advantage over digitizing is input speed.

For more on raster images, see [Registering Raster Images](#).

Digitizing System Requirements

Digitizing in MapInfo Pro requires special equipment and setup so that MapInfo Pro can read the information from the paper map.

Digitizing Tablet and Puck

To digitize in MapInfo Pro you will need a digitizing tablet and a puck. A digitizing tablet is the surface that you attach the map to for tracing. The puck is the device with which you trace the map. It is a lot like a mouse.

Source Map

You can digitize any paper map, aerial photo, or drawing that you can affix to a digitizing tablet and trace the map features by hand.

Before You Begin Digitizing

Digitizing with MapInfo Pro is located on the **SPATIAL** tab, in the **Edit** group, by clicking **Digitizer Setup**.

Setting the Projection before Digitizing

When you digitize a paper map, you need to specify the projection used for that map, (Default Table Projection preference is used for this operation). Most paper maps indicate their projection, generally in the legend. You can use any of the projections MapInfo Pro provides, or you can create your own coordinate system.

Note: It is very important to set the correct projection before you begin digitizing because you cannot fix it afterwards. When you do not correctly specify the projection of your paper map, your digitizing is not accurate.

When digitizing from an aerial photograph, you should generally use the Longitude/Latitude projection.

In order to digitize a non-earth map (such as a floor plan), the active **Map** window must be non-earth.

Clicking **Projection** in the **Digitizer Setup** dialog box opens the **Choose Projection** dialog box where you specify the projection of the paper map you are digitizing.

Setting Control Points before Digitizing

Once you have set your projection, you need to set control points. You set control points so that MapInfo Pro knows how to interpret the puck position. To set a control point, you indicate a position

on the digitizer tablet by pressing a button on the puck. Then you type in the map coordinates that correspond to that point. MapInfo Pro determines the map values from these coordinates.

You should use at least four control points when digitizing a paper map. When you are digitizing from an aerial photograph, you might want to use thirty or more control points. MapInfo Pro allows you to create as many control points as you need. You do not need to have the map in any special orientation when you digitize. However, once you start digitizing, you should not move the map for the duration of the session. We recommend that you tape your map firmly to the tablet to make sure it does not move during digitizing.

When you choose four or more control points, MapInfo Pro makes an error calculation estimating the possible error in your setup.

Note: These error values are very important. They are your only indication of whether or not your setup is correct.

Dealing With Error Estimates (Digitizing)

When you digitize a map and error values are high, the resulting map table may be too inaccurate for reliable use.

MapInfo Pro makes the error calculation by determining the relative positions of the control points based on the map coordinates you typed in. It can then determine where those points should be on the tablet. The error is the difference between where a point should be on the tablet and where you actually clicked. An error value displays for each point.

When you are digitizing from a paper map, these error values should be quite small; they should be on the same scale as the resolution of your digitizer. In most cases errors should be in thousandths or hundredths of an inch. Errors approaching a tenth of an inch are probably too large. When the error is too high, you should:

- Check the projection to make sure it matches the projection printed on the map. To do this, simply click on **Projection** in the **Digitizer Setup** dialog box. The **Choose Projection** dialog box displays with the current projection highlighted. If that is not the correct projection, scroll through the list and choose the correct projection.

Once you change the projection, MapInfo Pro recalculates the error.

When the problem is not with the projection or when changing the projection only slightly reduces the error, then you have to check individual control points. Start with the points with the highest error (choose **Edit** in the **Digitizer Setup** dialog box). Correct your control points until the error is acceptably small.

When you are digitizing from a photograph, you should use many control points, preferably over twenty. In general, the more control points you use, the smaller the error.

Setting Digitizer Buttons

Clicking **Buttons** in the **Digitizer Setup** dialog box opens the **Set Digitizer Buttons** dialog box where you configure the digitizer buttons.

If you have two or more buttons on your digitizer puck, you can designate which button performs each function.

1. Click **Buttons** in the **Digitizer Setup** dialog box to open the **Set Digitizer Buttons** dialog box.
2. Click the digitizer button you want to use for drawing objects (this sets the specified button as the drawing tool), another **Set Digitizer Buttons** dialog box opens.
3. Click the digitizer button you want to use for completing polygons and polylines, your digitizer puck is configured to your specifications.

If your digitizer puck has only one button, you must use it for both drawing and completing polylines and polygons. In this case a single click enters a point when you are drawing an object. A double-click completes a polyline or polygon.

Configuring Digitizer Buttons

Specify which digitizer button is used to draw and which is used to close polygons and polylines. By default, MapInfo Pro assigns the first function to button one and the second function to button two. You can override the default if you want. Also, you can use one button to serve both functions. In this case, you single-click to specify a point and double-click to complete a polygon or polyline.

Setting Up the Digitizing Equipment

Connect your digitizing tablet and puck according to manufacturer's instructions.

Connect your digitizing tablet and puck according to the manufacturer's instructions and install the appropriate device driver.

Attach your paper map securely to the digitizing tablet. It is very important that the map not be moved during the digitizing session, or it will invalidate any control points you have established for the map.

Setting Up your Map on a Tablet

Make sure the map/drawing to be digitized is securely fastened to the tablet. If the map moves, control points will need to be reconfigured.

The box at the top of the **Digitizer Setup** dialog box displays a list of control points that you created. The box displays the X and Y coordinates for each point. The coordinates are displayed in the units set with the **Map Units** options on the **Map Options** dialog box (in the **Layers** window, right-click on the map name, and select **Map Options**).

The box also indicates the error for each point. The error is in paper units, which you specify in **System Settings Preferences** (on the **PRO** tab, click **Options**, and **System Settings**).

You need to specify at least four control points for MapInfo Pro to calculate error. When the error for a given point is too large, re-specify the point by clicking **Edit** or double-clicking on the control point.

The **Digitizer Setup** dialog box allows you to:

- Set the projection of the map being digitized.
- Set control points.
- Configure the **Draw** and **Close** buttons on the digitizer puck.

You should perform these steps in the order listed.

Digitizer Setup

To communicate the tracings on the paper map to MapInfo Pro properly, you must provide some information about your map. In the **Digitizer Setup** dialog box, you specify control points for your map, the map projection and appropriate map units, and configure the buttons on your digitizing puck. On the **SPATIAL** tab, in the **Edit** group, click **Digitizer Setup** to open the **Digitizer Setup** dialog box. Each part of the dialog box is discussed below.

Using Tools with the Digitizer

You can use any of these tools with the digitizer.

Mouse Cursor

You can use the mouse and the digitizer at the same time. The mouse is always active, even when digitizer mode is on. So you do not need to exit from digitizer mode to use the mouse. The mouse cursor is always visible, and is always controlled with the mouse. Its appearance depends on which tool is selected.

Digitizer Cursor

The digitizer cursor is a large cross hair that covers the entire width and height of the **Map** window. Its appearance does not change to indicate which tool is selected. It is always a large cross hair, making it easy to see. When digitizer mode is off, or when digitizer mode is on and a **Map** window is not active, the digitizer cursor does not appear.

The **Status** Bar only displays the digitizer cursor location if you choose to display it (on the lower-left corner of the MapInfo Pro screen, click the scale value to display a list of options, and then select **Cursor Location**).

If you choose to display the cursor, you will get some additional information. The cursor location is always displayed with the appropriate precision, depending on whether the location came from the mouse, the digitizer, or a snapped node. When you move the mouse, the displayed location is rounded to the nearest pixel. When you move the digitizer puck, the displayed location is rounded to the nearest tablet point. When you snap to a node, the displayed location shows the exact coordinates as they appear in the map file.

Map Projection

Maps are drawn using a particular projection, or distortion, of the earth's surface to maintain the relationship of the curved earth's features on a flat piece of paper. When you digitize a map using MapInfo Pro, you must specify the projection so that MapInfo Pro can take the map's distortion into consideration and maintain the correct relationship among the map features.

You cannot change the projection after you have begun to digitize, so make sure you set it correctly. Click **Projection** in the **Digitizer Setup** dialog box to select a projection. In general, the projection is specified in the map legend. MapInfo Pro supports a wide variety of projections. For aerial photographs, use Longitude/Latitude as the projection.

Map Units

In addition to knowing the projection, you must specify the map units used for the coordinate system. For instance, a map in the Longitude/Latitude projection will show map coordinates in degrees.

If you do not have coordinates for the map, you will need to digitize it as a non-earth map, which means points on the image will only be relative to each other, not to points on the earth. Create a non-earth map table first and display it in the active **Map** window.

Specify the map units from the **Map Units** drop-down list in the dialog box that matches the coordinate units on the paper map. Degrees will always be available for earth maps. In addition, other map units may be available if you have identified the map in a projection other than Longitude/Latitude.

Specifying Map Units

The **Map Units** drop-down list in the **Digitizer Setup** dialog box allows you to specify a value from a list of map units.

1. Click the **Map Units** drop-down list. A list of units displays.
Degrees is always available for earth maps. Depending on the projection you are using, another unit, the native unit for that projection, may be available. When digitizing a non-earth map, you have a wider range of values.
2. Choose the unit that matches the coordinate units on your paper map. When the desired unit is not in the list, check to make sure you specified the correct projection.

Note: In order to digitize a non-earth map, the active **Map** window must also be non-earth.

Entering Control Points

For MapInfo Pro to make a digitized copy of your paper map, it must be able to correctly interpret the location of the digitizing puck on the tablet as you trace the map. To do this, you must first set the parameters by specifying locational coordinates for several control points on the map. To set a control point, choose a point on the tablet and click a button on the puck. Type the coordinates that correspond to that point in the **Digitizer Setup** dialog box.

To add, edit, remove, or clear all control points, choose the appropriate button in the **Digitizer Setup** dialog box. A dialog box appears for each button to walk you through the steps.

Picking and Adding a Control Point

The buttons in the **Control Points** box (**Digitizer Setup** dialog box) allow you to add, edit, remove, or clear all control points.

To pick or add a control point:

1. Click **Add** to open the **Pick Tablet Point** dialog box.
2. Choose a point on the tablet. As you move the puck around the tablet, the **Pick Tablet Point** dialog box opens where that point is on the tablet. When you click a digitizer button, you select that tablet location as a control point.
3. Click a digitizer button or press **Return** to cancel.
4. You have selected a point on the digitizer tablet as a control point, and the **Add Control Point** dialog box opens. The **Add Control Point** dialog box lets you enter a name for the control point (optional) and X, Y coordinates.

For instance, to add a control point, choose **Add**. The **Pick Tablet Point** dialog box displays telling you to choose a point on the tablet and click a digitizer button. The **Add Control Point** dialog box opens prompting you for a label (optional) and the map coordinates for the point. When you are through, click **OK**. Repeat this process for each control point you enter.

Keep in mind that you must enter the coordinates in the units you specified in the **Digitizer Setup** dialog box. If your map unit is in degrees, be sure to type in the coordinates as decimal degrees. For a discussion on converting degrees, minutes, and seconds to decimal degrees see [Converting Degree/Minute/Second Coordinates into Decimal Degrees](#).

Editing a Control Point using a Digitizer

If you make a mistake when entering a control point, you can edit it. High error values are often an indication that such a mistake was made.

To edit a control point, choose the point from the list of control points in the **Digitizer Setup** dialog box and click **Edit**. The **Edit Control Point** dialog box opens. Make the appropriate changes to the label or X and Y coordinates.

To edit a control point:

1. Choose the point from the list in the **Digitizer Setup** dialog box.
2. Click **Edit**. The **Edit Control Point** dialog box displays.
3. You can change the control point's label and its Map X and Map Y points by typing new values.
4. Press the **Table X,Y** button. The **Pick Tablet Point** dialog box displays.
5. Pick a point on the digitizer tablet and click any digitizer button.

The tablet's coordinates are changed accordingly.

You can also change the tablet position of the point through this dialog box. For instance, if the coordinates are correct, but you realized that you clicked on the wrong point on the tablet, you can choose the **Tablet X-Y** button in the **Edit Control Point** dialog box. This is easier than adding a new control point and removing the incorrect one.

You can also remove a control point by highlighting the point in the **Setup** dialog box and choosing the **Remove** button. To remove all points and reset the projection to that of the active Map window, choose **Clear All**.

Entering a Name for a Control Point using the Digitizer

To enter a name for a control point:

1. Type a name for the control point in the **Label** box.
2. Type the coordinate values for the point in Map X and Map Y.
3. Repeat the process at least three times.

When four or more control points are properly added, an error value displays in the **Control Points** section of the **Digitizer Setup** dialog box.

Most paper maps specify longitude and latitude in degrees, minutes, and seconds. Additionally, the MapBasic sample `DMSCNVRT.MBX` program displays a dialog box that converts coordinates.

4. Choose **OK**.

To begin digitizing:

1. Select a drawing command.
2. Press the **D** key. The cursor displays as a circle with a crosshair.

Removing Control Points

To remove a control point:

1. Choose the point from the list in the **Digitizer Setup** dialog box.
2. Choose **Remove**. The control point is removed.

To remove all control points, choose **Clear All**. All control points are removed and the projection is reset to the projection of the active Map window.

Saving Control Points

You can save your control points to a workspace. This is helpful if you must interrupt the session before you have finished entering your control points. When you open the workspace later, MapInfo Pro automatically turns digitizer mode on. There are some cases where MapInfo Pro will not be able to turn on digitizer mode. They are the following:

- If there are less than 3 control points entered in the workspace. You will need to enter at least 1 or 2 more control points in Digitizer Setup.

- If your control points run in a straight line. You must enter control points that are at different angles from each other.
- The digitizer size or resolution has changed since the workspace was saved. You will need to enter new control points in Digitizer Setup.

These problems do not, however, prevent the workspace from opening.

Control Point Error

You should use at least four control points when digitizing a paper map. When digitizing an aerial photograph or an image without a projection, you might want to use 30 or more control points.

MapInfo Pro uses the control points to perform an affine transformation, whereby the digitized objects are skewed, shifted and scaled to fit the control point locations.

MapInfo Pro determines the relative positions of the control points based on the coordinates you specify. It can then determine where those points should be on the tablet. MapInfo Pro then calculates an error estimate that is the difference between where the point should be on the tablet and where you actually clicked.

The error estimates give you an idea of how accurate the resulting computer map will be. Error values should be quite small, on the same scale as the resolution of your digitizer. In most cases errors should be in thousandths or hundredths of an inch. Those errors approaching a tenth of an inch are probably too large.

To minimize the likelihood of a high error estimate, increase the number of control points and be as precise as possible when specifying the coordinates for control points. Double-check that you specified the correct projection in Digitizer Setup.

Configuring Digitizer Buttons

To configure the buttons on your digitizing puck, click **Buttons** in the **Digitizer Setup** dialog box. The dialog box that displays will instruct you to click the digitizer button that you want to use as the main button and then to click the digitizer button that you want to use as the double-click button.

If you only have one button on the puck, you will use it for both drawing and completing the polyline/polygon. A single click enters a point when drawing an object; a double-click completes the object.

Note: If you use the same button for single-clicking and double-clicking, MapInfo Pro may mistake rapid single-clicks as a double-click.

Using the Digitizer Mode

MapInfo Pro automatically turns digitizer mode on after you have entered three or more control points. Not only does it turn on automatically, but with the additional capabilities available in digitizer mode,

there is little reason to turn it off. Digitizer mode no longer locks you in. You do not have to exit from digitizer mode to do something else. You can do anything in digitizer mode that you can do in mouse mode: open tables and windows, use any of the tools, use the mouse, etc.

You can still, however, turn digitizer mode off and on with the **D** key. Again, similar to when you have saved control points to a workspace, MapInfo Pro will not turn digitizer mode on if you have only entered one or two control points or if your control points run in a straight line.

The details of the new digitizer mode functionality is explained below.

Using Tools with the Digitizer

You can use any of the tools with the digitizer. You are not limited to just the drawing tools. You can zoom in on the area you are digitizing with the Zoom in tool, use the Ruler tool to measure distances, or add nodes, etc. without leaving digitizer mode.

Mouse Cursor

You can use the mouse and the digitizer at the same time. The mouse is always active, even when digitizer mode is on. So you no longer need to exit from digitizer mode to use the mouse. The mouse cursor is always visible, and can always be controlled with the mouse. Its appearance depends on which tool is selected.

You can also control the mouse with the digitizer using the mouse emulation capability of the digitizer driver (this must be configured outside of MapInfo Pro). If digitizer mode is off, or if digitizer mode is on and a Map window is not active, the digitizer controls the mouse. If a Map window is active and digitizer mode is on, the digitizer controls the digitizer cursor.

Digitizer Cursor

The digitizer cursor is a large cross hair that covers the entire width and height of the Map window. Its appearance does not change to indicate which tool is selected. It is always a large cross hair, making it much easier to see.

The digitizer cursor is always visible as long as a Map window is active. For example, if you decide to open a Browser window while you are in digitizer mode and work in the Browser, digitizer mode will still be on, but because the Browser is the active window, you will not see the digitizer cursor.

The status bar only displays the digitizer cursor location if you choose to display it (on the lower-left corner of the MapInfo Pro screen, click the arrow beside the value, and click **Cursor Location** from the list).

Digitizing Your Map

Once you have specified the control points, projection and map units of your map and have determined that the error for control points is acceptable, you are ready to digitize your map.

To begin digitizing:

1. Make the Map window active and make a layer editable.
2. Right-click on the **Map** window, and click **Change View** to open the **Change View** dialog box.
3. Set the zoom of the window to be larger than the area of the map you are digitizing. This will keep the cursor in view during digitizing.
4. Specify the X and Y coordinates of a point that generally falls in the center of the map to be digitized.
5. Click **OK**.

The **Map** window shows roughly the same area as your paper map. If you have entered at least three control points in the **Digitizer Setup** dialog box, digitizer mode should be on, and the digitizer cursor should appear in the **Map** window.

6. Press the **D** key to turn on digitizing mode. The cursor becomes a cross hair.
7. Begin tracing the map.

Note: MapInfo Pro does not support digitizing in stream mode.

Implementing or Canceling Your Digitizer Setup

When a **Map** window is open and a digitizer is properly configured, the option **Digitizer Setup** command enables on the **SPATIAL** tab. If this command is not available, MapInfo Pro is not recognizing the digitizer.

To access the **Digitizer Setup** dialog box:

- On the **SPATIAL** tab, in the **Navigate** group, click **Digitizer Setup** to open the **Digitizer Setup** dialog box.

Using Autotrace to Trace Digitized Objects

You can trace the nodes of an object using the **Polyline** or **Polygon** commands. This makes it easier to digitize objects that share a border because you do not have to re-digitize the shared border. You can also use this feature to trace an existing polygon/polyline network, for example, a street, a county, or some other polyline or boundary.

The words **SNAP** and **AUTOTRACE** display in the MapInfo Pro **Status** bar, located along the bottom of the MapInfo Pro screen.

AutoTrace entry in Status Bar.

Autotrace is available when Snap mode is turned on. Note that you can only use autotrace with existing polylines and polygons. You cannot autotrace rectangles, ellipses, arcs, or other shapes made with the drawing tools.

To autotrace a polyline/polygon while digitizing, do the following:

1. Open a Map layer you want to trace a polygon or polyline on and make the layer editable.
2. Press the **S** key to turn on the Snap process and the **T** key to turn on the Autotrace functionality.

Note: When you press the letter **I**, you turn on the AutoTrace mode session-wide in any map.

3. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and then **Polygon** or **Polyline**, and select the first node you want to trace.
4. Drag the mouse along the nodes of the line or object you want to trace. MapInfo Pro highlights the path you are autotracing. When you click, MapInfo Pro automatically traces all the segments between the two nodes and adds them to the polyline/polygon you are drawing.

Use the **Shift** or **Ctrl** key functionality for this mode. When you AutoTrace a polygon, the path contains the least number of nodes necessary to complete the AutoTrace, which is similar to the **Shift** key behavior. If you want to trace the longer path, press the **Ctrl** key to override default AutoTrace direction. AutoTrace works the same way as selecting multiple nodes in Reshape mode.

The **Shift** key autotraces the shorter path between the two nodes. The **Ctrl** key autotraces the longer path.

The rules that apply to AutoTrace:

- To enable the AutoTrace mode, you must be using a "poly" tool such as **Add Polygon** or **Add Polyline**
- You must press **S** to enable the Snap feature to use the AutoTrace feature
- You can only autotrace one object at a time
- The second node you **Shift/Ctrl**-click on must belong to the same object as the first node. If it belongs to a different object, MapInfo Pro draws a straight line between the two nodes. If you click a node that's shared by two objects (for example, a shared border), you can begin autotracing from either polygon.
- When a closed polyline is being autotraced, the trace line never crosses the start and end points of the polyline (so the **Ctrl** key has no effect).

See Also:

[Resolving Common Digitizing Problems](#)

Resolving Common Digitizing Problems

What follows are some common digitizing problems that may occur in MapInfo Pro and what you can do to correct them.

Selecting a Drawing Command and Making the Map Window Active

To begin digitizing:

- A drawing command must be selected

- The **Map** window must be made active
- The **D** key must be pressed.

The **D** key toggles digitizing mode on and off. When in digitizing mode, the cursor will appear as a circle with a crosshair in it. If you draw on the screen without the digitizer cursor, then coordinates entered into the package are relative to where the cursor is on screen. The cursor, even though driven by the digitizer tablet, is just a screen pointer until digitizing mode is entered. Once in digitizing mode, the control point transformation is put into effect, and coordinate information is taken from the tablet, not the screen.

- Make sure the coordinate system, projection, map orientation and map units are known and properly set in MapInfo Pro.

Improper initial setup may lead to inaccurate results that can only be corrected by starting over. Remember that the **Projection** button on the **Digitizer Setup** dialog box (on the **SPATIAL** tab, in the **Edit** group, click **Digitizer Setup**) refers to the paper map to be digitized, whereas the **Projection** button on the **Map Options** dialog box (in the **Layers** window, right-click the map name and select **Options**) refers to the map you are digitizing into. It is possible to digitize a map in a certain projection to a different projection. The **Digitizer Setup** projection must match the paper map projection, and the **Map Options** projection matches the projection you want to digitize into.

Make sure there are at least 4 known coordinate locations on the map/drawing that can be used to set control points, the more control points that are added, the more accurate the transformation from tablet to **Map** window will be.

The accuracy of these control points will directly affect the accuracy of the digitized map. It is best to select control points that are not too close and do not share any Latitude or Longitude coordinates. In general, more control points yield more accurate results.

High error when configuring control points (>.090) (Digitizer)

- Control points were not properly entered.
- The map has moved while setting control points.
- The control points are inaccurate.
- The map being digitized is inaccurate.

Map is coming out backwards (Digitizer)

- The map may be oriented improperly on the tablet. Check orientation of control points; positive and negative may be reversed. It is useful to have the cursor location displayed while in digitizing mode.

To do this, on the MapInfo Pro **Status** bar, click on the the scale value to display a list of options (this is located on the lower-left corner of the MapInfo Pro screen). Select **Cursor Location**. When the cursor is placed over a control point in digitizing mode, the cursor location should match the coordinates of the control point.

When switching into digitize mode, the cursor disappears

- Change active zoom and center of window to represent the zoom and center of the map/drawing being digitized. Often using a control point as the center of the window, toggling into digitize mode and placing the cursor directly over the control point will make the cursor appear.

Digitizer cursor jumps off screen when digitizing

- Increase the active zoom to better reflect the zoom being digitized. You must be in Digitizer mode (press **D**) to digitize but the digitizer cursor does not have to be visible in the **Map** window. On the **MAP** tab, pointing to **View Entire Layer** may be helpful when working with a pre-existing map. It is also possible that the tablet is damaged and has empty spots.

Can not access all parts of screen when using digitizer as mouse

- Digitizer should be configured as Absolute=1, so that the tablet represents the whole screen. If Absolute is on, it is possible that the tablet is configured incorrectly, or the wrong tablet has been selected in setup. It is also possible that there are damaged spots on the tablet.

Distances do not measure properly (Digitizer)

- The only way to measure a distance of a segment on a map being digitized is to digitize the segment into a **Map** window and then use the **Ruler** command to measure the segment. If a digitized segment measures incorrectly, then there is a setup problem, which could range from map properties (units, projection, etc.) to control points, to inaccurate digitizing.

Digitizer setup is unavailable even though the digitizer is connected

- The tablet driver is not supported by the operating system.
- The tablet is not turned on or is incorrectly connected to the computer.
- The tablet is improperly configured, see the tablet driver documentation.
- The wrong tablet/driver combination is being used.
- There is a problem with the tablet, the comm port, or the connecting cables.

If the tablet works with other applications or is being used as a mouse pointer in Windows, and none of the above problems apply, there may be a problem with our support of the tablet. If possible, configure the tablet to emulate different tablets supported by MapInfo Pro. Make sure the system.ini file is updated to reflect the changes, and restart Windows each time a change is made to the system.ini.

Digitizer Mode - D Key

You must be in digitizer mode when you begin to trace your paper map. This is so MapInfo Pro can recognize the coordinates and place the map in the correct geographic context. If you trace the map in mouse mode, you are only drawing objects that do not have any tie to your paper map.

You are in digitizer mode when you click the D key or when you have entered at least three control points in the **Digitizer Setup** dialog box. You should see the digitizer cursor in the **Map** window. It is a large cross hair that covers the entire width and height of the **Map** window. A **Map** window must be active for the digitizer cursor to display. The Status Bar will also say DIG when you are digitizer mode.

Digitized Map Does Not Display in Expected Location

If your map does not display in its proper geographic location, it is likely that you did not specify the appropriate negative degree coordinates for your control points. If you zoom out to view the entire world, you will see your points in a different area.

At the **Digitizer Setup** dialog box, be sure to specify negative coordinates if your map includes west longitude and/or south latitudes. For instance, for maps in the United States, you should specify a negative X coordinate. For Africa, the Y coordinate is negative. For South America, both coordinates are negative. (For Europe, both coordinates are positive).

If you still do not see your map in the expected location, it could be due to bad control points, incorrect projection, or map units, etc.

High Error for Control Points

A high control point error means that MapInfo Pro thinks there is a discrepancy between the point you chose on the tablet and where the point should be, based on the coordinates you specified. This can lead to inaccurate maps.

To reduce the error, edit the control point to be more precise with your click. Check to make sure the coordinates you entered are correct. You can also increase the number of control points.

Distances Do Not Measure Properly

If you measured a segment on the tablet using the puck and **Ruler** command, you will come up with inaccurate results. The only way you can measure a segment is to first digitize it, then use the **Ruler** command to measure it on screen.

If you still have bad results, it could be due to a setup problem (check projection and map units), control point problem (high error estimate, recheck coordinates), or inaccurate digitizing.

When Switching to Digitizer Mode, the Digitizer Cursor Does Not Appear

If you do not see the cursor when you switch into digitizer mode, check to make sure the coordinates are correct. You may need to specify negative coordinates (see Digitized Map does not Display in Expected Location, above).

Other things to do:

Set the center of the map to be one of your control points. In the **Change View** dialog box you can specify the coordinates of a point that falls in the general center of your paper map.

Put the cursor exactly on one of the control points.

Digitizer Cursor Jumps Off Screen When Digitizing

This happens when your **Map** window is set at a much different zoom than the map you are digitizing. Increase the active zoom to better reflect the area being digitized. For instance, if the map you want to digitize is 300 miles across, set the **Map** window zoom to about 300. On the **MAP** tab, click the launcher button located beside the **Navigation** group name to open the **Change View** dialog box. In the **Zoom (Window Width)** field enter a value of 300.

You do not have to see the digitizer cross hair to digitize, but it is helpful. **View Entire Layer** (right-click on the map to locate this option) may also help, if working with a pre-existing map. It is also possible that the digitizing tablet is damaged and has empty spots.

Digitizer is Connected but Digitizer Setup is Unavailable

Check the following:

- MapInfo Pro supports the digitizing tablet you are using.
- Make sure the tablet is turned on and is correctly connected to the computer.
- The digitizer driver is properly installed.
- The tablet is properly configured.
- The right tablet/driver combination is being used.
- There is no problem with the tablet, the connection, or the connecting cables.

If the tablet works with other applications or is being used as a mouse pointer in windows, and everything listed above checks out fine, there may be a problem with our support of the tablet. If possible, configure the tablet to emulate different tablets supported by MapInfo Pro. Make sure the `system.ini` file is updated to reflect the changes, and restart Windows each time a change is made to the `system.ini`.

If the tablet works with other applications or is being used as a mouse pointer in windows, and everything listed above checks out fine, there may be a problem with our support of the tablet. If possible, configure the tablet to emulate different tablets supported by MapInfo Pro.

Digitizing Two Maps

You must set control points for each map individually, even if the maps are adjacent.

Limitations of Digitizing

The *Snap to nodes* feature is available while digitizing. However, the snap tolerance is a pixel value that is based on the current zoom level of the Map window. Press the **S** key to turn Snap mode off.

Auto polygon closure does not work in digitizing. You must click on the button you set up to close a polygon (or double-click on the button if you only have one digitizing button).

If you change the zoom level of your map, or scroll in the Map window after you have selected your digitizer points and then switch into digitizer mode, your cursor may disappear from the screen, because the location in the map corresponding to the puck is no longer visible in the Map window. The active Map window view must correspond to the view represented on the paper map to see the cursor when in digitizer mode. Zoom out to see the cursor again.

Using the Auto Node to Streamline Digitizing

When you are tracing over a scanned map, you may not want to press the button for each node as you go. When you are digitizing an image, you can enable the **Auto Node** function for stream digitizing, which drops nodes along the route you are tracing based on your tolerance settings. This functionality is available for the **Add Polyline**, **Add Polygon**, and **Ruler** commands.

To set up the **AutoNode** feature:

1. From the **PRO** tab in the **Options** group select **Map Window** to display the **Map Window Preferences** dialog box.
2. In the **Digitizing Options** box, there is an option called **Auto Node Tolerance**. If you leave the default entry (10) in this box, this means that while this feature is active and you are tracing a line, MapInfo Pro will drop a node every 10 pixels automatically. You can change this number to suit your needs.

Note: We recommend that you move your mouse slowly so you can be as accurate as possible. This ensures that the **Auto Node** are added correctly.

3. Click **OK** to save your entry.

Using the Auto Node Feature

To enable **Auto Node** feature, press the **N** key and click to place your first node. MapInfo Pro computes the straight-line distance between that node in the polyline/polygon and the current mouse position. When you have moved the mouse at least as far as the distance you specified in the **Auto**

Node Tolerance field, MapInfo Pro drops a new node to the object. This continues until you turn **Auto Node** off or you complete the objects you are creating.

To remove the previous node, press the **Backspace** key.

You can use this feature on maps. You toggle this feature as you would the Snap or **Autotrace** features. The word `AUTONODE` displays in the **Status Bar** at the bottom of the application window when **Auto Node** is active.

Note: We do not recommend you use the **Auto Node** with the **Autotrace** functionality. If you do, nodes may get inserted in addition to the **Autotrace** nodes and may produce undesirable results.

4 - Working with Objects on the Map

The drawing and editing capabilities in MapInfo Pro let you create and customize an unlimited variety of objects for your maps. This section describes how to draw, edit, and buffer objects. It also describes the tools that help you work with objects and explains how to group objects to create districts, which is referred to as redistricting.

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Drawing and Editing Objects

The drawing and editing capabilities in MapInfo Pro allow you to create and customize an unlimited variety of objects for your maps. Easy-to-use commands are accessible on the **SPATIAL** tab. You can also display nodes, line directions and centroids to give you better control when editing objects.

Understanding the Drawing and Editing Commands

MapInfo Pro has a complete set of drawing commands and editing commands. These commands allow you to draw and modify objects on your map. You can also use these commands to customize the colors, fill patterns, line types, symbols, and text on your map.

However, these commands and commands give you more than the ability to modify your map. You can draw a variety of objects that you can use to perform powerful geographic analyses. For example, you can draw circles, polygons, and other bounded objects. You can then search for records within those boundaries.

Note: You can only draw and edit objects on a map when the layer the object is on is editable.

We have covered making a layer editable in depth elsewhere in this *User Guide*, see [Making the Layers "Editable"](#).

If you use the contouring process to create signal coverage maps, you can create highly detailed coverage areas. Theoretically, the size of an object is only limited by the amount of memory in your system, but for practical reasons, an actual limit is imposed to work within limits of file size and most system memory limits. The size limit for objects is 1,073,741,823 bytes in memory. We selected this limit so that an object of this size can be saved into a Map file, which has a limit of 2 GB.

Note: All MapInfo Pro files have a theoretical limit of 2GB, but due to header size and other contents required in the Map file, the actual size limit has to be a bit less.

In terms of actual number of nodes that can fit into this memory size, the limit is 134,217,724 nodes in any object. It would be very difficult to reach this node limit because memory allocation may prohibit it. It might not be possible to create a Map file this size on a computer being used to accommodate an object this size; the program may throw an error when this happens.

- For regions, the theoretical maximum number of polygons in a multi-polygon region or collection is 20,648,881 polygons that can fit into the size limit for all objects given above.
- For polyline objects, the theoretical maximum number of segments in a multi-segment polyline is 24,403,223 that can fit into the size limit for all objects given above.









- For multipoint objects, the theoretical maximum number of nodes is 134,217,724 that can fit into the size limit for all objects given above.


Using the Drawing and Editing Commands

Drawing Commands

Drawing commands let you add regions, lines, points, symbols, and text to the map. The region types are polygon, ellipse, rectangle, and rounded rectangle. The line types are straight line, polyline, and arc.

Drawing commands are located on the **SPATIAL** tab, in the **Create** group, by clicking on the **Insert** list.





Icon	Command Name	Description
	Symbol	Places point symbols (push pins) on your map. See Drawing Symbols .
	Text	Adds titles, labels, and annotations to maps and layouts. You can also use the Text command to rotate text with its edit handle.
	Line	Draws straight lines. See Drawing Straight Lines .
	Polyline	Draws polylines, which are a connected sequence of lines that are not closed. See Drawing a Polyline .
	Arc	Draws an arc the size and shape of one quarter of an ellipse. After creating an arc, you can reshape it to the desired size. See Drawing an Arc .
	Polygon	Draws polygons one side at a time. See Drawing a Polygon .
	Ellipse	Draws elliptical and round objects. See Drawing an Ellipse or Circle .
	Rectangle	Draws rectangles and squares. See Drawing a Rectangle .

Icon	Command Name	Description
	Rounded	Draw rounded rectangles and squares on the map, see Drawing Rounded Rectangles and Squares .

Reshape Commands

Reshape commands let you make changes to the shape of objects on the map. You can add or delete nodes, overlay nodes onto existing objects, reshape objects by moving nodes and by snapping to a node.





Reshape commands are located on the **SPATIAL** tab, in the **Edit** group in a dynamic list, meaning the last drawing command you selected is now active on the ribbon.

Icon	Command Name	Description
	Snap to Nodes	Reshape an object and align objects with each another. Regions, polylines, lines, arcs, and rectangles all have nodes that can be attached (or snapped) to each other. MapInfo Pro automatically snaps the cursor to a node or centroid when the cursor comes within the snap tolerance of the node. For details, see Using "Snap To" to Select Nodes and Centroids .
	Reshape	Edits regions, polylines, lines, and points by moving, adding, and deleting nodes that define line segments. You can also copy and paste selected nodes to create new polylines. Reshape is very useful when you are creating sales territories or other merged boundaries. For example, you are merging postal boundaries to create school districts. Some postal boundaries fall into more than one school district. Use the Reshape command to reshape the school district to incorporate a section of the postal boundary. See Reshaping Map Objects
	Add Node	Adds a node to regions, polylines, and arcs. (You can add nodes when the Reshape command is in effect.) Adding nodes can give more precision to your object.
	Overlay Nodes onto Target	Adds nodes to the target objects at the points where the target intersects the cutter object.

Object Style Commands

Object style commands give you control over how symbols, lines, regions, and text display on the map.

Drawing commands are located on the **SPATIAL** tab, in the **Create** group, on the **Style** list.

Icon	Command Name	Description
	Symbol Style	Opens the Symbol Style dialog box where you can change display symbols and specify attributes for symbols. The attributes you can specify are size, color, and symbol type. You can change the attributes of existing symbols and specify attributes for new point objects before you create them. The point objects must reside, or be created in an editable layer.
	Line Style	Opens the Line Style dialog box where you can set the line type, thickness and color of line objects (lines, arcs and polylines) and borders of closed objects. You can also change the type, thickness and color of objects you are editing.
	Region Style	Opens the Region Style dialog box where you can change the color, pattern, and borderline style of closed objects. You can also change the color and pattern of objects you are currently editing.
	Text Style	Opens the Text Style dialog box where you can change the font, size, color, and attributes of selected text or set new defaults for future text and labels.

Adding a Node to an Object


Nodes can be added only to lines, polylines, and regions.


The maximum number of nodes is 1,048,572 for a single polygon region or polyline. The limit drops by seven nodes for every two additional polygons.

To add a node:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.
3. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** in the list.
4. On the **SPATIAL** tab, in the **Edit** group, click **Add Node** in the list.
5. On the map, click on the segment where you want to add a node.

To delete the last node added, press the **Backspace** key.

To add a new row to the table for the node, on the **TABLE** tab, in the **Edit** group, click **Add New Row**.

Adding Nodes to an Object Using the Overlay Nodes onto Target Command

When you choose to overlay nodes onto an object using the **Overlay Nodes onto Target** command, MapInfo Pro calculates all points where the target objects intersect the currently selected objects. MapInfo Pro then adds nodes to the target objects at the points of intersection unless the target objects already have nodes at those locations. If the target objects do not intersect the selected objects, MapInfo Pro does not add any nodes.

If you use **Overlay Nodes onto Target** to add nodes to a line, MapInfo Pro converts the line to a polyline. If you use **Overlay Nodes onto Target** to add nodes to an ellipse, rectangle or rounded rectangle object, MapInfo Pro converts the object to a region. **Overlay Nodes onto Target** does not affect text or point objects, and you may not use point or text objects to add nodes to other objects.

To add nodes to an existing object:

1. Select one or more objects in the editable map layer of the active Map window. These are the objects to which you want to add nodes.
2. On the **SPATIAL** tab, in the **Edit** group, click **Set Target**. The objects you selected in Step 1 appear in a different style to indicate that they are the editing targets.
3. Select one or more objects from any layer of the active Map window. Presumably, these are objects that intersect your target object(s).
4. On the **SPATIAL** tab, in the **Edit** group, click **Nodes** and **Overlay Nodes onto Target**.

MapInfo Pro adds nodes, if appropriate, to the target object(s).

Drawing Objects

Drawing objects in MapInfo Pro is easy. Once you have made the layer editable, choose the appropriate command. Using the shape commands, you can draw arcs, ellipses, circles, lines, rectangles, and rounded rectangles on your map. You can either draw the object directly on the Cosmetic Layer (and save it to another or new layer later) or make a map layer editable and draw the objects there.

Once you have drawn the object, you can move the object, delete it, copy it to the Clipboard, or paste it to another Map window.

Also, you can delete the last node of the object by pressing the **Backspace** key. If there is only one node left in the object, it will not be deleted.

Specifying an Object's Spatial Attributes


If the selected object is editable (resides in an editable layer) then you can specify attributes for the object by accessing that **Objects Attributes** dialog box.


Note: If the object is not editable then you can only access a read-only dialog box.

To specify an object's spatial attributes:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **MAP** tab, in the **Selection** group, click **Select**.
3. Double-click the map object with the **Select** command to open the **Object Attributes** dialog box.
4. Type in attributes as appropriate.
5. Click **OK**.

Use the **Help** search option to locate information for a specific map object (for example, arcs, points, polygons and so on).

Reverting to a Previous Version

Use the **Revert** command to access a previous version of a table when you have made changes that you do not want to make permanent and have not saved yet. **Revert** replaces the selected table currently in memory with the last version saved.

To revert to a previous version:

1. On the **TABLE** tab, in the **Contents** group, click **Revert** to open the **Revert Table** dialog box. Here you can choose the table to revert to (that is, return to its previous state).
2. Once you have chosen a table to revert, MapInfo Pro prompts you on whether you wish to discard the changes you have made in the table.
3. Click **Discard**. MapInfo Pro discards the changes you have made to the table. However, if you have second thoughts, click **Cancel**.


Drawing a Curved Polyline


Polylines are a connected sequence of lines that are not closed. The polyline is drawn to the editable layer.

To draw a curved polyline:

1. Make the map layer where you want to draw the polyline editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Polyline**.
3. Move the **Polyline** cursor to where you want to begin drawing on the map. Click the mouse button and move the cursor to draw the line.
4. Click the mouse button once when you want to terminate the current line and start a new line.
5. Double-click to stop.

You can delete the last node by pressing the **Backspace** key.

6. Double-click the polyline to open the **Polyline Object** dialog box.
7. Select the **Smooth** check box.

MapInfo Pro smoothes your polyline into a curve. To unsmooth the object, clear this check box.

8. Click **OK** to save your changes.


Alternatively, you could select the figure and on the **SPATIAL** tab, in the **Edit** group, click **Smooth Lines** from the list. **Unsmooth Lines** turns a curved line or shape into an angular one.


Drawing an Ellipse or Circle

To draw an ellipse:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Ellipse**.
3. Move the **Ellipse** (cross hair) cursor to where you want to begin creating the ellipse.

This point will be the center of the ellipse.

4. Press and hold the mouse button.
5. Drag the mouse. The shape appears on the screen and changes size and proportion as you move the pointer.
6. Release the mouse button when the ellipse has the shape you want.
7. Use the **Ctrl** key to begin drawing the ellipse from a corner of the minimum bounding region for the ellipse instead of out from the center of the ellipse.

To draw a circle, repeat these steps while using the **Shift** key in conjunction with the **Ellipse** command to create perfect circles. Be sure to release the mouse button before you release the **Shift** key when the circle reaches the desired size.

The ellipse appears in the current line and fill style. Set the style on the **SPATIAL** tab, in the **Create** group, by clicking **Insert**, and **Line Style** or **Region Style** from the list.

Note: You can use the **Ctrl** key in conjunction with the **Shift** key to create perfect circles that begin at the corner of the bounding region.

Specifying Ellipse Attributes

Make the layer that you want to work with is both editable and selectable. The object must be editable (reside in an editable layer) before you can specify attributes.

To set the center, horizontal, and vertical coordinates of an ellipse:


1. Double-click on the ellipse, or select it and press **F7** to open the **Ellipse Object** dialog box.
2. Type the coordinate settings for the ellipse in the dialog box's coordinate settings boxes.
3. Click **OK**.


Drawing a Polyline ▴

To draw a polyline:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Polyline**.
3. Move the **Polyline** cursor to where you want to begin drawing and click the mouse button once.
4. Move the **Polyline** cursor to draw the first line segment.
5. Click the mouse button once if you want to terminate the current line and continue drawing another line from that endpoint.
6. Repeat for each additional line segment. A new line appears between the previous end point and the new point that you select.
7. Double-click the last endpoint to stop. You can delete the last node by pressing the **Backspace** key. If there is only one node left in the object it is not deleted.


Note: By pressing the **Shift** key while drawing a polyline, the line segments are constrained to horizontal, vertical, and 45-degree diagonals.


Drawing a Rectangle

To draw a rectangle:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Rectangle**.
3. Move the **Rectangle** cursor to where you want to begin creating the rectangle.
4. Press and hold down the mouse button and drag the pointer to the opposite corner of the rectangle. The shape appears on the screen and changes size and proportion as you move the pointer.
5. Release the mouse button to finish creating the shape.

Rectangles are closed figures filled with the default fill pattern and/or color style. Set the style on the **SPATIAL** tab, in the **Create** group, by clicking **Style**, and **Line Style** or **Region Style** from the list.


Note: The sides of a rectangle are always true horizontal and vertical, even when you change the map's projection. If you want the sides of a rectangle to adjust when you change the map's projection, create four-sided region objects instead of rectangle objects.


Drawing a Square

To draw a perfect square:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Rectangle**.
3. Move the **Rectangle** cursor to where you want to begin creating the rectangle.
4. Press the **Shift** key while using the **Rectangle** command.


Rectangles are closed figures that are filled using the default fill pattern and color. Set the style on the **SPATIAL** tab, in the **Create** group, by clicking **Region Style** from the **Style** list.


Drawing a Rounded Rectangle

To draw rounded rectangles on a map:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Rounded**.
3. Move the **Rounded Rectangle** cursor to where you want to begin creating the rectangle.
4. Press the mouse button and drag the pointer diagonally to the opposite corner of the rectangle. The shape appears on the screen and changes size and proportion as you move the pointer.
5. Release the mouse button when the rectangle is the size you want.

To draw rounded squares on a map, when you want to draw a square with rounded corners, press the **Shift** key while using the **Rounded Rectangle** command.

Rounded rectangles are closed figures. They are filled with the default fill pattern and/or color. This is set using the **Region Style** command on the **SPATIAL** tab, in the **Create** group, on the **Style** list.


Drawing an Arc


The **Arc** command allows you to draw an arc in an editable **Map** window. The arc will be the size and shape of one quarter of an ellipse. Once you have drawn an arc, you can reshape it to the desired size.

To draw an arc:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Arc**.
3. Move the **Arc** command cursor where you want to begin drawing the arc.
4. When you want to draw an arc that is a quarter of a circle, hold the **Shift** key down while drawing.
5. Press and hold the mouse button.
6. Move the cursor. The arc appears on the screen and changes size and proportion as you move the cursor.
7. Release the mouse button.

When the arc does not curve in the direction you want it to, redraw it in the same place but move the mouse in the opposite direction.

The **Arc** command creates an arc that is one quarter of an ellipse. The endpoints are at 0, 90, 180, or 270 degrees on the ellipse.

Repositioning an Arc

Make the layer that you want to work with is both editable and selectable.

To reposition an arc manually:

1. On the **SPATIAL** tab, in the **Selection** group, click **Select** from the list. Position the **Select** command at one of the two endpoints.
2. Press the mouse button and hold it down. The cursor becomes a four-way arrow.
3. Drag the arc to a new position.
4. Release the mouse button, and the arc moves to the new position.

To reposition an arc using coordinates:

1. Double click the arc to open the **Arc Object Attributes** dialog box.
2. Type your new center coordinates.

Reshaping an Arc

Make the layer that you want to work with is both editable and selectable.

To reshape an arc manually:

1. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** from the list.
A small box (node) appears at both the start and end-points of the arc.
2. Position the cursor over one of the nodes.
3. Click the node and drag it to a new location. The selected node becomes hollow. This node moves along the arc's ellipse and the angle between the two end nodes changes, reshaping the arc.
4. Continue dragging until the arc has the desired shape.

Reshape mode remains turned on until you turn it off. To turn off reshape mode, on the **SPATIAL** tab, in the **Edit** group, click **Reshape**.

Resizing an Arc

Make the layer that you want to work with is both editable and selectable.

To resize an arc manually:

1. Choose the arc by clicking on either end with the **Select** command. On the **SPATIAL** tab, in the **Selection** group, click **Select** from the list.
Four edit handles, small squares, appear around the arc indicating that it is selected for editing.
2. Click any of the four edit handles and drag it in the appropriate direction. When you drag an edit handle, a dotted box appears around the arc.
3. Drag the edit handle until you have resized the arc appropriately.

4. Release the mouse button, and the arc resizes according to the size of the box. When the mouse button is released, the arc resizes so that it extends to the lower right corner of its bounding rectangle.

To resize an arc using coordinates:

1. Double-click the arc to open the **Arc Object Attributes** dialog box.
2. Type your new beginning and ending coordinates.

Specifying Arc Object Attributes

Make the layer that you want to work with is both editable and selectable. The object must be editable (reside in an editable layer) before you can specify attributes.

To specify arc object geographic attributes:

1. Select the arc. On the **SPATIAL** tab, in the **Selection** group, click **Select** from the list.
2. Do one of the following:
 - On the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info**.
 - Double-click the arc with the **Select** command to open the **Arc Object** dialog box.
3. Type in a new Start Angle and/or End Angle, as appropriate.
4. Click **OK**.

Drawing a Polygon

Use the **Polygon** command to draw polygons one side at a time.

To draw polygons:

1. On the **SPATIAL** tab, in the **Create** group, click **Polygon** from the **Insert** list.
The cursor becomes a small cross.
2. Move the pointer to where you want to begin drawing and click the mouse button once. Drag the pointer to draw the first side or line.
3. Click the mouse button once when you want to terminate the current line and continue drawing another line from that endpoint.
4. Repeat steps 2 and 3 for each additional side, a new line appears between the previous end-point and the new point that you selected.
5. To stop, double-click the last end point. You can delete the last node by pressing the **Backspace** key. If there is only one node left in the object it will not be deleted.

MapInfo Pro draws the last side of the polygon for you, automatically connecting it with the starting point. MapInfo Pro fills the polygon with the default pattern. For example, when you want to draw a triangle, you can draw two lines in a V shape, then double-click. MapInfo Pro draws a line to close the shape.


When you hold the **Shift** key down while drawing a polygon, the line segments are constrained to horizontal, vertical, and 45-degree diagonal.


Drawing Straight Lines \

To draw a straight line:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Line**.
3. Move the pointer to where you want to begin drawing the line.
4. Click and hold down the mouse button, and drag the pointer. The line appears on the screen and changes length as you move the pointer.
5. Release the mouse button.

Note: Pressing the **Shift** key while drawing a line constrains the line to horizontal, vertical, or 45-degree diagonal.

Rotating Objects and Text

You can rotate objects in two ways: directly on the map, or by specifying a rotation angle for precise rotation.

To rotate object(s) directly on the map:

1. Make the layer containing the object editable.
2. Click **Select** command and select one or more objects. **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.

The object(s) is highlighted and bounded by four edit handles and a fifth handle (small diamond) below the lower right corner.

3. Click on the selected object's rotation handle, hold down the mouse button and drag it to rotate the highlighted box to the desired angle. A rubber banding box is drawn representing the rotated object.

Note: If the **Shift** key is pressed while the rubber banding box is being drawn, the rotation is limited to 45-degree increments. Drag the mouse in the rotation direction you wish to go. Multiple selected objects rotate when the edit handle is selected and dragged.

Rotating Objects and Text Using Angle of Rotation

To rotate objects by specifying an angle of rotation:

1. Make the layer containing the object editable.
2. Click the **Select** button and select one or more objects. **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.

The object(s) is highlighted and bounded by four edit handles and a fifth handle (small diamond) below the lower right corner.

3. For precise rotation control, on the **SPATIAL** tab, in the **Edit** group, click **Rotate Object** from the list to open the **Rotate Objects** dialog box.
4. Set the angle of rotation by typing a value into the **Rotation Angle** box. The rotation angle can be positive (counterclockwise) or negative (clockwise).
5. To choose a different rotation anchor point, do one of the following:
 - Type new entries in the **X** and **Y** coordinate fields to select a new anchor point.
 - Click the **Pick from Map** button and click the anchor point you want on the map. Click the mouse button only once to establish this point. To return to the default anchor point, choose **Reset Anchor** button.
 - To pick a precise location from the map, you can enable Snap mode by pressing the **S** key. To zoom in or out, press **+** or **-**.
 - To pan, navigate with the **Arrow** keys on your keyboard.
6. To lock the anchor point, select the **Lock Anchor Point Position** check box.

When you lock the anchor point, you ensure that the anchor point will not be recalculated when you return to the Map window. If you do not lock the anchor point, MapInfo Pro recalculates the anchor point in the based what may be a slightly different centroid.

The default anchor point varies depending upon the type of object and the number selected. See table below.

7. Click **OK** when finished.

The following objects types can be rotated:

Object Type	Anchor Point
Line	Centroid
Polyline	Center of MBR
Polygon	Centroid
MultiPoint	Centroid

Object Type	Anchor Point
Collection	Centroid
Arc	Center of MBR
Ellipse	Center of MBR
Rectangle	Center of MBR
Rounded Rectangle	Center of MBR

Note: Points cannot be rotated.

Rotating Text

You can rotate text manually or by specifying the angle of rotation in the **Text Object Attributes** dialog box.

To rotate text manually:

1. Make the layer containing the text editable.
2. Click the **Select** button and select a text object.

The text region is highlighted and bounded by four edit handles and a fifth handle below the lower right corner.

1. Click on the fifth handle and hold down the mouse button: on the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.
2. Rotate the highlighted box to the desired angle.

To specify a rotation angle:

1. Double-click the text object to open the **Text Object Attribute** dialog box.
2. Type the desired degree of rotation in the **Rotation** box, and click **OK**.

Using the Ruler Window as You Draw

The **Ruler** window shows the distance of line segments as you draw, as well as the cumulative distance of the drawn object. If necessary, a rubber-banding line displays to show what points are being used to compute the distance. The **Ruler** window also displays what type of calculation is used to compute the distance: Spherical or Cartesian. The type of calculation depends on the projection of the map.

The following drawing commands will display a rubber-banding line:

- Arc
- Ellipse
- Rectangle
- Rounded Rectangle

You can also use the **Ruler** window with the **Radius Selection** and **Marquee Selection** commands.

If the **Ruler** window is not active, the drawing and selection commands noted above do not display distance. The rubber-banding line does not display.

For more instructions, see [Measuring the Distance between Two Points](#).

Measuring the Distance between Two Points

The **Ruler** command measures the distance between two points and the total distance of a multi-segment path.

To measure the distance between two points:

1. Select **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Ruler** from the list, to open the **Ruler** window.
2. Click at the point where you want to start measuring, a small box displays on the screen to mark the point.
3. Move the cursor and click on a location. A box displays to mark the second point. MapInfo Pro adds that distance to the total distance.

This is useful when you want to follow along a street in a map and see how long the street is. You can also use it to find the distance along a path that includes various streets and roads.

4. Double-click the mouse button when you have completed the measurement.

To measure the length of a multi-segment path, repeat step 3 above until you have outlined the total distance of the path. When you have completed the measurement, double-click the mouse button.

You can start another measurement or choose a new command. When you choose a new command, you may want to close the **Ruler** window.

When you want to change the units of measure, on the **MAP** tab, in the **Options** group, click **Map Options**.


Object Styles


MapInfo Pro draws objects using the default color, fill pattern, line type, symbol, and text settings for the layer you are drawing on. The default style can be set in the **Styles Preferences** dialog box.

To change the style of an *existing* object:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. Select the object. On the **SPATIAL** tab, in the **Selection** group, click **Select** from the list.
3. On the **SPATIAL** tab, in the **Create** group, click **Style**, and **Symbol Style**, **Line Style**, **Region Style**, or **Text Style**.
4. Save your changes.

Your style selection also sets the styles for any subsequent objects to be drawn on the layer.

For closed shapes such as circles and squares, you can change the fill pattern and color, the style and color of the border, and the line width of the border. For arcs and lines, you can change the type of line, its color, and the width of the line. In addition, you can use interleaved line styles to create the appearance of intersections for overlapping intersections and lines within a single layer. Interleaved line styles are available for use with lines of the same style and color (they can be different widths). Interleaved line styles are not available for solid lines or borders.

Any edits to an object's default settings will be applied during the entire work session until you make new changes. To save the settings, you must save the table where the object resides.

You can also change the display of an object from the **Layers** or **Explorer** windows. In the **Layers** window, double click on the layer to open the **Layer Properties** dialog box. Under the **Layer Display** tab, check the **Style Override** check box. Click the **Style** button to bring up the appropriate style dialog box.

Note: The settings you specify are temporary unless you save the table to a workspace.

Using Interleaved Line Styles

Interleaved Line Styles create the appearance of intersections on your maps for overlapping intersections and lines. This option is available for lines, polylines, and arcs in the map view only.

To use interleaved lines:

1. On the **SPATIAL** tab, in the **Create** group, click **Line Style** from the list to open the **Line Style** dialog box.

If you select a line style that has 'multiple passes,' the Interleaved check box is enabled.

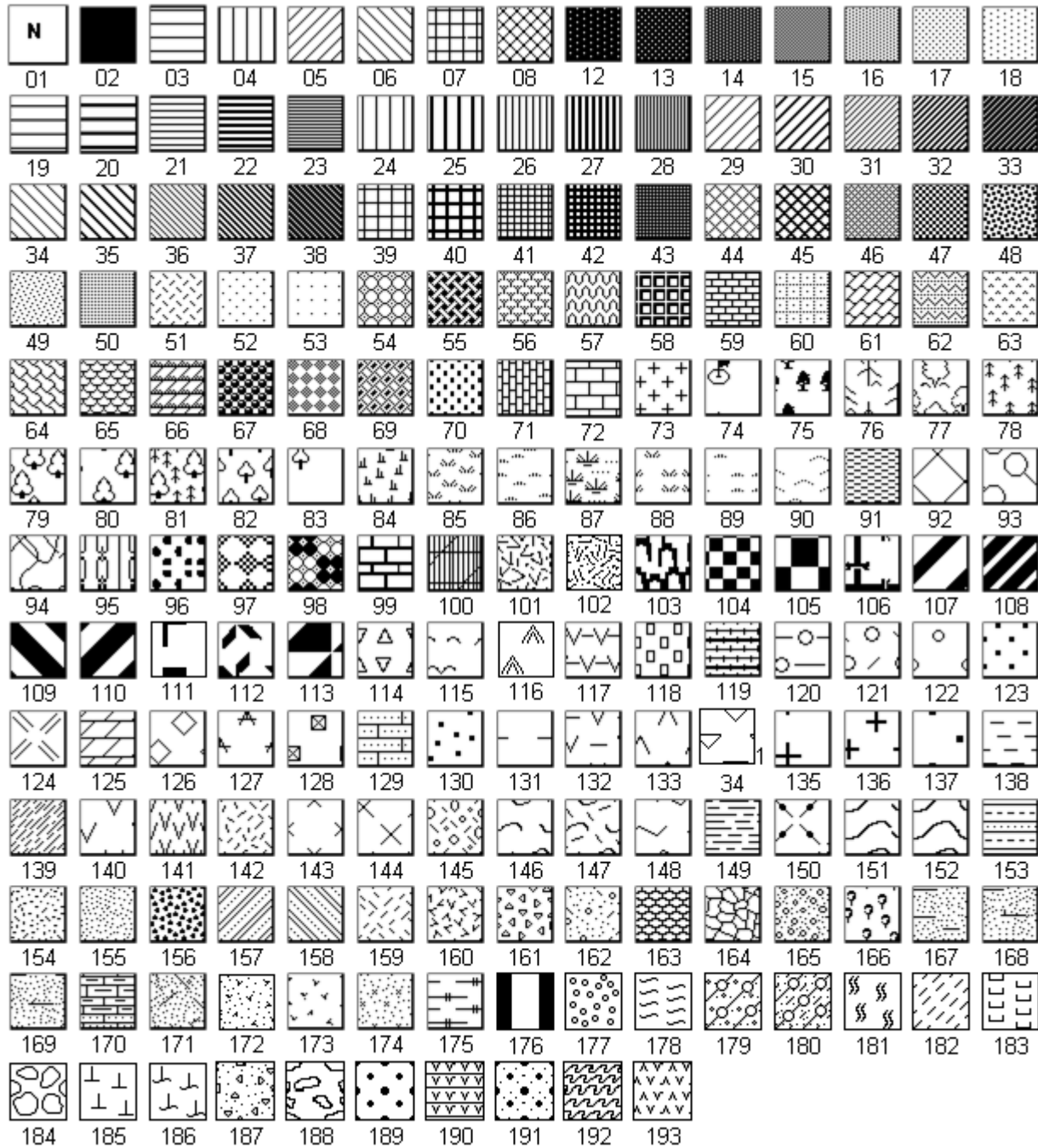
2. Select the **Interleaved** check box to use the interleave feature.

Items to keep in mind:

- The **Interleaved** option is not available for solid lines.
- The **Interleaved** option is not available for borders.
- Only lines of the same style and color are interleaved. Lines of the same style and color, but different width are interleaved.
- Interleaving only works for lines within a single layer. If two lines from different layers cross, they are not interleaved.

MapInfo Pro Fill Pattern Table

In the Region Style dialog box, you have the option of selecting fill patterns for regions. This section shows the fill pattern ID numbers and their corresponding patterns.



Drawing Polygons and Polylines


Drawing polygons is different than drawing other shapes because you are creating a region on which you can perform other editing and analysis.


For instance, you want to create school districts for your map. You have a street map of your town to guide you in defining the school district boundaries.

To create a polygon:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Polygon**. The cursor becomes a cross hair.
3. Click a starting point on the map for the polygon.
4. Continue to click to add segments to the polygon.
5. When you are ready to complete the object, double-click the last end point.

You can delete the last node by pressing the **Backspace** key.

Note: If there is only one node left in the object it will not be deleted.

You can then use the **Combine** commands (on the **SPATIAL** tab, in the **Edit** group) to combine this region with another or reshape the region.

Polylines are made up of multiple line segments that are treated as one object. Unlike lines created with the **Line** command, you can smooth polylines into a continuous curve using the **Smooth Lines** command (on the **SPATIAL** tab, in the **Edit** group, click **Fix/Clean**, and **Smooth Lines**). You can delete the last node by pressing the **Backspace** key.

Note: If there is only one node left in the object it will not be deleted.

Drawing Orthogonal Polygons

You can draw orthogonal (right angle) polygon line segments when you press the **Ctrl** key. Using this key you can draw the polygon at 45 degree increments relative to the slope of the last line segment. This functionality works for **Line**, **Polyline**, **Polygon**, and **Ruler** commands.


This functionality is useful when you want to draw perpendicular lines at an angle rather than horizontal to the map.


Note: **Snap** and **Autotrace** functionality must be turned off to use this feature, because when these features are activated, the **Ctrl** and **Shift** keys have other purposes. The **Shift** and **Ctrl** keys also do not operate when you are using the **Polygon Selection** command.

To see this functionality:

1. On the **HOME** tab, click **Open** and select a map to display.
2. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

3. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Polygon**.

Note: This works with any of the **Line**, **Polyline**, and **Ruler** commands as well, we are just using the **Polygon** command as an example.

1. Click and draw a single line in any direction other than horizontal following these directions:
 - To draw the next segment perpendicular to the last segment, press **Ctrl** while dragging the cursor.
 - To draw the next segment perpendicular to horizontal, press **Shift** while dragging the cursor.

Tracing Polylines and Polygons

When you are drawing a new polyline or polygon, you can use **Autotrace** to trace nodes from existing polylines or polygons. The **Autotrace** tool is only in effect when you are using a polygeometric tool (when adding a polyline or polygon, or when selecting a polygon) and **Snap** is on.

Use **Autotrace** to trace a boundary of an existing object and avoid creating splinter polygons trying to trace a difficult line.

To trace the nodes of an existing polyline or polygon:

1. Press the **S** key to activate Snap Mode.
2. Press the **I** key to activate **Autotrace** (for information about autotrace, see [Autotracing Objects](#)).
3. Click on the first node of the polyline/polygon you want to trace.
4. Move the mouse to another node of the same object. Follow the procedure below for the type of object you are tracing:
 - **Polyline:** Hold down the **Shift** key or the **Ctrl** key and click.
 - **Polygon:** Hold down the **Shift** key for the shorter set of nodes or the **Ctrl** key for the longer set of nodes and click.

Pressing the **Shift** or **Ctrl** keys highlights the trace path. Click to automatically trace the segments between the nodes and add them to the polyline/polygon you are drawing.

- Continue until you have traced the entire polygon/polyline and right-click to end.

Note: **Autotrace** only one object at a time; clicking nodes in different objects will produce a straight line between the two nodes.

Drawing Orthogonal Polygons

You can draw orthogonal (right angle) polygon line segments when you press the **Ctrl** key. Using this key you can draw the polygon at 45 degree increments relative to the slope of the last line segment. This functionality works for **Line**, **Polyline**, and the **Polygon** commands, as well as for the **Ruler** command.


This functionality is useful when you want to draw perpendicular lines at an angle rather than horizontal to the map.


Note: Snap and Autotrace functionality must be turned off to use this feature, because when these features are activated, the **Ctrl** and **Shift** keys have other purposes. The **Shift** and **Ctrl** keys also do not operate when you are using the **Polygon Selection** command.

To see this functionality:

- From the **HOME** tab, in the **File** group, click **Open**, click **Table**, and select a map to display.
- Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

- On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Line**, and then **Polygon**.

Note: This works with any of the **Line**, **Polyline**, and the **Ruler** commands as well, we are just using the **Polygon** command as an example.

- Click and draw a single line in any direction other than horizontal following these directions:
 - To draw the next segment perpendicular to the last segment, press **Ctrl** while dragging the cursor.
 - To draw the next segment perpendicular to horizontal, press **Shift** while dragging the cursor.

Tracing Polylines and Polygons

When you are drawing a new polyline or polygon, you can use **Autotrace** to trace nodes from existing polylines or polygons. The **Autotrace** command is only in effect when you are using a polygeometric command (**Polyline**, **Polygon**, or **Polygon Selection**) and **Snap** is on.

Use **Autotrace** to trace a boundary of an existing object and avoid creating splinter polygons trying to trace a difficult line.

To trace the nodes of an existing polyline or polygon:

1. Press the **S** key to activate **Snap** Mode.
2. Press the **I** key to activate **Autotrace** (for information about autotrace, see [Autotracing Objects](#)).
3. Click on the first node of the polyline/polygon you want to trace.
4. Move the mouse to another node of the same object. Follow the procedure below for the type of object you are tracing:
 - **Polyline**: Hold down the **Shift** key or the **Ctrl** key and click.
 - **Polygon**: Hold down the **Shift** key for the shorter set of nodes or the **Ctrl** key for the longer set of nodes and click.

Pressing the **Shift** or **Ctrl** keys highlights the trace path. Click to automatically trace the segments between the nodes and add them to the polyline/polygon you are drawing.

5. Continue until you have traced the entire polygon/polyline and right-click to end.


Note: Autotrace only one object at a time; clicking nodes in different objects will produce a straight line between the two nodes.


Converting a Polyline to a Region

To convert a polyline into a region:

1. Make the **Map** window active by clicking on it.
2. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

3. Select the polylines you want to convert to a region.
4. On the **SPATIAL** tab, in the **Create** group, click **Regions**, and **Enclose (Polylines to Regions)** to open the **Create Region Objects From Enclosed Areas** dialog box.
5. Click **OK**.

The polyline selection is now a region.

You can also convert regions to polylines. For these instructions, see [Converting Regions to Polylines](#).

Splitting Polylines at Nodes

A single-section polyline can be split into two polylines at a selected node.

To split a single-section polyline:

1. From an editable layer, select a single-section polyline
2. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** from the list.
3. Select one node (other than the first or last node).
4. On the **SPATIAL** tab, in the **Edit** group, click **Split**, and **Split Target using Polyline**.
5. If a layer is not a cosmetic layer, the **Data Disaggregation** dialog box opens. Here you can specify how data is disaggregated.
6. After selecting the data disaggregation method, click **OK**.

The selected polyline splits at the node to create two polylines.

Error messages display under the following conditions:

- You did not select a node of the polyline.
- You selected a beginning or ending node of the polyline.
- You selected more than one node of the polyline.
- The object that you selected is not a polyline object.
- You attempted to split a multi-segmented polyline (only single-section polylines can be split).

Converting Objects into Polyline Objects

If a region contains lakes or islands, and you convert that region to a polyline, the polyline has multiple sections. Each lake or island comprises one section of the polyline. When you convert a circle or ellipse into a polyline, the polyline contains 102 nodes. When you convert an arc into an ellipse, the number of nodes depends on the starting and ending angle of the arc. If the arc spans 180 degrees (for example, the starting angle is zero and the ending angle is 180), a polyline based on the arc will contain 52 nodes; if the arc spans 90 degrees, a polyline based on the arc will contain 26 nodes; etc.

Displaying Distance While Drawing Objects

If the **Ruler** window is active, the **Ruler** command shows the distance when drawing or selection commands are being used. The **Ruler** window shows the current segment distance, as well as a cumulative distance. If necessary, a rubber banding line displays to show what points are being used to compute the distance. The type of object being drawn or used for selection determines whether the rubber-banding line displays.

To open the **Ruler** window, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Ruler** from the list. To then work with the **Ruler** command, on the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Ruler**.

When you choose a new command, you may want to close the **Ruler** window.

The commands that show an additional rubber banding line are on the **SPATIAL** tab:

- In the **Create** group, click **insert**. The commands are **Arc**, **Ellipse**, **Rectangle**, and **Rounded Rectangle**.
- In the **Selection** group, the commands are **Marquee Selection** and **Radius Selection**, which are in a selection list.

Note: If the **Ruler** window is not active, then the drawing and selection commands do not display distance and the additional rubber banding line is not visible.

See Also:

[Measuring the Distance between Two Points](#)

Displaying Distance, Length, Perimeter, and Area Calculations

Double-clicking on an object type, such as lines, rectangles, rounded rectangles, region, polyline, and ellipses, displays information about the object. This information includes measurement; the type of calculation method used to calculate measurement displays in parenthesis after the measurement.

The **Convert to Polylines** command simplifies the task of creating buffer regions that have a hole in the middle of them. Suppose you want to create a buffer representing the area within one mile of a county boundary. You may want the buffer to have a hole in the middle of it and extending exactly one mile to either side of the county line.

You could create a buffer simply by selecting the county region and choosing to buffer it: on the **SPATIAL** tab, in the **Edit** group, click **Buffer Objects** from the list. However, the resultant buffer would not have a hole in the middle of it. Instead, it would contain all of the county, plus an area of one mile outside the county.

If you convert the county region into a polyline before you choose to buffer it, then the resultant buffer region includes a hole in the middle of it.

Convert to Polylines lets you perform node-editing operations (such as adding and moving nodes) on objects that ordinarily do not allow node editing. For example, MapInfo Pro does not allow you to add nodes to rectangle objects; however, if you convert a rectangle to a polyline, you can then add nodes to the polyline.

To convert objects into polyline objects:

1. Make the Map window active.
2. Choose the layer containing the objects and make it editable.
3. Select one or more objects from the editable layer.
4. On the **SPATIAL** tab, in the **Edit** group, click **Convert to Polylines**.

When you choose **Convert to Polylines**, MapInfo Pro converts each of the selected objects into a polyline. Each object is converted into a separate polyline; MapInfo Pro does not combine all selected objects into one polyline.

Line, arc, ellipse, rectangle, rounded rectangle and region objects may all be converted to polylines. The **Convert to Polylines** command does not affect point objects, text objects and polyline objects.

See also:

[Changing the Default or Preference Setting for Calculations](#)

[Specifying Buffer Calculations](#)

Specifying Distance, Length, Perimeter, and Area Calculations for a Particular Map

To specify distance, length, perimeter, and area calculations for a particular map:

1. On the **MAP** tab, in the **Options** group, click **Map Options** to open the **Map Options** dialog box.
2. Choose a calculation method from the Distance/Area using option:

Spherical: Spherical calculations are used for distance methods that attempt to keep the measurement on the curved surface of the earth. The data is first converted to Latitude/Longitude and then a calculation is produced. Non-earth data cannot use spherical calculations, since the data cannot be converted to Latitude/Longitude.

Cartesian: Cartesian methods are used to perform calculations on Non-earth data. Cartesian coordinates are a pair of numbers, (x, y), defining the position of a point in a two-dimensional space by its perpendicular projection onto two axes that are at right angles to each other. Cartesian calculations cannot be used for Latitude/Longitude data, which is not a flat projection.

3. Click **OK**.

The only calculations available for the map Window's projection are those that will produce a valid result. For example, Cartesian is not available for a Latitude/Longitude projection because it cannot be use on a curved surface. Spherical is not available for a table in a non-earth projection because it is not curved and cannot be converted to Latitude/Longitude.

Note: When a **Map** window is first opened, it uses the setting from the preference as the default. **Map** windows saved in a workspace will save this setting, which will be re-sorted when the workspace is opened.

Drawing Symbols

Symbols on your maps make your map more expressive and easier to understand. This section explains how to change a style currently used by MapInfo Pro and create your own custom symbols. We also discuss in detail the rules governing symbols.

To draw symbols, make the layer you want to draw the symbols to editable and choose the **Symbol** command (on the **SPATIAL** tab, in the **Create** group, click **Insert**). Place the cursor where you want the symbol to be and click. The symbol displays using the default symbol style settings.


Adding Point Symbols to your Map


You can add individual point symbols to represent any feature on your map.

To add point symbols to your map:

1. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

2. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Symbol**.
3. Click on the map where you want to place the point symbol.

The point symbol appears at that location.

Specifying Symbol Styles of Point Objects

Use the **Symbol Style** command to set the symbol type, size, and color of symbols for point objects that you create. You can also change the attributes of existing symbols. MapInfo Pro supports three types of symbols: vector symbols, installed font symbols, and custom symbols.

- **Vector symbols** – The 36 shapes from the MapInfo Pro symbol set.
- **Installed font symbols** – Symbols available from the installed fonts that offer a symbol set.
- **Custom symbols** – Symbols found in bitmap format in the `CUSTSYMB` directory where MapInfo Pro is installed. The symbols must reside in an editable layer or in the **Layout** window in order to change their attributes.

The **Symbol Style** command applies only to symbols. To change the attributes of other types of objects, use the **Region Style**, **Line Style**, and **Text Style** commands.

To specify symbol styles for new point objects:

1. Make the layer that you want to work with editable.
2. On the **SPATIAL** tab, in the **Page** group, click **Symbol Style** from the list.
3. Choose from the style options, (see [Symbol Style Dialog Box](#)).
4. Select **OK**.
5. Click on the map to display your symbol.

Any new point objects that you add to your map will use the symbol style that you specified.

Changing the Location of Point Symbols

To drag your symbol to a new location:

1. Make the layer that you want to work with editable.
2. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.
3. Click and drag the symbol to a new location on the map.

Setting New X and Y Coordinates for a Point Symbol

To specify new X and Y coordinates:

1. Make the layer that you want to work with editable.

2. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.
3. Double click the symbol to open the **Point Object** dialog box.
4. Enter the new X and Y coordinates.
5. Click **OK**.

The symbol displays in the new location on the map.

Changing a Symbol Style on a Map

To change a symbol's style on a map:

1. Select the symbol on the map. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.
2. On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Symbol Style** from the list.
3. In the **Symbol Style** dialog box change the symbol, font, color, and size, as well as create background effects and bold face for symbols.

When **Custom Symbols** are selected, the following additional options are available:

Select the **Display at Actual Size** check box to see the symbol you selected at the size it was originally created.

Click the **Reload** button to refresh the list of custom symbols stored in the Application Data CUSTSYMB directory. Select this button if you added a new custom symbol and do not see the symbol(s) in the list.

Click the **Full View** button to display the entire view of custom symbols in a separate window. This button displays only when you select the Custom Symbols font type. You use this button when the preview is too large to display completely in the sample area.

Note: The options in the **Symbol Style** dialog box may be different depending upon the size and complexity of the image.

4. Make the desired changes, and click **OK**.

The symbol displays with the style changes you specified. These settings also apply to any subsequent symbols you draw until you change the settings.

Supported Fonts for Symbols

You have many options when drawing symbols. We support a number of TrueType fonts that carry their own symbol sets. We have also organized a number of symbol fonts around different industries, such as real estate and transportation, making it easy for you to find the symbols you need. MapInfo Pro supports the following fonts:

- MapInfo Cartographic
- MapInfo Transportation
- MapInfo Real Estate
- MapInfo Miscellaneous

- MapInfo 3.0 Compatible Symbols (vector symbols, available as a True Type font in MapInfo Pro): the 36 shapes from the MapInfo symbol set
- MapInfo Oil & Gas
- MapInfo Weather
- MapInfo Arrows
- Installed font symbols: symbols available from the installed fonts that offer a symbol set
- ERS Fonts (For more about these fonts, see [Homeland Security Symbols](#).)
- Custom symbols: from here you can access user-created bitmap symbols which you have saved to the CUSTSYMB directory. This directory is created during MapInfo Pro installation. See [Working with Custom Symbols](#) for more about this process.

The MapInfo Symbols font is a TrueType font. When you use these symbols, the Background and Effects options in the **Symbol Style** dialog box are unavailable.

Homeland Security Symbols

These ERS fonts have been prepared by the Office of Homeland Security for use in your MapInfo maps. These fonts were developed to standardize the way emergency circumstances and industries are depicted in maps. These TrueType fonts are listed using the format "ERS V# symbol type" for clarity. Specifically the new symbols are:

- **ERS v2 Damage** - Use these fonts to create your own symbols. These fonts include circles, squares, and rectangles of various complexity.
- **ERS v2 Incidents** - Use these fonts to show various hazardous circumstances such as fires, police activity, and other dangers.
- **ERS v2 Infrastructures Stage 01 - 04** - Use these fonts to show various industrial environments including farms, factories, financial businesses etc. in a wide variety of complex frames to indicate severity
- **ERS v2 Natural Events** - Use these fonts to show areas of natural disasters such as hurricanes, tsunamis, volcanoes and other natural events
- **ERS v2 Operations Stage 01 - 04** - Use these fonts to show various emergency circumstance symbols such as ambulances, biohazard, and Red Cross-type symbols in a wide variety of complex frames to indicate severity

Working with Custom Symbols

You can create and use your own custom bitmaps as symbols in MapInfo Pro. To access these custom symbols, place them in the CUSTSYMB directory and select them from the Custom Symbols option in the Font list of the **Symbol Style** dialog box (**STYLE > Symbol Style**). All of the custom symbols in MapInfo Pro are stored in the CUSTSYMB directory. If you cannot find this directory, there are a couple of places you could check. The location of this file depends largely on the administration of your computer, the version of MapInfo Pro you use, and the location of your installation directory.

Usually, this directory is located in Program Files\MapInfo\Professional\ (or one of its subdirectories) or in \Documents and Settings\user's login directory\Applications

Data\MapInfo\MapInfo\version number\. If you cannot find this directory, click **Start** and **Search** and search for CUSTSYMB on your system.





Note: If you add custom symbols while you are working in MapInfo Pro, open the **Symbol Style** dialog box and click the **Reload** button to ensure that the new symbol(s) you have added display. Otherwise, you have to exit MapInfo Pro and re-enter it to get the new symbols to display in the Custom Symbols list.









When you change the style of a custom symbol, the **Effects** options in the **Symbol Style** dialog box change. You can either show a background or apply a color.


- **Show Background** displays the custom symbol with the background color with which it was created.
- **Apply Color** replaces all non-white pixels with a color you choose from the color palette.
- **Display at Actual Size** shows the symbol at its actual size.

When you are creating extended custom symbols we recommend you check the **Show Background** check box if you do not require transparency. This setting improves performance significantly during exporting and drag and drop operations.

MapInfo Pro ships with custom symbols that you can use to enhance your maps.

Title	Image	File Size	Color Depth
AMBU-64.BMP		13 KB	24-bit
BANK-64.BMP		13 KB	24-bit
BUILDINGS.BMP		13 KB	24-bit
FIRE-64.BMP		13 KB	24-bit

Title	Image	File Size	Color Depth
FOOD-64.BMP		13 KB	24-bit
HOUS-64.BMP		13 KB	24-bit
PINB-64.BMP		13 KB	24-bit
PING-64.BMP		13 KB	24-bit
PINGY-64.BMP		13 KB	24-bit
PINR-64.BMP		13 KB	24-bit
RAIL-64.BMP		13 KB	24-bit
RED-CAR.BMP		13 KB	24-bit

Title	Image	File Size	Color Depth
TRUC-64.BMP		13 KB	24-bit

Understanding the Custom Symbol Types

There are two types of custom symbols: custom symbols and extended custom symbols. The difference in these two types depends upon the complexity of the bitmap images. Files that are equal to or larger than 128K and/or have greater than 8 bit color are considered to be extended custom symbols. You need to know the distinction between these two types of custom symbols because the options for the extended custom symbols are slightly different from the custom symbols.

Understanding the Custom Symbol Sizes, Shape, and Color Rules

There are two types of custom symbols:

- Custom symbols
- Extended custom symbols

The difference in these two types depends upon the complexity of the bitmap images. Files that are equal to or larger than 128K and/or have greater than 8-bit color are considered to be extended custom symbols. You need to know the distinction between these two types of custom symbols because the options for the extended custom symbols are slightly different from the custom symbols.

You can create various sized and shaped bitmaps for use as custom symbols. As a general rule, smaller symbols look better at smaller font sizes because they will not need to be stretched. Larger symbols look better at larger font sizes because they have more pixels and more detail. Here are some rules and tips that govern custom symbols:

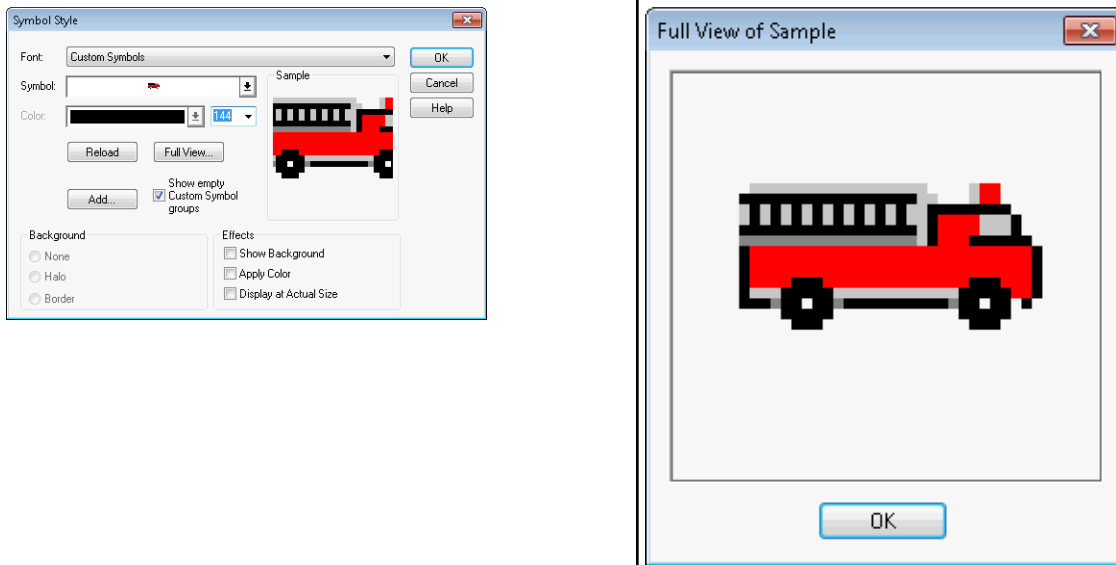
- You can select the point size for custom bitmaps from 9 to 240 pt.
- You can display the custom bitmap image at actual size.
- There is no a file size limit for custom bitmaps (other than what is required by your raster engine and the amount of memory you have).
- Extended custom symbols can be either rectangular or square in shape.
- Extended custom symbols usually have their own complex color pattern (which is what makes them extended) so the **Apply Color** option is disabled.
- MapInfo Pro supports up to 24-bit color bitmaps.

When you are dealing with very large bitmaps, there are a couple of special rules to keep mind:

- Some users have reported panning problems associated with very large symbols. When you create a symbol that is larger than 36 points, the symbol may not completely redraw as you pan across

your map. To alleviate this problem, go to the system registry and add or change your `MBRExtraPoints` registry entry.

- There are times when the custom symbol you are trying to display is too large for the sample area.




To display this image, click the **Full View** button to display the entire image in a new window. There may be times when the custom symbol you have created may be too large for even the new window.


Creating a Custom Symbol

To create a custom symbol:

1. Create your own custom symbol and save it as a bitmap.
2. Place the bitmap in the directory you have assigned for symbols.
3. Restart MapInfo Pro if it is running.
4. Open your map and make the map layer where you want to place the symbol editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

5. On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Symbol Style** to open the **Symbol Style** dialog box.
6. From the **Font** drop-down list, choose **Custom Symbols**.
7. Click **Reload** to view the newly added custom symbol.
8. Select your custom symbol and click **OK**.

- Click on the map using the **Symbol** command to display your custom symbol. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Symbol Style**.

Note: The bitmap file has to be 256 color and under 128k in size. Bitmaps should also be the same dimension in x and y.

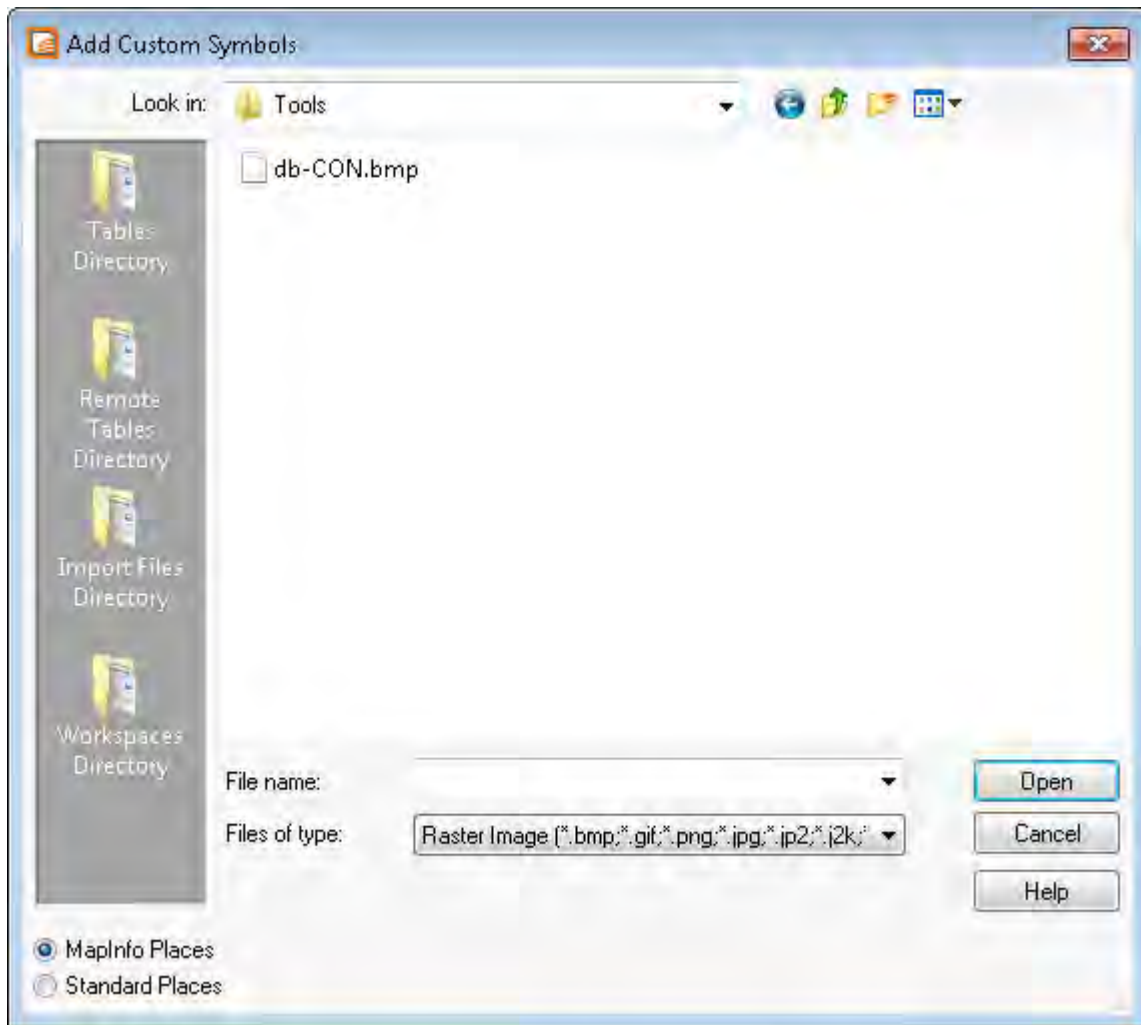
Adding User-Defined Custom Symbols

You can add custom symbols to the current style collection using the **Symbol Style** dialog box.

To add a custom symbol:

- On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Symbol Style** to open the **Symbol Style** dialog box.
- From the **Font** drop-down list, choose **Custom Symbols**.
- Click **Add** to open the **Add Custom Symbols** dialog box.

Note: The **Files of Type** drop-down list only displays the single file formats that are supported, including *.bmp; *.gif; *.png; *.jpg; *.jp2; *.j2k; *.pcx; *.psd; *.tif; *.tga; *.ecw. The **All files (*.*)** option lets you add the image and support files for multi-file format images.



4. Go to the appropriate directory and do one of the following:
 - If you are adding a raster image with a single file format, navigate to the image you want to add.
 - If you are adding a raster image with a multi-file format, choose the **All Files *.*** option and select the all of the files that are part of the image you want to add.

Note: You can also copy raster files to the `CUSTSYMB` folder subfolder manually.

Click **Open** to open the **Add Custom Symbol Results** dialog box.

5. Click **OK** to confirm what symbols you added and where they were added. You must place these files in the `CUSTSYMB` directory; its location is determined by the during MapInfo Pro's installation.

Note: If you add your custom symbols to the Custom Symbols folder (`CUSTSYMB`) manually, click **Reload** to display your new symbol in the **Symbol** drop-down list.

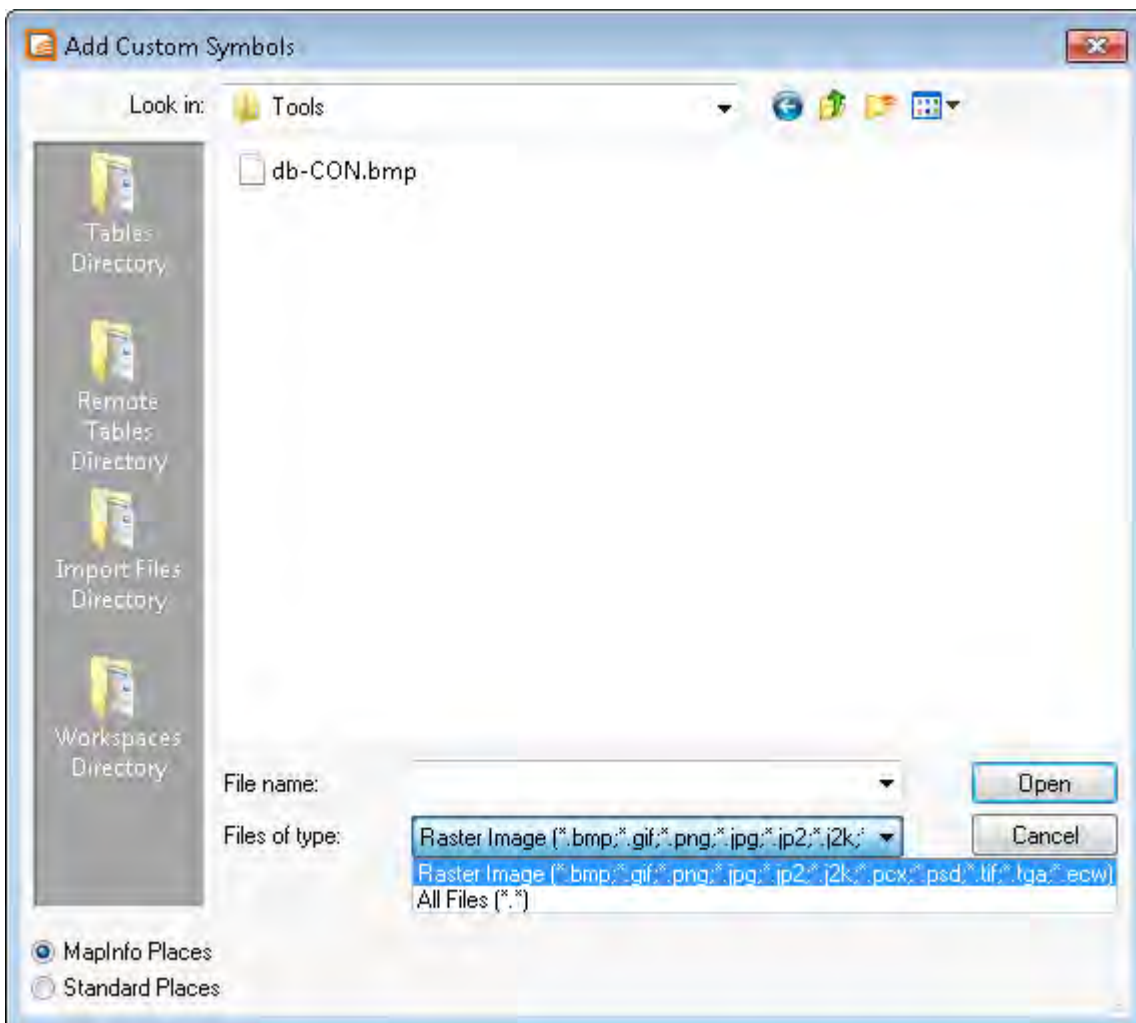
Note: If you executed the `Reload Symbols` statement MapBasic command to reload custom symbols from a particular directory, then the **Add Custom Symbols** dialog box adds the new symbols to that directory instead. For more about the `Reload Symbols` statement, see the *MapBasic Reference*.

If one or more files cannot be copied, the **Results** dialog box reports the failure. The copy can fail for a number of reasons, including:

- File name must be unique. You may have attempted to overwrite an existing .BMP file of the same name.
- Destination file name is too long (greater than `MAX_PATH`, which is 260 characters for a 32-bit Windows system).
- Destination directory does not exist
- The security permissions on your system prevent copying.

After the symbols have been copied, they are immediately available in the **Symbol** drop-down list.

Figure: Symbol Style with Custom Symbols Selected



Note: If you do not click the **Reload** button in the **Symbol Style** dialog box, the new custom symbol does not display until you close MapInfo Pro and reopen it.

Custom symbols do not have any size restrictions, but your system may slow down if you use very large (multiple gigabyte) images in your maps. Consider the resolution of your custom symbols when you load and display them to prevent this performance issue.

From time to time, we add high-resolution (24-bit color) custom symbols and update existing custom symbols. These are installed along with other custom symbols in the `CUSTSYMB` directory. The symbols in the Symbol drop-down list are sized to fit into each square cell, so the high resolution images are only approximations of the final image. To change the size of an image, change the font size.

Finding the Custom Symbol Directory

You can create and use your own custom bitmaps as symbols in MapInfo Pro. To access these custom symbols, place them in the `CUSTSYMB` directory and select them from the **Custom Symbols** option in the **Font** list. All of the custom symbols in MapInfo Pro are stored in the `CUSTSYMB` directory. If you cannot find this directory, there are a couple of places you could check. The location of this file depends largely on the administration of your computer, the version of MapInfo Pro you use, and the location of your installation directory.

Usually, this directory is located in `Program Files\MapInfo\Professional\` (or one of its subdirectories) or in `\Documents and Settings\user's login directory\Applications Data\MapInfo\MapInfo\version number\`. If you cannot find this directory, click **Start** and **Search** and search for `CUSTSYMB` on your system.

Note: If you add custom symbols while you are working in MapInfo Pro, open the **Symbol Style** dialog box and click **Reload** to ensure that the new symbol(s) you have added display. Otherwise, you have to exit MapInfo Pro and re-enter it to get the new symbols to display in the **Custom Symbols** list.

Organizing Custom Symbols

If you use groups of custom symbols together, then organize these symbols into subfolders under your `CUSTSYMB` folder. The name you give the subfolder appears in the Font list of the **Symbol Style** dialog box, so that you can use the custom symbol set in your map.

Adding your New Folder to the Font List

After you add the `CUSTSYMB` subfolder and images you want, there are several ways that the application can update the **Font** list.

To add a new folder to the **Font** list:

1. Using Windows Explorer, create a folder under the `CUSTSYMB` folder and place the appropriate images into it. Use a descriptive name for this folder to remember what the symbol group is for.

For more about sharing your custom symbols, see [Sharing or Not Sharing your Custom Symbols](#).

2. After these folders and images are copied, update the **Font** list so they display. There are three ways to do this:
 - On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Symbol Style** to open the **Symbol Style** dialog box.
 - From the **Font** list, select **Custom symbols**.
 - Click **Add** to add a symbol individually or select **Reload**.
 - Use the MapBasic statement `Reload Custom Symbols from dir` in the MapBasic window

Using any of these options prompts the application to search for additional custom symbols under the `CUSTSYMB` folder.
3. Click the **Font** drop-down list to display your new folder with the new images in them. In the **Symbol** drop-down list, the images display in alphabetical order, from left to right.

Using the New Fonts

To use one of the fonts you added:

1. On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Symbol Style** to open the **Symbol Style** dialog box.
2. From the **Font** drop-down list, select **Custom Symbols CivicEngland**.
3. Select the image you want from the **Symbol** drop-down list, and click **OK** to display it.

Sharing or Not Sharing your Custom Symbols

Where you keep your `CUSTSYMB` folder determines whether you share this folder or not. There are four locations that MapInfo Pro will look for the `CUSTSYMB` folder:

- To prevent others from sharing your custom symbol folder (default setting):

```
C:\Documents and Settings\<yourloginID>\Application
Data\MapInfo\MapInfo\Professional\950\CUSTSYMB\New Subfolders
```

- To share your custom symbol folder with other users:

```
C:\Documents and Settings\All Users\Application
Data\MapInfo\MapInfo\Professional\950\CUSTSYMB\New Subfolders
```

- To keep your custom symbol folder in a per-computer location:

```
C:\Documents and Settings\<machine name>\etc...)
```

- You can also keep the CUSTSYMB folder in the application folder:

```
C:\Program Files\MapInfo\Professional\CUSTSYMB\New Subfolders
```

Displaying Overlapping Symbols

When point objects display at the same coordinate, you can miss the significance of their proximity because the data overlaps each other, preventing you from making the connection.

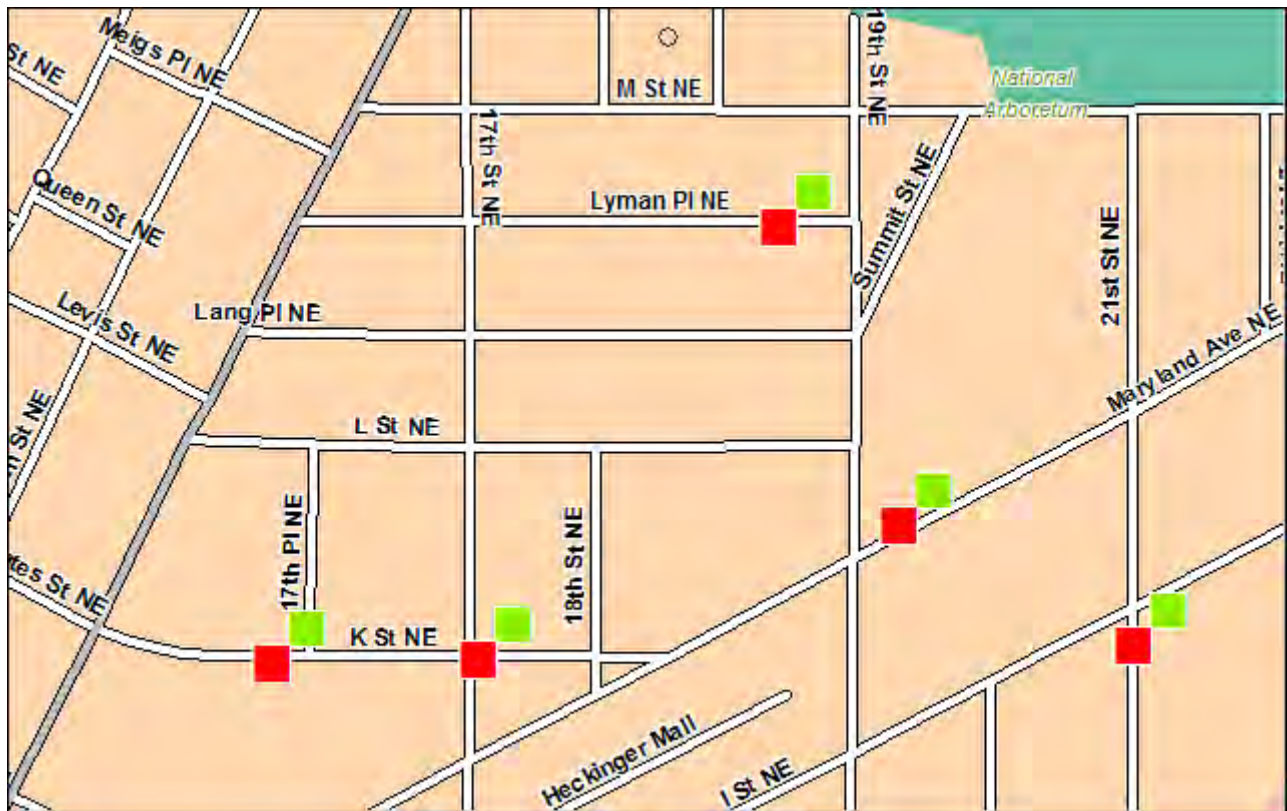
The **Dispersed Groups** symbol font gives you a way to display symbols that represent different organizations, events, or services that occupy the same coordinate location without overlapping each other. When you zoom out from the coordinate point, these symbols display around the coordinate point side by side. This font is installed when you install MapInfo Pro.

This symbol style is useful in several industries:

- Crime mapping - See multiple incidents at the same address and for traffic incident analysis
- Insurance - See multiple policy holders, policies, claims, or inspection requirements at the same address
- Wireless telecom - See multiple assets on the same mast/tower.
- Health care - See multiple incidents at the same address.
- Retail - See multiple attributes of a retail store, for example what internal franchised departments it contains or specific services that it offers.

To use this font in your current symbols:

1. Open a file that contains the points you want to use this font for.
2. Make the layer that contains those points editable.
3. Select one set of points using **Select**, **SQL Select**, or click the first set of points you want to display.
4. On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Symbol Style** to open the **Symbol Style** dialog box.
5. From the **Font** drop-down list, select **MapInfo Dispersed Group**.
6. Click the **Symbol** drop-down list to display the font options.
7. Select the symbol, the color, and the other features you want for this custom symbol. Click **OK**.
8. Repeat this process for the other set of points. Click **OK**.



In this example, the red point indicates arson reports and the green point indicates robberies. These points are located at the same coordinate address but can be viewed more distinctly as you zoom out.

Working with Text on the Map

Although the labeling feature takes care of most of your text needs, you will still need to create text objects with the **Text** command to annotate your map (for example, map titles and subtitles). Unlike labels, text objects have no connection to data.

To create text, make sure the layer you want to draw the text to is editable and then choose the **Text** command. The cursor changes to an I-beam. Place the cursor where you want the text to be and type in the text you want.

To enter text onto a map:

1. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Text**.

The cursor turns into an I-beam when moved over the active window.

2. Click the cursor at the place on the map or data displayed in the **Browser** window where you want to enter the text. A blinking cursor appears.

In a **Browser**, press **Tab** to move to the next cell.

3. Type the desired text. The text will appear at the blinking cursor as you type.
4. When you want to move to a new line of text press **Enter**.
5. When you are finished entering text, press **Esc**.

Note: The font used is the current font, as indicated on the **SPATIAL** tab, in the **Create** group, by clicking **Style**, and then **Text Style**.

To change the style of the text:

1. Select the text with the **Select** command (on the **SPATIAL** tab, in the **Edit** group, by clicking **Select**, and **Select**).
2. on the **SPATIAL** tab, in the **Create** group, click **Text Style** from the list to open the **Text Style** dialog box. Change the font, the size, color, and create various effects, such as haloing or drop shadows.

These settings will remain in effect for any text you subsequently draw on the map until you change them.

3. To save changes, on the **HOME** tab, in the **File** group, click **Save**. To save objects drawn to the Cosmetic layer, on the **MAP** tab, in the **Content** group, click **Cosmetic**, and click **Save Cosmetic Objects** from the list (or right-click on the **Map** window).

Editing Objects

In all likelihood, you will need to change or edit some of the objects you have drawn or mapped. To begin this process, you need to make the layer that you want to change editable (On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window, and then click the **Editable** icon for the layer).

To edit an object:

1. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.
 If the object is a line, edit handles appear at either endpoint.
 If the object is a boundary or region, edit handles appear at the outer corners of the object.
2. Drag the object to a new position or change its line style, fill pattern, or symbol.
3. From the **HOME** tab, **File** group, click **Save**.

Deleting Objects

To delete an object:

1. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.
2. Do one of the following:
 - On the **MAP** tab, in the **Clipboard** group, click **Cut**.
 - Press the **Delete** key.

Using either method, MapInfo Pro deletes the object. To view an object's nodes, centroids, and line direction when editing and drawing, set the conditions in the **Layer Properties** dialog box (on the **PRO** tab, click **Options**).

Positioning and Sizing your Map Objects

To move an object to a new location, make the object's layer editable and click the object to select it. Hold down the mouse button for at least one second until the cursor turns into a four-headed arrow. Drag the object to its new location and release the button. The object maintains its shape.

To move an object (in an editable layer) one pixel at a time, click it and press and hold the **Ctrl** key and press the **Arrow** key corresponding to the direction you want the object to move. To move the object 10 pixels at a time, press and hold the **Ctrl** and **Shift** keys and press the **Arrow** key corresponding to the direction you want the object to move.

Also, if you click the on the fifth edit handle (rotate handle) and hold down the mouse button, you can rotate the highlighted box to the desired angle. A rubber banding box is drawn representing the bounds of the rotated object. If you press and hold **Shift** key while the rubber banding box is being drawn, the rotation will be limited to 45 degree increments.


Moving Objects on the Map


You can move selected objects within its editable map layer easily.

To move an object on the map:

1. Click your map to make it active.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

3. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select** and then select the objects on the map.

If you select more than one object at a time to move, the objects move in the same way. Take care to ensure that you do not move an object off the map or off land by mistake.

Note: When you move the objects, you move them all at once, maintaining their positions relative to one another.

4. Do one or all of the following:

- To move the selected object(s) using the mouse, hold down the mouse button and drag the object to its new location
- To move the selected object(s) one screen pixel at a time, press and hold the **Ctrl** key and press the **Arrow** key in the direction you want the object(s) to move
- To move the selected object(s) 10 screen pixels at a time, press and hold the **Ctrl** and **Shift** keys and press the **Arrow** key in the direction you want the object(s) to move

Note: Since the moves are made in screen pixels, the zoom level affects how far the object is moved.

Offsetting Objects on the Map

The **Offset Object** feature makes a copy of the object(s) you select from the original source object(s) and saves them in the original data file.


You can both move and offset the objects you select using this process. The difference between these two operations is whether MapInfo Pro makes a copy of the data (as in the case of copy) or simply moves the objects and stores the new value in the original table.


The offset/move functionality is available when any layer is editable, not just when the objects you want to move or offset are in the editable layer. However, you can only move an object within its editable layer. Copy is always permitted as long as a layer is editable.

To move/offset selected objects on the map:

1. Click your map to make it active.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

3. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.
4. On the **SPATIAL** tab, click **Transform > Offset Object**.
5. In the **Offset Objects** dialog box, to move your selected objects, enter or select from the following options and click **OK** to apply the changes. To copy your selected objects to offset them, enter or select from the following options and click **Next**. Then go to [step 6](#).

- **Angle** - To offset your selected object at an angle, type the angle (in degrees) in this field. The new object is created based on the original object and is offset in the direction of the angle you

specified, measured from the positive X-axis. If you enter a positive angle, the object is offset counterclockwise; if you enter a negative angle, the object is offset clockwise.

- **Distance/Units** - To set the offset distance and units, type the distance and select the units in the Distance box. The list of units is as follows: inches, links, feet, U.S. Survey feet, yards, rods, chains, miles, nautical miles, millimeters, centimeters, meters, and kilometers.

Note: MapInfo Pro takes the default units from the map window in which you've selected the object.

- **Create Copy** - Click this option to create a copy of the selected object(s) in the data. When you complete this process, MapInfo Pro saves the copy to the editable layer.
- **Move Objects** - Click this option to move the object without creating a copy in the data. You can only move an object within its own editable layer. When you move objects, the **Data Aggregation** dialog box does not display, since you are only moving the data within the layer.
- **Copy or Move Distance Using** - The option you select in this box depends largely upon the projection of your source map. If your map has a latitude/longitude projection, MapInfo Pro enables the **Spherical** type only. If you are working with a non-Earth projection, MapInfo Pro enables the **Cartesian** type only.

When you click **Spherical**, MapInfo Pro calculates the copy/move distance by mapping the data into a Latitude/Longitude On Earth projection.

When you click **Cartesian**, MapInfo Pro calculates the copy/move distance by considering the data to be projected to a flat surface and distances are measured using Cartesian distance calculations.

6. The **Data Aggregation** dialog box displays if one of these conditions are true:

- You clicked the **Create Copy** option.
- You selected objects in a different table from the table associated with the editable layer
- The editable layer is not the cosmetic layer and has no text associated with the spatial objects in it

You may notice that the only controls available to you in this dialog box are **Blank**, **Value**, and **No Data**.

Type a value you will remember in the **Value** field of this dialog box. For more information about data aggregation, see [Aggregating and Disaggregating Data](#).

7. Click **OK** to copy the data and offset the objects you selected.

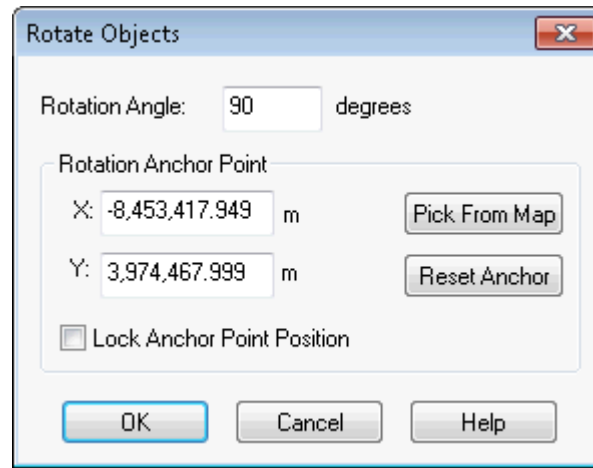
Rotating Objects on the Map

To rotate an object or objects by a specific angle, use the **Rotate Object** command, which is available whenever you have selected an object(s) in an editable layer in a **Map** window.

To rotate an object or objects in a **Map** or **Layout** window:

1. On your editable layer, select the objects that you want to rotate.

2. On the **SPATIAL** tab, in the **Edit** group, click **Rotate Object** to open the **Rotate Objects** dialog box.



3. In this dialog box, you specify the angle and the anchor point of the rotation. Type the rotation angle in the Rotation field. The rotation angle can be positive (counter clockwise) or negative (clockwise).
4. Determine the anchor point by doing one of the following:
 - Accept the default anchor point of the selected object(s) by leaving the X and Y coordinates that display in these field as they are

Note: The default anchor point varies depending upon how many objects you have selected and the kind of objects they are. See [Understanding an Object's Default Anchor Point](#) for more about default anchor points.

- Type new entries in the X and Y coordinate fields to select a new anchor point
- Click the **Pick from Map** button and click the anchor point you want on the **Map** or **Layout** window. Click the mouse button only once to establish this point.

Note: When the **Pick from Map** button is disabled, you can select locations directly from the open map. If a map is not open, you can select another command (like the **Select** command) and use that command instead of the **Pick from Map** functionality.

To return to the default anchor point, click the **Reset Anchor** button.

5. Decide whether or not you want to lock the anchor point. Click the **Lock Anchor Point Position** check box to lock the anchor point.

When you lock the anchor point, you ensure that the anchor point will not be recalculated when you return to the **Map** or **Layout** window. If you do not lock the anchor point, MapInfo Pro recalculates the anchor point based on the rotated selection. Once the objects are rotated, they may have a different anchor point.

Note: You cannot maintain an anchor point lock when you change the selection from the **Map** window to the **Layout** window or from the **Layout** to the **Map** window.

6. When you have completed these entries or selections, click **OK** to rotate your object(s).

Understanding an Object's Default Anchor Point

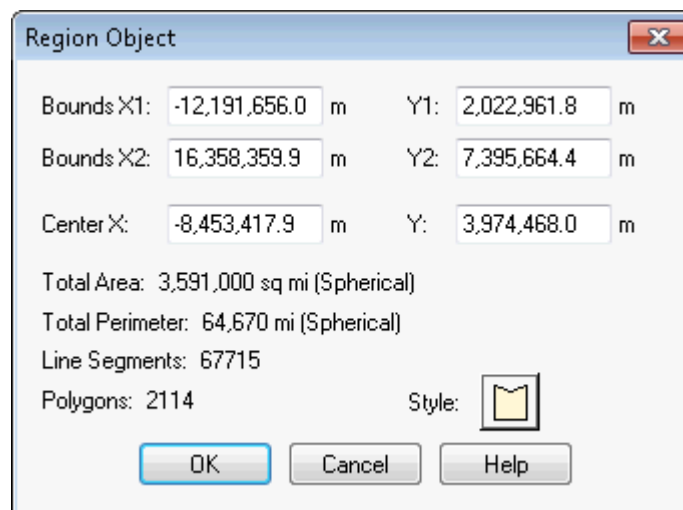
When rotating objects in an editable layer, the default anchor varies depending upon how many objects you are rotating and the kind of objects you select. If you select:

- A single object (not a polyline), the default anchor point is the object's centroid
- A single polyline or several objects, the default anchor point is the center of the polyline's or the selected objects minimum bounding rectangle (MBR)
- Multiple objects, the default anchor point is the center of the MBR of the selected objects

Changing your Map Object Attributes

When you double-click a region, line, point or text object with the **Select** command, MapInfo Pro opens the **Object Attribute** dialog box where you can control the object's size, position, and information specific to the object.

For example, if you double-click a region, MapInfo Pro displays the perimeter, centroid, and area. It also shows the type of distance calculation that was used to obtain these values.



If the layer is selectable but not editable, you can only view these attributes. If the layer is also editable, then you can change these attributes by typing new values into the text boxes of the dialog box. The illustration above shows the **Object Attribute** dialog box for a region object in an editable layer.

Changing an object's size and position with the **Object Attribute** dialog box gives you much greater control over its exact size and position than you have through drawing it on the screen. For example, you have a list of ten radio towers and their X and Y coordinates. You could geocode these points using the **Create Points** command. However, if you open the **Points Object Attribute** dialog box and type the new X and Y coordinates, you can create ten points with the Symbol tool and then individually place them in the correct location.

You can also use the **Text Object Attribute** dialog box to change the point's actual text. For example, you have typed the title "World Population" on a **Map** window. You want to fix your typographical error. Bring up the **Object Attribute** dialog box for the text object. You can correct your error in the box that displays the text.

Changing Attributes For Multiple Layers

Using the multi-select functionality, it is possible to change the attributes of multiple layers at once.

To change the visible attribute for multiple layers:

1. In the **Layers** window, do one of the following:
 - Press and hold the **Shift** key and select a contiguous block of layers
 - Press and hold the **Ctrl** key and select multiple layers that are out of sequence
2. Check the **Visible On/Off** check box for one of the layers. All of the other layers in your selection are also set to be visible.

Note: If a layer you selected was already visible, this process makes the layer invisible.

3. Click **OK** to save your changes.

Note: The Cosmetic layer's display status cannot be changed.

To change the Selectable attribute for multiple layers:

1. In the **Layers** window, do one of the following:
 - Press and hold down the **Shift** key and select a contiguous block of layers
 - Press and hold down the **Ctrl** key and select multiple layers that are out of sequence
2. Click the **Selectable** icon for one of the layers. All of the other layers in your selection are also set to Selectable.

Note: If a layer you selected was already selectable, this process makes the layer unselectable.

3. Click **OK** to save your changes.

Note: MapInfo Pro only allows one editable layer in a map.

Reshaping Map Objects

You can reshape regions, polylines, lines, arcs and points. A region is an object created with the **Polygon** command. You cannot reshape objects created with the **Rectangle**, **Rounded Rectangle**, and **Ellipse** command.

To reshape an object:

1. Select an object with the **Select** command.
2. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** from the list.

You are now in **Reshape** mode. MapInfo Pro draws nodes at every juncture where two polyline or polygon line segments meet.

3. To reshape the object, move the nodes, add nodes, or delete nodes from the object.

To move a node, click it and, while holding down the mouse button, drag the node to the desired location. The line segments connected to the node are moved to a new position.

To add a node, on the **SPATIAL** tab, in the **Edit** group, click **Add Node** from the list. Position the cursor where you want to add the node, and click the mouse button. MapInfo Pro adds a node. You can move this node or delete it, just as you would any node.

To delete a node, position the cursor over the node, click it, and press the **Delete** key. To delete the last node when creating a polyline or polygon, click the **Backspace** key.

The **Reshape** command is very useful when you are creating sales territories or other merged boundaries. For example, you are merging postal code boundaries together to create school districts. Some postal code boundaries fall into more than one school district. Use the **Reshape** command to reshape the school district to incorporate a section of a postal code boundary.

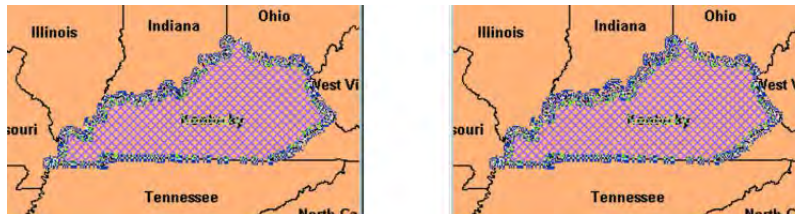
Reshape mode remains turned on until you turn it off. To turn off reshape mode, on the **SPATIAL** tab, in the **Edit** group, click **Reshape**.

Moving the Endpoints of an Arc

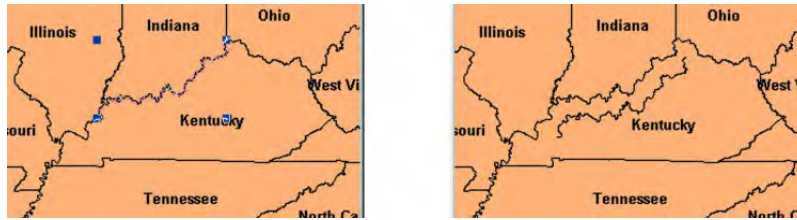
You can also change the endpoints of an arc with the **Reshape** command. Select the arc with the **Select** command and then choose **Reshape**. Grab either end of the arc and move it to the desired location. Reshaping an arc will not change the shape of the ellipse that it is part of, merely its endpoints.

Selecting Multiple Nodes

Reshape mode allows you to easily select nodes of an existing object and copy and paste them, drag them to reshape the object, or delete them. To trace an existing object, we recommend that you use the autotrace feature, which is explained in the next section, **Snap to Nodes**. The following illustrations show how to copy the border between Kentucky and Indiana.



- 1 Select the object. Click **Reshape mode** to display the nodes.
- 2 Select the nodes you want to copy.



3 Choose **Copy** and **Paste** to display the new objects with edit handles (small squares).

4 Click and drag the object to move to another location.

To reshape an object (such as the state of Kentucky):

1. Select Kentucky to enable **Reshape** mode.
2. Select the first node with the **Select** command. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.

Shift-click the last node to be copied. MapInfo Pro selects all nodes between following the shortest route. (To select all nodes *except* those between the shortest distance, use **Ctrl-click** with the **Select** command.)

3. On the **HOME** tab, in the **Clipboard** group, click **Copy** to copy the nodes to the clipboard.
4. Paste the duplicate nodes onto the map. On the **HOME** tab, in the **Clipboard** group, click **Paste**.

The object you copied is drawn on top of the original object as a polyline.

5. To move the polyline click it and drag the polyline to a new location.

Using "Snap To" to Select Nodes and Centroids

You can use nodes to reshape an object and align objects with each another. MapInfo Pro refers to this process as snapping to a node. In the Map window, regions, polylines, lines, arcs and rectangles all have nodes that can be attached (or snapped) to each other. When the Snap mode is enabled, MapInfo Pro searches for nodes and centroids as you move around a window. MapInfo Pro automatically snaps the cursor to a node or centroid when the cursor comes within the snap tolerance of the node. The crosshairs display when the node is "snapped to".

Note: You can also use the snap to capability to snap to visible centroids in region objects.

To toggle Snap to Nodes, press the **S** key. The Status Bar displays with the word "SNAP" when Snap mode is activated. When you activate the Snap mode, a circle displays around your cursor showing the size of the tolerance of the Snap mode in pixels. The **S** key acts like a toggle on/off switch. You can set the snap tolerance in pixels in the **Map Window Preferences** dialog box. The **Snap Tolerance** field allows you to specify a tolerance. If you set the snap tolerance to 3 pixels, whenever you move the cursor within 3 pixels of a node, the cursor will snap to the node.

Snap mode works in the **Map** window and a map in a **Layout** window (but not raster layers). It works with all MapInfo Pro commands except **Pan**, **Drag Map**, and **Text** command. Additionally, snap mode works on object types, including regions, points, multipoints, collection objects, lines and polylines,

rectangles, and arcs. It is not available for text objects, ellipses, and rounded rectangles. You set the Snap in one window at a time and can save it with your workspace.

Snap to Nodes applies to all selectable layers-this is useful if you are drawing an object in one layer and want to attach it to an object in another layer. If you do not want to snap to objects in certain layers, make those layers unselectable. The Snap and Thin settings remove self-intersections and overlaps in your data based on values you set. When you complete your selections and entries in the **Set Values for Node Snap & Thinning** dialog box, MapInfo Pro saves these values to the table's metadata. This allows the Snap and Thin changes to be retrieved in the dialog box after the table is saved or the user has left MapInfo Pro.

Snap and Thin Settings Saved in Metadata

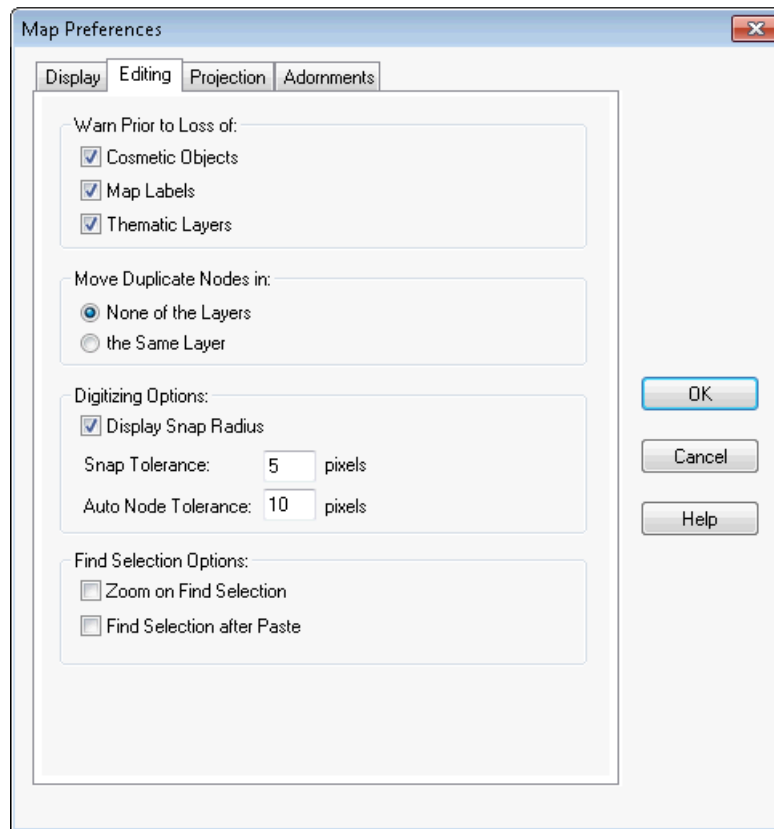
The Snap and Thin settings remove self-intersections and overlaps in your data based on values you establish. When you complete your selections and entries in the **Set Values for Node Snap & Thinning** dialog box, MapInfo Pro saves these values to the table's metadata. This allows the Snap and Thin changes to be retrieved after the table is saved or you have left MapInfo Pro.

Setting Snap Preferences for a Visible Snap Area

The **Map Window Preferences** dialog box has a **Display Snap Radius** check box that controls whether or not the snap radius displays when **Snap** mode is on. The snap tolerance (in pixels) can also be selected.

On the **PRO** tab, click **Options**, and **Map Window** to open the **Map Preferences** dialog box.

On the **Editing** tab, under the **Digitizing Options** section, you can change the snap tolerance to make the snap radius larger or smaller (measured in pixels).



If you clear **Display Snap Radius** check box, then the radius does not display when snap mode is turned on. Remember to click **OK** to save your preferences.

Move Duplicate Nodes

In most maps, nodes of various objects are usually connected, especially for adjoining streets and boundaries that share a common border. Using the **Move Duplicate Nodes Option** in the **Map Preferences** dialog box, you can specify where MapInfo Pro looks for connected nodes in order to move them in unison. Click the **None of the Layers** button to turn the option off. Click the **Same Layer** button, so that connected nodes in the same layer are moved when one of them is moved.

Autotracing Objects


You can trace the nodes of an object, for example, the Yucatan in Mexico using the **Polyline** or **Polygon** commands. This makes it easier to digitize objects that share a border because you do not have to re-digitize the shared border. You can also use this feature to trace an existing polygon/polyline network, for example, a street, a county, or some other polyline or boundary. A Status Bar entry displays showing that this mode is enabled.


To trace a border:

1. Open a map layer you want to trace a polygon or polyline on.

2. Make the layer that you want to work with editable. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

You can also see map layers in the **Explorer** window.

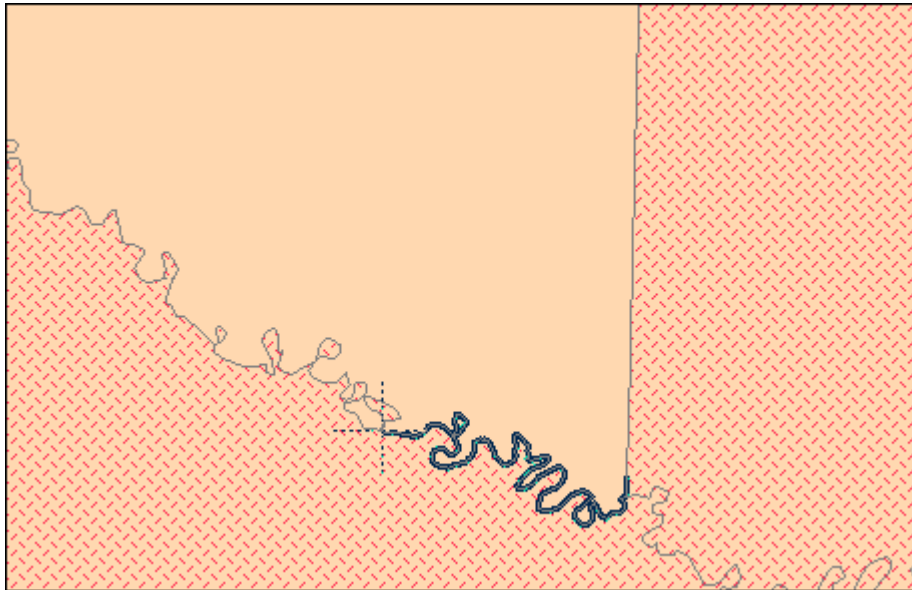
Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.



3. Press the **S** key to turn on the Snap process and the **T** key to turn on Autotrace mode.

The words **SNAP** and **AUTOTRACE** display in the MapInfo Pro status bar, located along the bottom of the MapInfo Pro screen.

4. On the **SPATIAL** tab, in the **Create** group, click **Insert**, and **Polygon** or **Polyline** from the list.
5. On the map, click on the first node that you want to trace. Drag the mouse along the nodes of the line or object you want to trace.



The rules that apply to AutoTrace are:

- To enable the AutoTrace mode, you must use the **Polygon**  or **Polyline**  commands.
- You must press **S** to enable the Snap feature to use the AutoTrace feature.

You can use the **Shift** or **Ctrl** keys. When you auto trace a polygon, the path contains the least number of nodes necessary to complete the auto trace, which is similar to the **Shift** key behavior. If you want to trace the longer path, press the **Ctrl** key to override default auto trace direction. When you are auto trace a closed polyline, the trace line never crosses the start and end points of the polyline (so the **Ctrl** key has no effect).

Smoothing and Unsmoothing Lines

You can use the Smooth command to convert polyline angles into polyline curves.

To smooth a polyline angle into a polyline curve:

- Click on a polyline with the **Select** command. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.
- On the **SPATIAL** tab, in the **group**, click **Smooth Lines** in the list.

MapInfo Pro smoothes the line so that it appears to be one continuous line with curves instead of angles.

- To undo the process, on the **SPATIAL** tab, in the **group**, click **Unsmooth Lines**.

The **Smooth Lines** and **Unsmooth Lines** commands only work on polylines. A polyline is a line drawn with the **Polyline** command. **Smooth Lines** and **Unsmooth Lines** do not work with objects drawn with the **Line** command. If you attempt to smooth or unsmooth any object besides a polyline, MapInfo Pro displays a warning message.

Converting Objects into Region Objects

When you convert a circle or ellipse into a region, the region contains 101 nodes. When you convert an arc into a region, the number of nodes depends on the starting and ending angle of the arc. If the arc spans 180 degrees (for example, the starting angle is zero and the ending angle is 180), a region based on the arc will contain 52 nodes; if the arc spans 90 degrees, a region based on the arc will contain 27 nodes; etc.

If you perform extensive map editing, you may need to convert polylines to regions. If you cut or copy a group of selected nodes, MapInfo Pro treats the set of nodes as a polyline object, and places the polyline on the clipboard. If you then paste the object, MapInfo Pro places the polyline on your map. At this point, you may want to perform Convert to Regions, depending on whether you want the finished object to be a region.

Convert to Regions also allows you to perform node-editing operations (for example, adding and moving nodes) on objects that ordinarily do not allow node editing. For example, MapInfo Pro does not allow you to add nodes to rectangle objects; however, if you convert a rectangle object to a region, you can then add nodes to the region.

To convert objects into region objects:

1. Make the **Map** window active.
2. Choose the layer containing the objects and make it editable.
3. Select one or more objects from the editable layer.
4. On the **SPATIAL** tab, in the **Create** group, click **Regions**, and **Convert to Regions**.

MapInfo Pro converts each of the selected objects into a region object. MapInfo Pro does not combine all selected objects into one region. To combine objects, use the **Combine** commands (on the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Selected Objects**).

MapInfo Pro automatically assigns the current region style to each of the region objects. To specify a region style, choose **Region Style** on the **STYLE** tab. You may need to turn on **Apply Styles**.

Line, polyline, arc, ellipse, rectangle, and rounded rectangle objects may all be converted to regions. The **Convert to Regions** command does not affect point objects, text objects and region objects.

Creating Regions from Polygonal Areas Enclosed by Polylines

Convert any regions to polylines, and then perform the normal enclose operation.

If the polyline totally passes through the region and forms two or more separate enclosed areas, then the Enclose operation will effectively split the region at the polyline.

Note: Enclose does not carry data to the output objects.

To create regions from polygonal areas enclosed by polylines:

1. Select polylines in an active **Map** window with an editable layer.
2. On the **SPATIAL** tab, in the **Create** group, click **Regions**, and **Enclose (Polylines to Regions)** to open the **Create Region Objects From Enclosed Areas** dialog box.
3. Click **OK**.

Specifying the Color and Pattern of Closed Objects

The **Region Style** command on the **STYLE** tab applies to closed objects such as ellipses, rectangles, rounded rectangles, and polygons. To change the color and pattern of these objects, they must be editable.

To change the color(s) and pattern of an existing object:

1. In the Layers or Explorer windows, make the layer editable.
2. Choose an object or multiple objects.
3. On the **STYLE** tab, click **Region Style** to open the **Region Style** dialog box.
4. Choose a pattern and color(s) in the **Region Style** dialog box.
5. Choose **OK**. The object's color, pattern and default style change according to your selections.

To change the attributes of text and point objects, use the Text Style and Symbol Style commands.

Note: When you are using a black and white monitor (or a color monitor with a monochromatic display), MapInfo Pro provides you with a menu of eight color options. Although these colors appear as various shades of gray on your screen, they print in the correct color when you are using a color output device.

Converting Regions to Polylines

You may find it necessary, on occasion, to change an object into a polyline or a polyline into a region during an editing session. You can do so using the **Convert to Regions** or **Convert to Polylines** commands.

For instance, you select a group of nodes that you want to copy and paste elsewhere on your map. MapInfo Pro treats the group as a polyline and copies it to the clipboard. After you paste the polyline on your map, you can convert it to a region: on the **SPATIAL** tab, in the **Create** group, click **Regions**, and **Convert to Regions**.

If you want to create a buffer zone within one mile of a boundary, meaning you want a zone that extends one mile from the boundary to the outside and to the inside, you must first convert the region to a polyline and then create the buffer. If you first create the buffer on the region, you will include too much territory in the buffer (the entire region in the buffer plus the one mile buffer that extends outside of the region).

Converting objects to polylines and regions lets you perform node-editing operations on objects that ordinarily do not allow node editing. For example, you cannot add nodes to a rectangle object. If, however, you first convert the rectangle into a polyline or region, you can then add nodes to the object.

Editing Street Maps (StreetPro)

MapInfo Pro sells street maps for every county in the United States. If you have purchased any of these StreetPro maps, you will need to know how to edit them. You can add and delete streets, rename streets, or edit existing streets.

We have included a StreetPro file with your sample data. This map contains streets in San Francisco, California (`SF_STRTS.TAB`).

StreetPro files are read-only files; you cannot change them. But, associated with each StreetPro file are two files that you can change: `SF_STRT1.TAB` and `SF_STRT2.TAB`. `SF_STRT1` contains the graphic information about the streets and address ranges for each segment (hence, we will call it the segments file). `SF_STRT2` contains the street names (we will call it the names file).

These two files are associated through a field called `MI_REFNUM`, which contains a reference number. A segment with a reference number 23 in `SF_STRT1` will be associated with the name in `SF_STRT2` that has the same reference number.

The other fields in the segments file are:

- FromLeftStarting point of address numbers, left side of the street.
- ToLeftEnding point of address numbers, left side of the street.
- FromRightStarting point of address numbers, right side of the street.
- ToRightEnding point of address numbers, right side of street.
- TypeThese numbers indicate the type of street or highway.

Adding a Segment to an Existing Street

Let us assume you want to add a segment to an existing street or want to add a street for which a name already exists.

When you want to add a segment to an existing street, you already know that the street name is in the name file.

Adding a street where the name already exists is not as odd a situation as you might imagine since StreetPro maps are county-wide. You might want to add Poplar St to one town. If another town already has a Poplar St, then you do not need to add that name to the name file since it contains all the names used in the county. To find out whether a name already exists in the name file, use the **Find** command on the **SPATIAL** tab.



In either case the basic idea is that you have to add a new record to the segments file and associate that record to the name file through the reference number. Assume we are working in the Washington D.C. files; the procedure is the same for any StreetPro file.

1. On the **HOME** tab, in the **File** group, click **Open** and select to open the `DCWASHS`, `DC_STRTS`, AND `DC_ZIP` files.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

Click the **Editable**  icon beside the `DCWASH` layer name to turn **On** editing.

Click the **Selectable**  icon beside the `DC_STRTS` layer name to turn **On** selection.

3. On the **MAP** tab, in the **Selection** group, click **Find** locate the street you want to edit.
4. On the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info** to open the **Info** window. And now click the street. Scroll through the **Info** window until you locate the `MI_REFNUM` (MapInfo Pro reference number) field. Make a note of that number.
5. Go to the `DCWASHS` layer in the **Map** window and draw the new segment. By setting the **Snap to Nodes** mode (on the **SPATIAL** tab, in the **Edit** group), MapInfo Pro will guide you to connect the node from the existing street with the node from the new segment.
6. Click the new segment with the **Info** command. Type the appropriate textual information, address ranges, street type, and MapInfo Pro reference number.
7. Repeat the process for each additional new segment.

Adding a New Street

Let us consider the case where you want to add a completely new street. Since the street is new, you have to make changes in both `DCWASHS1` and `DCWASHS2`. The following procedure will work with any StreetPro file.

1. Open `DC_STRTS` and `DCWASHS1` in a **Map** window.
2. Open `DCWASHS2` as a **Browser** and make it the active window.
3. On the **TABLE** tab, in the **Edit** group, click **Add New Row**.

Scroll down to the bottom of the **Browser**. MapInfo Pro appends an empty row to the **Browser**.

4. Type the name of the street into the empty record.
5. The new street name also needs a corresponding `MI_REFNUM`. The easiest way to select a reference number is to keep these numbers continuous. Simply add 1 to the last `MI_REFNUM` listed in the **Browser**. Use that number as the `MI_REFNUM` for your new street name.
6. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

Click the **Editable**  icon beside the `DCWASHS1` layer name to turn **On** editing.

Click the **Selectable**  icon beside the `DC_STRTS` layer name to turn **On** selection.

7. Draw the new segment on the `DCWASHS1` layer.
8. Click the new segment with the **Info** command. Type the appropriate textual information, address ranges, street type, and the new MapInfo Pro reference number.
9. Repeat the process for each additional new segment.

Renaming a Street

If you want to rename a street, simply change its name in the name file, which is the `S2` file in StreetPro. Note that changing a name in that way affects all segments that reference it.

For instance, if you want to change the name of Broadway in one town, you have to make sure there are not other towns in the county that also have a Broadway. If there are, then you have to add the new street name to the names file and give it a reference number. You would then go into the segments file and give the new reference number to those segments you want to change.


If you want to rename only a part of the street, you have to add a new record to the names file, give that record a new reference number, and then assign that new reference number to the appropriate segments in the segments file.

How do you find those segments? One way would be to call up a **Map** window of the town and select the segments using the **Select** command. Those segment records will then be highlighted in the **Browser**, where you can change their reference number.

Editing Street Colors

You can change the street colors and line types in StreetPro maps. For example you might want to do this to indicate streets under repair or all streets that make up a sanitation pickup route.

1. Open the street file in a **Map** window.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

Click the **Editable**  icon beside the street layer name to turn **On** editing.

3. Select all the streets you want to change.
4. On the **SPATIAL** tab, in the **Create** group, click **Style**, and **Line Style**.

5. Select a line width, line style, and color and then click **OK**.
6. To save your changes, on the the **HOME** tab, in the **File** group, click **Save**.

You can use any method to select the streets, depending on the nature of the situation. You can use the **Select** command to click the segments, one-by-one. You could also use the **Radius Selection**, **Marquee Selection**, or **Boundary Selection** commands, or the SQL Select or **Select** commands.

Merging One Map into Another

There are two ways to merge layers from one **Map** window to another:

1. You can use the **Drag Map** command to drag the layers of an existing **Map** window onto the another **Map** window.

To see this method, see [Merging Maps using the Drag Map Command](#).

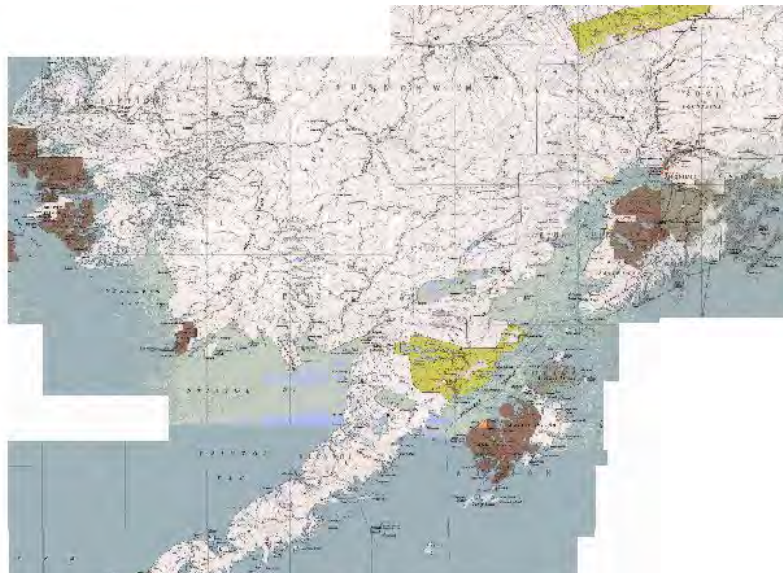
2. You can copy the map layers you want from one map to the other in the **Layers** window.

To see this method, see [Merging Maps from Layers](#).

When you merge the layers from the source map on top of the destination map, the destination map settings take precedence. This means that the clip regions and coordinate systems, for example, are based on the settings in the destination map. If the destination map does not allow raster reprojection and the source map has a raster layer, the coordinate system of destination map could change.

Consider this example of a vector map and a raster map. Many times you want to add detail to a map by merging it with another open map. You can think of the map you are dragging or copying layers from as the source map.

Figure: Alaska Raster Map (Source Map)



You can think of the map that you are dragging or copying the layers to as the destination map.

Figure: Alaska Vector Map (Destination Map)



Note: MapInfo Pro does not copy the Cosmetic layer objects or thematic layers from a source map to the new window, so any symbols or features you have created there do not merge.

Merging Maps using the Drag Map Command

If you drag a raster layer from one map to another, MapInfo Pro uses the projection rules you establish in the **Setting up the Image Processing Preferences** to determine the projection.

To merge the layers from one **Map** window to another:

1. Open two maps.
2. On the **MAP** tab, in the **Options** window, click **Drag Map** and select the map you want to drag the layers from.
3. Drag the layers to the new **Map** window and release the mouse button. The new map displays both the old layers and the new.

Note: You cannot drag the Cosmetic layer to the new map.

The results are the same for this method as they are using the **Layers** window. However, in the **Layers** window you can choose among the layers in a map.

Merging Maps from Layers

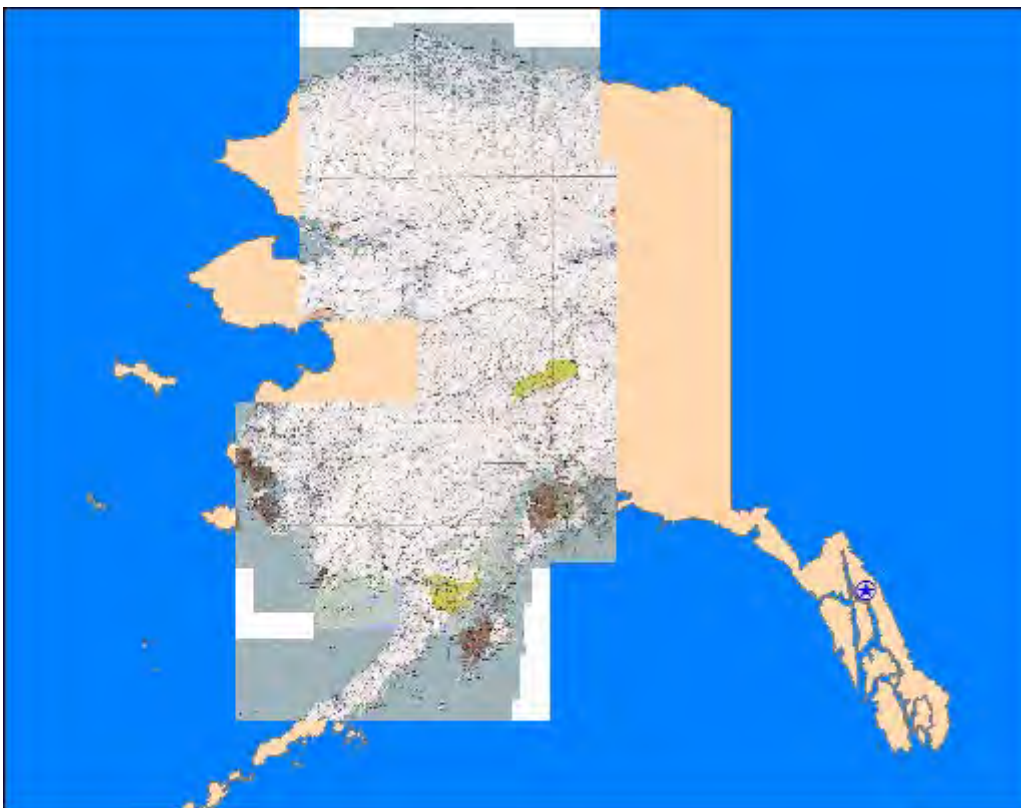
To merge layers from one map to another:

1. Open two maps.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
3. On the **Layers** window, right-click on a map name and select **Add Layers** to open the **Add Layer** dialog box.
4. Highlight the layer(s) you want to add from the list, and then click **OK**.

When you copy layers using the **Layers** window, you cannot copy the Cosmetic layer or thematic layers to the new map.

The new map displays.

Figure: Final Alaska Map



Buffering and Working with Objects

Two of the most important features in MapInfo Pro are buffers and the tools we provide to work with objects. Buffers group and create areas around objects, lines and regions, so that you can visually analyze your data. The **Set Target** editing model includes a wide range of editing operations that

apply to an object or a series of objects. MapInfo Pro also includes commands that enclose, check, and clean objects. These features are useful when you need to create territories and new objects.

Buffering Your Data

If you would like to search for all underground cable wires that are buried within 440 yards of Interstate 490 or you would like to contact all families with pre-school age children who live within five miles of a proposed school district, buffering is the command for you.

Understanding Buffers

A buffer is a region that surrounds a line object, another region, symbol, or any other object in a Map window. For example, you can create a buffer region that surrounds Interstate 90 by 440 yards on either side. You can create a buffer region that surrounds the proposed school district by five miles on all borders. Both the 440 yards and five miles are their respective regions' buffer radii. The buffer table is then joined to data associated with the original buffered objects.

Note: The maximum buffer resolution is 500 segments per circle. This affects the entry you can make in the Smoothness field of the **Buffer Objects** dialog box.

Creating a Buffer

To buffer objects:

1. Select the objects that you want to buffer. Make sure there is an editable layer in the Map window. The output buffered objects will be placed in that layer.

Note: There are certain table variables that you need to be aware of that will determine the aggregation method used in joining the table of buffers to data associated with the original objects. See [Table Variables](#) for this information.

2. On the **SPATIAL** tab, in the **Edit** group, click **Buffer**. The **Buffer Objects** dialog box displays.
3. Select appropriate buffer radius, segments per circle, distance type calculation to use, and buffer method as described.
 - **Radius** - The radius is the width of the buffer you want to create around the object you selected. The **Value** and the **From Column** radio buttons give you different ways to specify that width.
 - **Value** - Type a value into this field if the radius of the buffer you want to create is a specific distance. Examples might include 10 feet, 20 kilometers, 50 chains.
 - **From Column** - Select this radio button if the buffer you want to create is specified in a particular column or is to be calculated by an expression. Then select the column or choose **Expression** from the drop-down list.

- If you select **Expression**, the **Expression** dialog box displays. Specify the expression you want MapInfo Pro to use to calculate the buffer radius and click **OK** to return to the **Buffer Objects** dialog box.
- **Units** - Select the units for the buffer from this drop-down list. Options include: inches, links, feet, US Survey feet, yards, rods, chains, miles, nautical miles, millimeters, centimeters, meters, kilometers.
- **Smoothness** - Type the number of segments per circle that determines the resolution of the curves in the buffer polygon. You can enter a number between 3 and 100. The default value is 12 segments per circle. If making adjustments, a value of 24 yields good results.
- The more segments you enter, the smoother the curve. The fewer segments, the more jagged the curve. More segments produce a smoother curve; fewer segments make a more jagged curve.

Note: Creating a buffer is time consuming. The higher the smoothness (more segments), the longer it takes to create a buffer.

- **One buffer of all objects** - Select this option to create one buffer for all of the objects you have selected. For example, if you are buffering Pennsylvania, New York and New Hampshire, one buffer will be created for all three of these objects.
 - **One buffer for each object** - Select this option to create one buffer for each object you have selected. For example, if you are buffering Pennsylvania, New York and New Hampshire, each object will have a separate buffer.
 - **Buffer Width Distance using Spherical** - Select this option if you want the buffer to take into account the curvature of the Earth. Using this method, MapInfo Pro converts the data to Latitude/Longitude and then creates a mathematical calculation of the buffer. You cannot use this method for non-Earth projections.
 - **Buffer Width Distance using Cartesian** - Select this option if you want the buffer to be calculated as if the map is on a flat plane. Cartesian coordinates are a pair of numbers, (x, y), defining the position of a point in a two-dimensional space by its perpendicular projection onto two axes which are at right angles to each other. If you are using a Latitude/Longitude projection, this option is disabled.
4. When you have completed your entries and selections in this dialog box, click the **Next** button. The standard **Data Aggregation** dialog box displays.

Note: If the editable layer is the Cosmetic layer, the **Data Aggregation** dialog box will not display because there is no data in the layer to aggregate. The **OK** button displays in place of the **Next** button. Click **OK** to begin the buffer operation.

5. Highlight each of the columns to complete the fields in this dialog box.
- **No Change** - Select this option to keep the value for the selected column in the target row unchanged. This option only displays when you combine objects into a target object.
 - **Blank** - Select this option to store blank values in the selected column(s). To store blank values in all displayed columns, select the **No Data** check box. Only choose the **Blank** option to blank out individual columns.

- **Value** - Select this option to store the value that displays in the edit field in the new row. When you select this option, enter an appropriate value in the field.
 - **No Data** - Check this check box if you want no data aggregated to any column.
6. After setting the appropriate data aggregation parameters, click **OK**. MapInfo Pro calculates the buffer according to the parameters you set and creates the new objects in the editable layer. The original objects remain unchanged. Once MapInfo Pro has created the buffer region, it puts it in the editable layer.



Note: The maximum buffering resolution is 500 segments per circle.

When using this feature remember that the greater the value in the Smoothness field, the greater the demands you are placing on your system's RAM, on disk space, and on processing power. Please take these points into consideration to avoid out of memory issues. If you do encounter memory issues however, consider one of the following:

- Use the thinning operations to reduce the resolution of your data or
- Increasing your machine's RAM may allow for more complex object processing

Table Variables

If the table containing the selected table and the editable table are either the same table, or contain the exact same table structure (same number of columns with each column in both tables having the same name and data type), then the **Sum** and **Average** radio buttons do not display. The data is taken from the current selection, and the results are placed in the editable layer.

If the table containing the selection objects and the editable table are different, and the table structures are different, then the **Sum** and **Average** radio buttons are displayed. In this case, the data aggregation for the editable destination table column is initially blank, and you need to select the column from the input selection table to derive the data from.

Saving your Buffer as a New Layer

You can create a buffer and save it as a new table (layer) or as part of another layer in your map. This process is similar to the Voronoi process described in [Saving your Voronoi Polygon as a New Layer](#). This process is also similar to the Combine Using Column process, except that there is no "Group By" functionality for buffers.

Note: The table must be mappable to use this feature.

To create the buffer as a distinct layer:

1. To create a selection to buffer, select the object in the map. This step is not required if you want to buffer all objects in a particular table.
2. On the **SPATIAL** tab, in the **Edit** group, click **Buffer Objects** from the list to open the **Table Buffer** dialog box.
3. Do one of the following:
 - To buffer the selected object, leave the **Selection** object selected in the **Buffer objects in table** drop-down list box.
 - To buffer objects from a particular table, select the table in the **Buffer objects in table** drop-down list box.
4. Select the type of table you want to place the buffer into from the Store results in Table drop-down list box. Select one of the following:
 - **New table** - saves the buffer in a new table
 - **<tablenames>** - saves the buffer in one of the currently open tables

After you make this selection, click **Next** to continue.

Note: You cannot save a buffer to the Cosmetic Layer.

5. Do one of the following:
 - If you chose the **New table** option, go to *Saving a Buffer to a New Table* in the *Help System*.
 - If you chose **<tablenames>**, go to [Saving a Buffer to an Existing Table](#).

Saving a Buffer to a New Table

You can create a buffer and save it as a new table (layer) in your map. You must complete the instructions in [Saving your Buffer as a New Layer](#) before you begin this operation.

1. Use the **New Table** check boxes to indicate where you want the new buffer to display. You can click more than one check box.

Open New Browser - Select to display the new buffer in a new **Browser** window only.

Open New Mapper - Select to display the new buffer in a new **Map** window.

Add to Current Mapper - Select to display the new buffer in the current **Map** window.

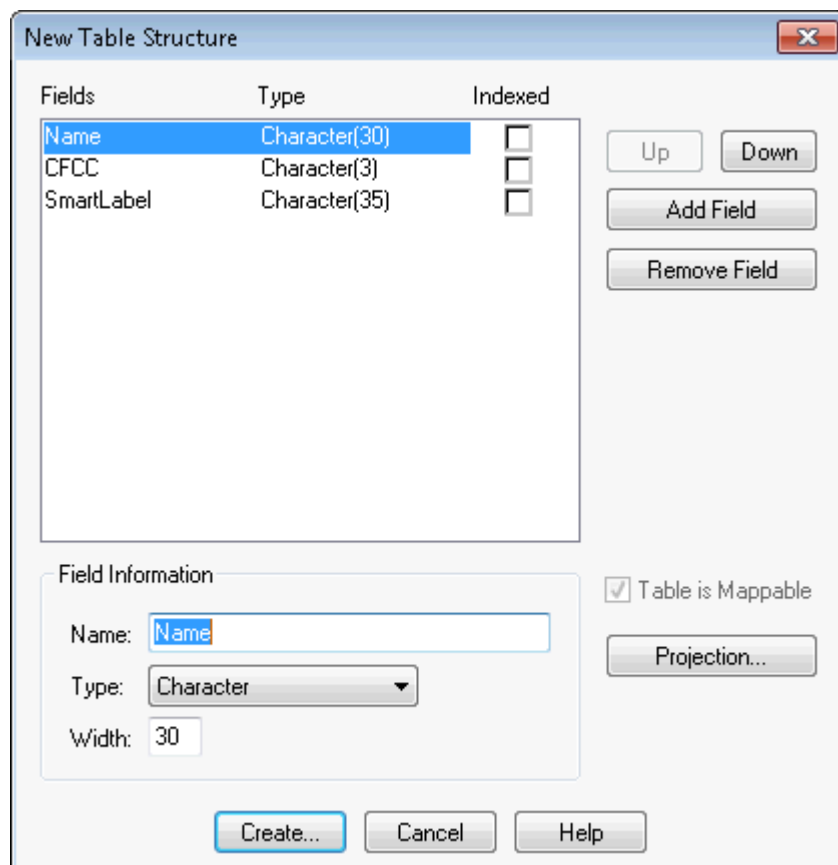
2. Choose the table structure for the new table, using only one of these options:

Create New - Click this check box to specify a new table structure and create the new fields in the **New Table Structure** dialog box.

Use Table - Click this check box to create the new table structure based on the fields in an existing table. You can base your new table structure on any open table.

3. Click **Create** to open the **New Table Structure** dialog box.

If you selected **Create New** in the last step, the **New Table Structure** dialog box displays no fields and you need to add the fields you need.



Click the **Projection** button to set the table's projection. For more about this, see [Coordinate Systems, Projections, and their Parameters](#).

4. Click the **Add Field** button and enter the field name, select the field type, and enter the field width for each new field until your table structure is complete.
5. Click **Create** to create the table and display the buffer. The **Create New Table** dialog box opens prompting you to save the name of the new table.
6. Select the directory for this table and type the name of the new table in the File Name field. Click **Save**.

Saving a Buffer to an Existing Table

You can create a buffer and save it as a layer in an existing table in your map. You must complete the instructions in [Saving your Buffer as a New Layer](#) before you begin this operation.

To save a buffer to a table:

1. When you choose to store the table results in the existing table, the **Data Aggregation** dialog box opens.
 - a. Click a field from the **Destination** list.
 - b. Specify the data aggregation method in the **Aggregation Method** panel.

Note: If you selected tables with disparate values, there may be additional fields in this dialog box. You need to reconcile these table values using this dialog box.

2. In the **Data Aggregation** dialog box, click a field and specify an aggregation method:

Blank - Click this radio button to indicate that this field should remain blank.

Value - Click this radio button to indicate that this field should contain a specific value or should retain its existing value. If the field should contain a specific value, enter that value into the **Value** field.

Sum - Click this radio button to add the field values from the original objects to create a field total for the field in the new column. (Applies to numeric fields only.)

Average- Click this radio button to average the field values from the original objects. (Applies to numeric fields only.)

Weighted by - Click this radio button to give more weight to one value over another when averaging. You can choose a numeric field in your table as the weighting factor or choose area (where the weighted average is based on the relative geographic area of the regions to be combined). Applies to numeric fields only.

3. To add no data to the existing table, select the **No Data** check box. This disables the **Blank** and **Value** radio buttons.
4. After you have completed these selections and entries, click **OK**.
5. The Buffer Objects dialog displays. From here the process is the same as described in [Creating a Buffer](#).

Note: The values in the **Buffer Objects** dialog box are saved at the end of the operation. If you perform another buffer operation using the **Table Buffering** option or the **Objects Buffering** option using the same base table, MapInfo Pro restores the previous values.

Buffer Radius

The buffer radius determines the dimensions of the buffer region. For example, if you want to create a region that covers an area one mile on either side of a freeway, set your buffer radius to 1 mile. If

you choose to use a field from the table or an expression, MapInfo Pro will calculate the radius of the buffer based on that value.

You can set the radius to be a constant value or you can choose a data value from the table to be used as the radius. For example, to create buffers around major cities that reflect the size of their population, choose the population field as the value.

You can go even further to calculate the buffer radius using an expression. For instance, you want to create buffers around cities showing the population density. Since you do not have a field containing population density, you will need to write an expression that can calculate density from population and area. This is no different than writing an expression for thematic mapping or query selection.

Buffering - Setting the Number of Segments per Circle

The number of segments per circle determines the level of detail in the buffer region. The more segments per circle, the higher the level of detail. The default level is 12 segments per circle.

Buffer Width Distance

MapInfo Pro's buffering feature calculates the buffer width to create a buffer that is some measured distance from the outline of the object. This distance is calculated using either the Spherical or Cartesian method.

Spherical calculations measure distance according to the curved surface of the Earth. This means that the distance from the boundary of the original object to the boundary of the new buffered object may vary from node to node.

Cartesian calculations measure distance on data that has been projected onto a flat, X-Y plane. This produces buffers that are exact in width, as long as the data is not in a Latitude/Longitude projection.

The availability of the Spherical and Cartesian buttons depends on the type of calculation that is appropriate to the table's projection. The **Cartesian** button will not be available if the table is in a Latitude/Longitude projection. Conversely, the **Spherical** button will not be available if the table is in a Non-Earth projection.

Self-Intersecting Polygons and Oracle

The algorithms for **Buffer** and **Combine** commands can yield self-intersecting polygons when processing data. Oracle does not consider these objects valid. It will not be able to return these objects to MapInfo Pro or process them in any way.

If you must upload, store, retrieve, or otherwise use this data in Oracle, you can either find the self-intersecting polygons in the data and remove them.

To determine if your data contains self-intersecting polygons, run the table using the **Check Regions** command located on the **SPATIAL** tab and in the **Objects** group. To remove unwanted self-intersecting polygons, run a **Clean Objects** command on the table. Note that **Check Regions** and **Clean Objects** take some time to process large tables.

Buffer Methods

You can create a single buffer to include all selected objects, or create individual buffers for each object. There are two ways you can buffer multiple objects at the same time. The first method is to create one buffer for all objects. Buffers are produced around each input object, and the resulting buffer objects are combined into a single output object.

The more powerful method is to create one buffer for each object. For example, you have a layer of satellite offices. You would like to create a five-mile radius buffer around every satellite office symbol. You select all office symbols (with the **Select** command), on the **SPATIAL** tab, in the **Edit** group, click **Buffer**, and select the option to create one buffer for each object. MapInfo Pro creates five mile buffer polygons around each point. With this method, MapInfo Pro considers the resulting buffers as individual region objects and does not combine them into one. Once you create a buffer region, you can search for objects within it, as with any other boundary.

About Buffer Calculations

Buffer functionality uses a Width setting to create a Buffer that is some measured distance from the outline of the object. Using Latitude/Longitude data, the perfect buffer width, as defined in native Latitude/Longitude decimal degrees, may change on different portions of an object. This is because the width is provided in some flat measurement unit, (for example, miles, meters), and the decimal degree to measurement transformation will vary depending on the location on the earth. For example, a mile spans a larger number of latitude degrees as you move toward the poles of the earth and away from the equator.

MapInfo Pro calculates a native decimal degree width (converting from the input measurement unit) for one location in the object, typically the center of the bounding box. Thus, the measured On Earth (Spherical) distance from the boundary of the original input object to the boundary of the new buffered object may vary slightly from node to node. On small objects the distance may be negligible. On objects that span a large distance, such as the United States, the distance variation may be measurable.

In MapInfo Pro, you can produce Cartesian calculated buffers. Using this option, the data is considered to be in a flat-projected coordinate system, and the measured buffer widths are calculated using Cartesian distances. This produces exact buffers (as measured by the Cartesian Distance functions) as long as the data is not in a Latitude/Longitude projection.

Types of Buffers

MapInfo Pro supports the following buffer type:

- **Convex hull buffers** create a region object that represents a polygon based on the nodes from the input object. You can think of the convex hull polygon as an operator which places a rubber band around all of the points. It will consist of the minimum number of points so that all points lie on or inside the polygon. With convex hull buffers, no inside angle is greater than 180 degrees.

Convex Hull Buffers

The **Convex Hull** command provides another means of creating a polygon around a selected object or objects. **Convex Hull** is similar to creating a buffer in several ways. Like a buffer, the **Convex Hull** command always creates an object from the input objects, and it will place the result objects into the editable layer. In addition, you have a choice to create one convex hull object from all of the input objects, or to create one convex hull object for each input object.

The resulting region object(s) are based on the nodes from the input object. The **Convex Hull** command can be thought of as an operator that places a rubber band around all of the points. It consists of a minimal set of points such that all other points lie on or inside the polygon. Since the polygon is convex, no interior angles are greater than 180 degrees. No attribute data is aggregated in this operation. To use **Convex Hull**, a **Map** window must be active, it must have an editable layer, and objects in the editable layer must be selected.

To create convex hull objects:

1. On the **SPATIAL** tab, in the **Edit** group, click **Convex Hull** to open the **Create Convex Hull** dialog box.
2. Select the type of convex hull objects you want to create. You have two options:
 - **One output object for all input objects** button is the default setting. It creates one convex hull object around all of the selected objects.
 - **One output object for each input object** button creates a convex hull object around each selected object.
3. Click **OK**.

Your map redisplay. The convex hull object(s) is displayed over the input objects. If you want to save this data, save the editable table. The convex hull object is selected when it displays.

4. To change the fill of the convex hull object, do one of the following:
 - Double-click it to open the **Region Object** dialog box. Click the **Style** icon at the bottom of the dialog box to open the **Region Style** dialog box. Make any changes you like and click **OK**.
 - Select the convex hull object, if it is not already. On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Region Style** from the list to open the **Region Style** dialog box. Make the changes you want and click **OK**.

Specifying Buffer Calculations

To specify buffer calculations:

1. On the **SPATIAL** tab, in the **Edit** group, click **Buffer Objects** from the list to open the **Buffer Objects** dialog box.
2. Check one of the following:

Spherical: Spherical calculations are used for distance methods that attempt to keep the measurement on the curved surface of the earth. The data is first converted to Latitude/Longitude

and then a calculation is produced. Non-earth data cannot use Spherical calculations, since the data cannot be converted to Latitude/Longitude.

Cartesian: Cartesian methods are used to perform calculations on Non-earth data. Cartesian coordinates are a pair of numbers, (x, y), defining the position of a point in two-dimensional space by its perpendicular projection onto two axes that are at right angles to each other. Cartesian calculations cannot be used for Latitude/Longitude data, which is not a flat projection.

Note: The only calculations available for the target table's projections are those that will produce a valid result. For example, Cartesian is not available for a Latitude/Longitude projection because it cannot be used on a curved surface. Spherical is not available for a table in a non-earth projection it is not curved, and cannot be converted to Latitude/Longitude.

3. Click **OK**.

See Also:

[Displaying Distance, Length, Perimeter, and Area Calculations](#)

[Changing the Default or Preference Setting for Calculations](#)

Convex Hull Buffers

The **Convex Hull** command provides another means of creating a polygon around a selected object or objects. **Convex Hull** is similar to creating a buffer in several ways. Like a buffer, the **Convex Hull** command always creates an object from the input objects, and it will place the result objects into the editable layer. In addition, you have a choice to create one convex hull object from all of the input objects, or to create one convex hull object for each input object.

The resulting region object(s) are based on the nodes from the input object. The **Convex Hull** command can be thought of as an operator that places a rubber band around all of the points. It consists of a minimal set of points such that all other points lie on or inside the polygon. Since the polygon is convex, no interior angles are greater than 180 degrees. No attribute data is aggregated in this operation. To use Convex Hull, a **Map** window must be active, it must have an editable layer, and objects in the editable layer must be selected.

To create convex hull objects:

1. On the **SPATIAL** tab, in the **Edit** group, click **Convex Hull** to open the **Create Convex Hull** dialog box.
2. Select the type of convex hull objects you want to create. You have two options:
 - **One output object for all input objects** button is the default setting. It creates one convex hull object around all of the selected objects.
 - **One output object for each input object** button creates a convex hull object around each selected object.
3. Click **OK**.

Your map redisplay. The convex hull object(s) is displayed over the input objects. If you want to save this data, save the editable table. The convex hull object is selected when it displays.

4. To change the fill of the convex hull object, do one of the following:
 - Double-click it to open the **Region Object** dialog box. Click the **Style** icon at the bottom of the dialog box to open the **Region Style** dialog box. Make any changes you like and click **OK**.
 - Select the convex hull object, if it is not already. On the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Region Style** from the list to open the **Region Style** dialog box. Make the changes you want and click **OK**.

See Also:

[Specifying Polygon Objects Attributes](#)

Editing Objects using the Set Target Model

With MapInfo Pro's advanced set target editing functionality, you can combine, split, erase map objects, and overlay nodes using a "Set Target - Apply Action" editing model. This model allows you to use objects from the same table or another table to create new objects. Sophisticated data aggregation methods allow you to calculate new data values that match the new objects.

The **Set Target** editing model in MapInfo Pro allows you to set a map object as the target for editing, then create a modifying object that will act as the cookie cutter that overlays the target and performs the editing action on the target. **Set Target** is located on the **SPATIAL** tab, in the **Edit** group.

Figure: Buffered retail locations showing market penetration



The Set Target model for editing map objects can be broadly described as a three-step process:

1. Set the object you want to edit as the target.

- Choose and select another object or objects to act as the modifying object for the editing operation. You can also create a new object.
- Perform the edit operation (combine, split, erase, erase outside, or overlay nodes).

A new object (or objects) is created in place of the target object.

The following table describes valid cutter/target objects for supported object processing operations:

Object Type	Overlay Nodes onto Target		Split Target, Erase Target, Erase Outside Target		Combine Target	
	Cutter	Target	Cutter	Target	Target	Other non-target
Closed	X	X	X	X	X	X
Linear	X	X		X	X	X
Text						
Points				X	X	X
Multipoints				X	X	X
Collections				X	X	X

You are not limited to working with map objects in the same layer. While the target objects must be in the Editable layer, you can choose the modifying objects from another layer.

The set target process is essentially the same whether you want to combine objects or create new objects by splitting objects or erasing portions of objects. Each operation is discussed individually in this chapter.

In addition to creating new map objects, the Set Target model allows you to control how the data associated with the target object will be transferred to the new object or objects. The next section discusses a number of data aggregation and disaggregation methods that give you tremendous flexibility with editing map objects.

Understanding Object Size

For specific instructions, see *Setting a Map Object as a Target* in the *Help System*.

Many customers use the contouring process to create signal coverage maps, which requires large object sizes to create highly detailed coverage areas. To accommodate this need, we have increased the limit on number of nodes and the number of polygons or polylines that can be stored in objects.

Theoretically, the size of an object is only limited by the amount of memory in the system, but for practical reasons, a limit is imposed to work within limits of file size and most system memory limits. Currently, the object size limit is 1,073,741,823 bytes in memory. This limit is imposed so that an object of this size can be saved into a MAP file. All MapInfo Pro files have a theoretical limit of 2GB, but due to header size and other required Map file contents, the actual size limit has to be somewhat less.

The node limit is 134,217,724 nodes in any object. This is the actual number of nodes that can fit into this 2GB memory size limit. It will be difficult to reach this node limit because memory allocation may prohibit it. It may not be possible to create a Map this size on a computer being used to accommodate an object this size; the program may throw an error when you try it.

Keep these notes in mind:

- For regions, the theoretical maximum number of polygons in a multi-polygon region or collection is 20,648,881 polygons that can fit into the size limit for all objects given above.
- For polyline objects, the theoretical maximum number of segments in a multi-segment polyline is 24,403,223 that can fit into the size limit for all objects given above.
- For multipoint objects, the theoretical maximum number of nodes is 134,217,724 that can fit into the size limit for all objects given above.

Setting a Map Object as a Target

To set a map object as a target:

1. Make the layer containing the map object editable.
2. Select the object(s) to be the target for editing.
3. On the **SPATIAL** tab, in the **Edit** group, click **Set Target**.

You can now create a cookie cutter object and perform an editing operation.

Setting a map object as a target allows you to perform a variety of editing functions on the object, including **Combine** commands, **Erase** commands, **Split** commands, and the **Overlay Nodes onto Target** command. Setting the target tells MapInfo Pro to apply any of these editing operations to the target object.

MapInfo Pro's editing model is based on first setting the target, then creating an object to act as the "cookie cutter" that overlays the target and performs the editing action on the target.

Use **Set Target** command on editable lines, polylines, arcs, ellipses, rectangles, and rounded rectangles. You cannot use **Set Target** to edit point or text objects.

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Aggregating and Disaggregating Data

If you have data attached to map objects that will be edited, you can proportion the data for each field to match the new object(s). This is called data aggregation or disaggregation, depending on whether you are combining or splitting objects. MapInfo Pro calculates new data values for the object depending on how you specify the aggregation or disaggregation.

When combining objects, you can choose from several methods of data aggregation, including:

- **Sum** - adds the field values from the original objects to create a total for the field in the new object.
- **Average** - averages the field values from the original objects.
- **Weighted average** - gives more weight to one value over another when averaging. You can choose a numeric field in your table as the weighting factor or choose area (where the weighted average is based on the relative geographic area of the regions to be combined).
- **Value** - stores a specific value in the field of the new object.
- **No Change** - maintains the value of the target object in the new object.

When splitting or erasing portions of a map object, you can choose from:

- **Blank** - removes the original value of the target object.
- **Value** - maintains the original value of the target object.

- **Area proportion** - removes a portion of the original value based on the size of the new object.

For any of the editing operations in the **Edit** group on the **SPATIAL** tab, you can elect not to bring over any data at all by choosing the **No Data** check box. You might do this, for instance, if you are only editing map objects for presentation purposes and do not need any data associated with the objects.

The **Data Aggregation** (or **Data Disaggregation**) dialog box displays after you have set the target, chosen the modifying object, and chosen an editing operation. In these dialog boxes, you must specify how you want the data calculated for each field. Once you are satisfied with the aggregation method, you can carry out the editing operation.

Clipping a Region of a Map

You can use the **Set Clip Region** command to isolate a region of a map for display and/or printing. The clipped region may be a pre-defined map region, such as a state, or you can use a drawing command to define a region. Use the **Select** command to select a pre-defined region or a region that you defined. Thematic maps and seamless layers, labels, and points displayed on the map will be included in the clipped region.

To clip a region of a map:

1. Use the **Select** command to select the region of the map you want to clip. Only one region can be selected. If you select another clip region, you will be prompted to replace or retain the current clipped region.
2. On the **SPATIAL** tab, in the **Edit** group, click **Clip Region**, and **Set Clip Region**.

The map redraws to display the clipped region.


To redisplay the entire map, on the **SPATIAL** tab, in the **Edit** group, click **Clip Region**, and **Clip Region On/Off**.

To toggle between the map and the clipped region, you may find it useful to use the **Clip Region On/Off** command.

Note: To clip a raster image, use an object created in the cosmetic layer, or an object from an existing vector layer.

Saving a Clipped Region of a Map

To save a clipped region of a map:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Editable**  icon beside the **Cosmetic Layer** to turn **On** editing.
2. Use a drawing command to draw the map clipping object: on the **SPATIAL** tab, in the **Create** group, click a drawing command from the list.
3. Select the object you just added to the map. On the **MAP** tab, in the **Selection** group, click **Select**, and **Select**.

4. On the **SPATIAL** tab, in the **Edit** group, click **Clip Region**, and **Set Clip Region**.

The map redraws showing only the clipping object and the following prompt displays:

`Retain the object used for clipping in the Cosmetic Layer`

5. Select **OK** to leave the map clipping object in the Cosmetic Layer.
6. To view the map region associated with the map clipping object, on the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Region Style**. From the **Pattern** drop-down list, select **N** (none). The layers that comprise the clipped region display.

Setting Clip Region Options On-the-Fly

You can set options on-the-fly, which override the default options and only effect the current active **Map** window.

To set clip region options on-the-fly:

1. On the **PRO** tab, click **Options**, and **Map Window** to open the **Map Options** dialog box.
2. Check one of the three options under **Apply Clip Region Using**:
 - **Window Device Clipping (all objects)** - The Windows Device Display (screen or printer) provides the clip region functionality. All objects (including points, labels, text, rasters, and grids) will be clipped at the Clip Region boundary. This is the default mode.
 - **Window Device Clipping (no points, text)** - The Windows Device Display provides the Clip Region functionality. All objects are using Windows Device Clipping except points and labels. Points and labels will be completely displayed only if the point or label point lies inside the Clip Region object. Text objects, rasters, and grids are always displayed and never clipped.
 - **Erase Outside (no points, text)** - This option uses the MapInfo Pro **Erase Outside Target** functionality to produce the clipping. The Clip Region object is the Cutter object, and all other objects are Target objects for this operation. All objects are clipped using **Erase Outside Target**, except points and labels. In addition, points and labels will be completely displayed only if the point or label point lies inside the Clip Region object. Text objects, raster, and Grids are always displayed and never clipped with this method.
3. Click **OK** to have the specified clip region settings applied to you current active **Map** window.

Overview of Combining Map Objects

There are two **Combine** operations:

1. **Combine Selected Objects**: MapInfo Pro geographically combines the selected objects. The new object represents the geographic union of the original objects. Therefore, if you select two adjacent region objects and choose Combine, MapInfo Pro combines the regions into a single object, and the border between the regions disappears.
2. **Combine Using Column**: MapInfo Pro performs data aggregation. Data aggregation is a process where MapInfo Pro calculates what the column values for the new object should be, based on sums or averages of the values of the original objects.

Perhaps you have a table of sales territories, and the table contains demographic information about the number of households per territory. Using the **Combine** commands, you can combine two of the sales territories into one, large territory. In the same operation, MapInfo Pro also can calculate the number of households in the new territory by adding the values from each of the original territories.

Combining Objects with Set Target

The **Combine** operation can work in conjunction with the target feature selected in the **Edit** group on the **SPATIAL** tab. Before you choose a **Combine** command, you can select one map object and designate that object as the editing target. You can then select additional map objects and choose **Combine Selected Objects** to combine the selected objects with the target. If you set a target before you choose **Combine Selected Objects**, the operation is more flexible, allowing you to combine objects from different tables.

You should assign a target object if one of the objects you are combining is more important than any of the other objects. For example, if you want to add small, unnamed islands to an existing "mainland" region, you should make the mainland region the target object. If you designate the mainland region as the target, MapInfo Pro is able to retain the mainland region's name after the objects are combined.

Using a **Combine** command with the **Set Target** command allows the mainland region to retain its name after the objects are combined. You can only set one object as the target at a time when using a **Combine** command with **Set Target**. The modifying object can consist of more than one object.

Keep in mind that the **Combine Selected Objects** command works with selected map objects. To apply the **Combine** operation to an entire table, select everything in the map by pressing **Ctrl+A**. To combine into groups rather than objects, or output to a separate table, use the **Combine Using Column** command.

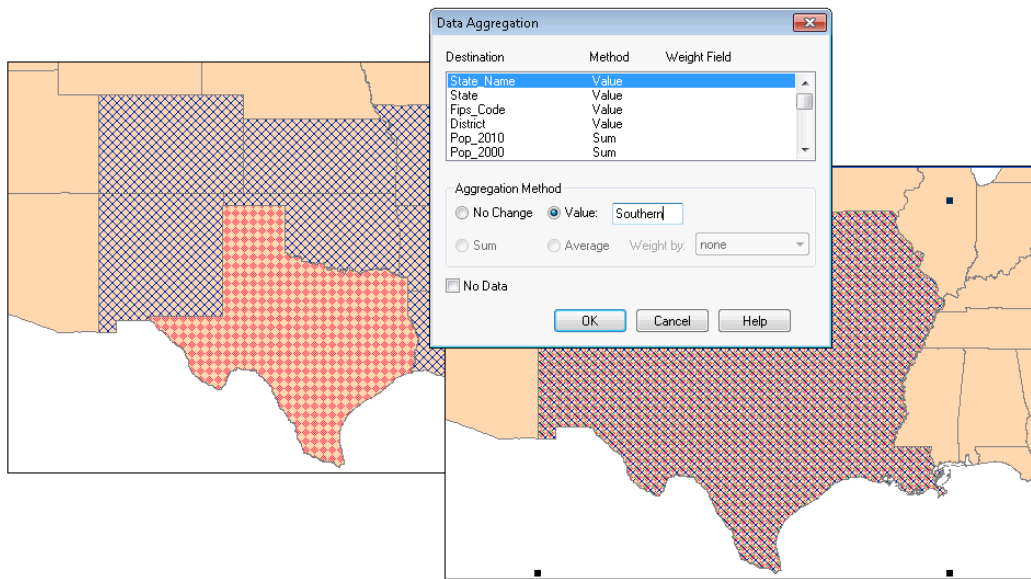
To combine map objects using **Set Target**:

1. Select one object in an editable layer to be the target object.
2. On the **SPATIAL** tab, in the **Edit** group, click **Set Target**. The object displays in a different style to indicate that it is the target object.
3. Select (or create and select) one or more map objects from any layer in the **Map** window. This is the modifying object.
4. On the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Selected Objects** to open the **Data Aggregation** dialog box.
5. Choose the appropriate aggregation method (or **No Data**) for each field in the **Destination** list. See the definitions for these methods in [Aggregating and Disaggregating Data](#).

Note: To select more than one field in the **Data Aggregation** dialog box at a time, use these keystrokes:

- **Shift-click** to apply the same method to consecutive fields
- **Ctrl-click** for non-consecutive fields.

When you have chosen the aggregation methods for each field, click **OK**.



6. Select one or more columns by clicking in the list at the top of the **Data Aggregation** dialog box.
7. Choose a data aggregation method: **Blank**, **No Change**, **Value**, **Sum**, **Average**, or **Weighted Average**. (Depending on whether you specified an editing target, some of these aggregation methods may not be available.) MapInfo Pro updates the column list in the upper half of the dialog box to show the chosen method.
 - For example, if you choose **Average**, you are telling MapInfo Pro to calculate the average of the column values of all the selected objects. This average is stored in the column of the new row.
 - Aggregation methods are described below.
8. Repeat steps 6 and 7 for all columns in your table and click **OK**.
 - To simplify this process, select multiple columns at one time by **Shift**-clicking and/or **Ctrl**-clicking in the list of columns. If you select multiple columns, and then choose an aggregation method, MapInfo Pro applies that method to all selected columns.

If your table contains a large number of columns, it can be time-consuming to specify aggregation methods for all columns. However, MapInfo Pro remembers your aggregation methods for the remainder of your session; thus, the next time you choose a **Combine** command, you do not need to respecify all aggregation options.

MapInfo Pro computes the new object and displays it as a single object. Use the **Info** command to view the aggregated data (if any) associated with the object.

Combining Points, Linear, and Closed Objects into a Single Object

Combine points, linear, and closed objects into a single (collection) object by selecting points and performing a **Combine** operation. The collection object displays in the **Browser** as a single record.

All line, polyline and arc objects, as well as the polyline component of any collection objects that exist in the input will be combined to form a new polyline object.

All regions, rectangles, rounded rectangles, and ellipses, as well as the region component of any collection objects, that exist in the input will be combined to form a new region object.

Note: As with other combine operations involving rounded rectangles, all rounded rectangles will be treated as rectangles (the rounded aspect is a display time only attribute). Any resulting MultiPoint, Polyline and Region objects created by this process will then be assembled into a new collection object.

To create a collection object:

1. Select two or more points from the editable layer of the active **Map** window.
2. On the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Selected Objects**.

The points are combined into a single object.

Note: To breakup a collection object see, [Disaggregating Objects](#).

To specify object attributes for a collection object, double-click on the collection object to display the **Collection Object** dialog box.

Specifying Collection Object Attributes

A collection object is the result of combining points, linear, and closed objects into a single object.

The collection object must be editable (reside in an editable layer) before you can specify attributes.

1. Make the layer containing the collection object editable.
2. Do one of the following:
 - Select a collection object and press **F7** to open the **Collection Object** dialog box.
 - Double-click the collection object to open the **Collection Object** dialog box.
3. Specify attributes for the collection object.
4. Click **OK**.

Default Data Aggregation Methods

When the **Data Aggregation** dialog box first opens, MapInfo Pro automatically assigns a default aggregation method to every column in the table. For numeric columns (Integer, Small Integer, Float, or Decimal), MapInfo Pro assigns Sum as the default aggregation method. For all other types of columns, MapInfo Pro assigns Value as the default method.

You could simply choose **OK**, without changing any of the default aggregation methods. However, there is no guarantee that the default aggregation methods will produce meaningful results. By default, MapInfo Pro uses the Sum method for all numeric columns; however, depending on your data, it may not make sense to total all of your columns.

For example, perhaps your table contains demographic information, such as median income statistics. If two adjacent regions have different median income values (\$30,000 and \$35,000), and you combine the two regions, it does not make sense to total the two values; instead, you should choose Average or Weighted Average as the aggregation method.

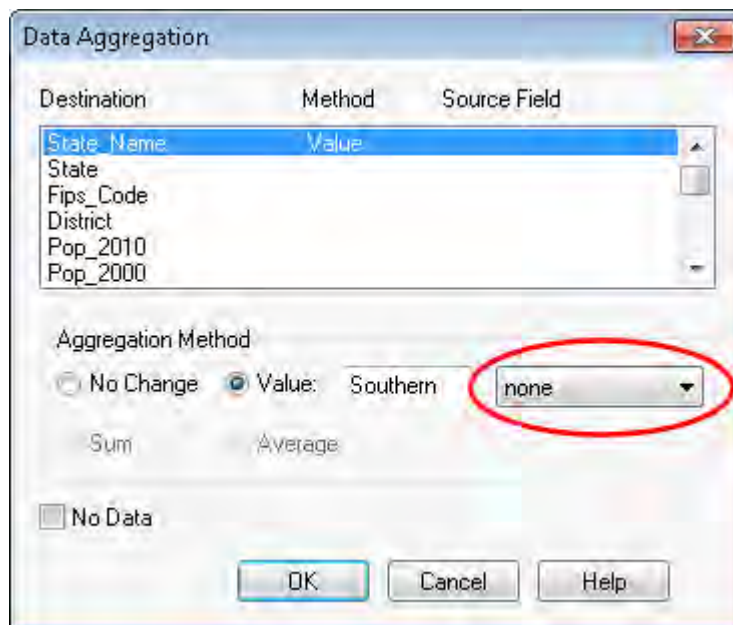
Clearing a Target

If you do not want to edit an object after it has been set as the target, use the **Clear Target** command. The object will no longer be highlighted or marked for editing. An object will also be cleared as a target automatically if it has been deleted or modified by **Combine**, **Erase Target**, **Erase Outside Target**, **Split Target**, **Overlay Nodes onto Target**, or if you have chosen a new target.

To clear a target, on the **SPATIAL** tab, in the **Edit** group, click **Clear Target**.

Combining Objects with Different Table Structures

If the tables you are combining have the same table structure, the process we have discussed in **Combining Objects with Set Target** works perfectly. When you are working with two tables with different table structures, the Data Disaggregation options are slightly different. When the input table has a different table structure from the output table, the **Data Aggregation** dialog box opens with a **Column Name** field to accommodate the table structure.



Column Name field

The **Area Proportion** radio button is active if the selected field is numeric. Also the **Value** entry field is enabled when you select the **Value** radio button and the drop-down list contains "none".

Splitting Objects

Splitting Objects allows you to divide the target object into smaller objects, using another object as a cutter. You can also combine objects into territories using redistricting. For example, you might use Split to separate a large territory into smaller units.

You can split either closed objects (regions, ellipses, rectangles, or rounded rectangles) or open objects (polylines, lines and arcs) using the **Split** command. You cannot use **Split** on points or text objects or to cut objects that are not in editable layers.

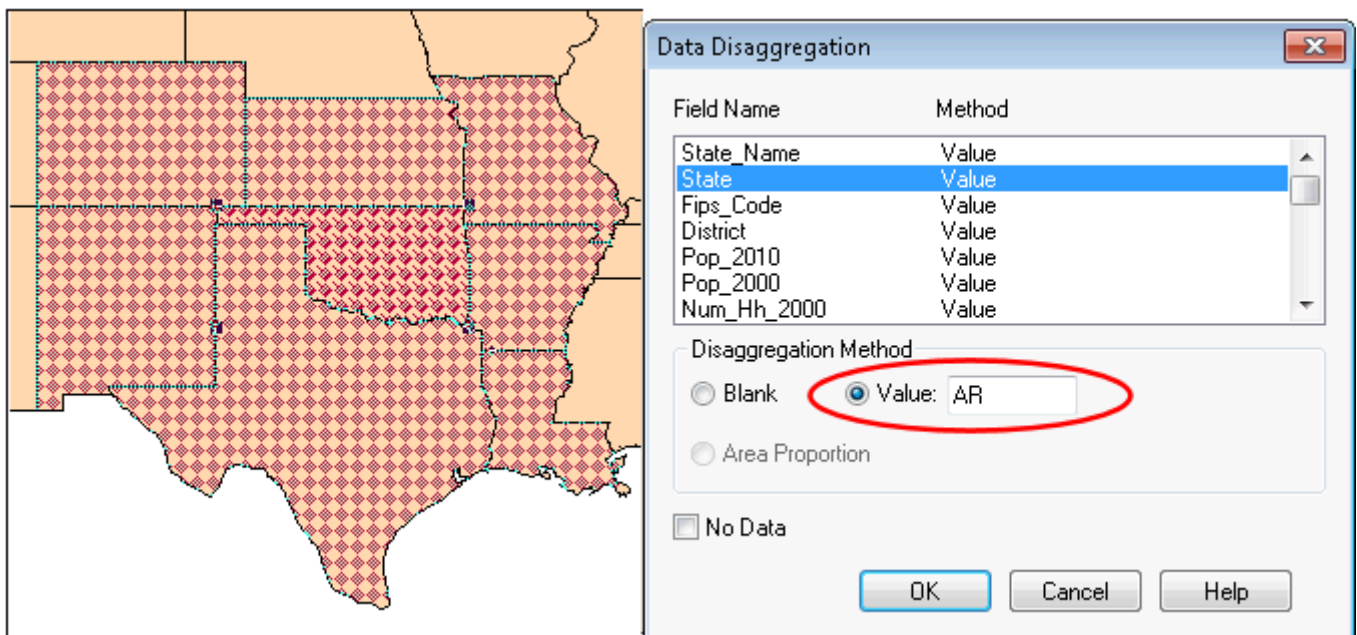
For more about the redistricting process, see [Redistricting-Grouping Map Objects into Districts](#).

To split map objects using **Set Target**:

1. Select the object(s) in an editable layer to be the target.
2. On the **SPATIAL** tab, in the **Edit** group, click **Set Target**.

The object(s) displays in a different style to indicate that it is the target object.

3. Select (or create and select) one or more map objects from any layer in the **Map** window to be the cutter object. The object must be a closed object.
4. On the **SPATIAL** tab, in the **Edit** group, click **Split**, and **Split Target** to open the **Data Disaggregation** dialog box.



Value Edit field.

5. Highlight each field and select the appropriate disaggregation method in the Destination list. Selecting the **No Data** check box ensures that no data is brought over for the fields. For definitions for these methods, see [Aggregating and Disaggregating Data](#).

- **Blank** - Select this option to store blank values in the selected field(s). We recommend you choose the **Blank** option to blank out individual fields only.
- **Value** - Select this option to store the value that you enter in the **Value Edit** field in the selected field(s) of the new table.

If the table structure you are splitting from has a different table structure than the table you are saving the results to, a drop-down list displays beside the **Value Edit** field. This list contains the columns associated with the table you are saving the split data to.

To save the value in this field to a particular column in the new table (layer), select the column from the list.

- **Area Proportion** - Select this option if the field is a numeric field, to adjust the area proportion to reflect the proportion of the newly split object.

To select more than one field in this dialog box at a time:

Shift-click to apply the same method to consecutive fields

Ctrl-click for non-consecutive fields

6. Click **OK**.

MapInfo Pro computes the new objects and displays them. Use the **Info** window (On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Info** from the list) to view the disaggregated data (if any) of the split objects. After splitting the target object(s), MapInfo Pro deletes the original target from the table. The new objects are appended to the end of the table.

Proportioning Associated Data after Using Split

After using the **Split** command, you may want to proportion (disaggregate) the associated data. Data disaggregation splits the data associated with a map object into smaller parts to match the new map objects. For instance, you may want to split a state into regions and have the data previously associated with the entire state proportioned for each new region. When you initiate the **Split** command, a **Data Disaggregation** dialog box opens to specify how the data will be proportioned.

Splitting Map Objects Using a Polyline

You can split multipoints and collections, as well as closed objects (regions, ellipses, rectangles, and rounded rectangles), and linear objects (polylines, lines and arcs) using the **Split Target using Polyline** command.

As mentioned previously, splitting objects requires that the cutter be a closed object. With **Split Using Polyline**, the polyline cutter will first be transformed into a region suitable for the cutter operation. The region created will be displayed for acceptance. The polyline(s) used as the cutter must be contiguous and non-branching. In general, if the cutter polylines were to be combined, the result would be a one single section polyline. If the cutters are not polylines, and are not contiguous and non-branching, then an error will occur, and the operation will be cancelled.

Note: You cannot use **Split Target using Polyline** on text objects or to cut objects that are not in editable layers.

To split a map object:

1. Make the target table editable.
2. Select the object(s) to be used as targets for editing using the selection commands or the **SQL Select** command located on the **SPATIAL** tab in the **Selection** group.
3. Set the objects as targets using the **Set Target** command, or by using the MapBasic **Set Target On** statement.
4. Create the cutting object(s) (or use objects from the same or different layer). The cutter object(s) must be contiguous, non-branching polylines.
5. Select the cutting object.
6. On the **SPATIAL** tab, in the **Edit** group, click **Split**, and **Split Target using Polyline**.
7. A region object is created from the polyline to be used as the cutter object.

Note: Only objects that intersect the original polyline will remain as targets. Some objects may be removed from the list of target objects.

8. Click **Next** to open the **Data Disaggregation** dialog box.

Data disaggregation splits the data associated with a map object into smaller parts to match the new map objects. For example, you may want to split a state into regions and have the data previously associated with the entire state proportioned for each new region. Complete the **Data Disaggregation** dialog box.

9. Click **OK**.

The target object(s) will be split into smaller map objects.

After splitting the target object(s), MapInfo Pro deletes the original target from the table. The new objects are appended to the end of the table.



Creating Territories by Combining Objects

Creating territories is one of the most common tasks performed with MapInfo Pro. Most people create territories by combining two or more smaller regions to create a larger one. Police departments combine postal code boundaries to create precinct boundaries. Sales managers combine county boundaries or state boundaries to create sales territories. Political analysts combine census tract boundaries to create voting districts.

Remember, when you are combining regions, you are also combining the data associated with the regions. If you combine regions without somehow aggregating the data associated with the regions, that data will be lost. For some applications, you might not want to save your data. For example, you are merging census tract boundaries to create school districts. The census tract data is of no interest to you; you merely want the boundaries. There is no reason to aggregate the data, but you would want to apportion the demographic data. For most tasks, you'll want to save the data associated with the regions.

MapInfo Pro gives you three methods for combining regions.

1. The first method, **Combine**, works with objects that are selected.
2. The second method, **Combine Objects Using Column**, is used to combine objects into groups based on a specified column.
3. The third method, **Redistricting**, is covered in [Redistricting-Grouping Map Objects into Districts](#).

Most frequently, the **Combine Regions** options are your easiest and quickest options for combining regions and creating territories.

Combining Selected Objects

When you choose to combine objects, MapInfo Pro performs two operations:

- MapInfo Pro geographically combines the selected objects. The new object represents the geographical union of the original objects and the border between the regions disappears.
- MapInfo Pro performs data aggregation. As described earlier in this chapter, data aggregation is a process where MapInfo Pro calculates what the column values for the new object should be, based on sums or averages of the original objects.

Your setup of the **Layers** window depends on whether you want to copy the result object to another layer (and, thus, save the original objects) or combine the objects in the original layer (and, thus, lose the original objects).

If you want to copy the result object, make the region's layer selectable and another layer editable. Specify a target object, then select the objects using any selection command and on the **SPATIAL** tab, in the **Edit** group, from the **Combine** list. This will display the **Data Aggregation** dialog box where you tell MapInfo Pro how to combine the data. Fill in this dialog box and click **OK** to combine the objects to combine the objects' data. This method was discussed earlier in this chapter.

If you want to combine objects in the original layer, make sure that the layer is editable, select the objects in the layer, and on the **SPATIAL** tab, in the **Edit** group, click a **combine** command from the **Combine** list. Do not set a target. The **Data Aggregation** dialog box displays. After the operation is complete, a new object will be added to the layer, and the original objects will be deleted.

Combining Objects Using Column

Combine Objects Using Column allows you to modify geographic data to create new map objects that contain data about the group. This feature is similar to redistricting in that it groups objects

together, but goes beyond redistricting to combine a copy of the relevant objects while leaving the original objects untouched.

To access Combine Objects Using Column:

1. On the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Objects Using Column**. For example, you have a layer of states. You want to combine the state boundaries to create sales territories. The data record associated with each state looks like this:

SALES_REP	STATE	CUSTOMERS	AVG_SALES
Benita	West Virginia	1782	24231.4
Benita	Ohio	121	33265.0

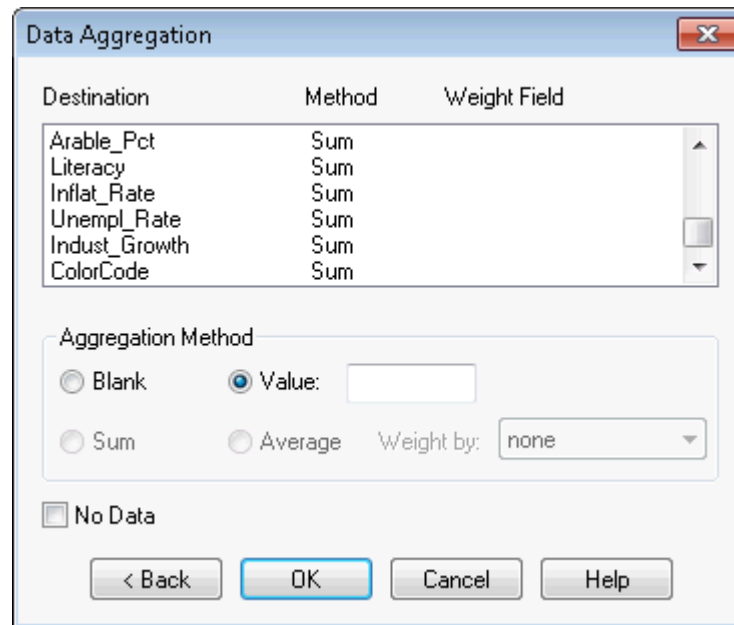
- **SALES_REP**: Sales representative assigned to that state
- **CUSTOMERS**: Number of customers per state
- **AVG_SALES**: Average spent per customer

You would like to aggregate the data in the following manner:

- **SALES_REP**: Combine all records that list Benita as the sales representative
- **CUSTOMERS**: Sum up the number of customers in the sales territory
- **AVG_SALES**: Average the amount spent per customer in the sales territory

When performing a Combine Objects Using Column operation, you must specify which column contains the grouping information. In the preceding example, the grouping information is located in the **SALES_REP** column. We want to combine all of Benita's individual territories into one large territory.

2. Choose the appropriate column from the Group Objects by Column popup. In our example, you would choose the **SALES_REP** column from the Group Objects By Column popup. MapInfo Pro combines all records that have common data in the column. In other words, MapInfo Pro combines all records that have the same sales representative.
3. Specify the table and the grouping column.
 - If you chose **<New>** from the Store results in table drop-down list to create a new table for the combined objects, a series of dialog boxes prompt you to create the new table.
 - If you specified an existing table, you need to specify how to combine the data. To aggregate your data, click **Next** to display the **Data Aggregation** dialog box.



- Once you have completed both dialog boxes, click **OK**. MapInfo Pro combines the records based on the column specified in the **Group Objects By Column** list. MapInfo Pro also aggregates the data and combines any objects associated with the records.

To combine objects using a column:

- Open at least one native MapInfo Pro table.
- On the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Objects Using Column** to open the **Combine Objects Using Column** dialog box.
- Choose the objects from the table you want to combine.
- Choose the column you want the objects to be grouped by.
- Choose the table in which you want to store the results.
- Click **Next** to open the **Data Aggregation** dialog box.
- Specify computations in the **Data Aggregation** dialog box.
- Choose **OK**, and the objects will be combined.

If you specified a field where all values are unique for each object, no groups will be created.

Creating a Voronoi Polygon

The Voronoi polygon is a partition of space into cells. Voronoi takes points and produces regions (cells) as output where each cell contains exactly one point. Each cell is an area in which the contained points are closer to the enclosed site than to any others. Use Voronoi to generate these polygons from a designated set of points. It is useful for dividing areas of responsibilities for field offices or possibly postal zones. It ultimately gives you the areas that are closest to your point of interest. You can create a Voronoi polygon within the same layer, or select points from one layer and place the Voronoi polygon in another layer.

To create a Voronoi polygon:

1. Select at least three points. The Voronoi polygon is constrained by the bounding box of the selected points. You can also use a target region to constrain the size of your polygon.
2. On the **SPATIAL** tab, in the **Create** group, click **Regions**, and **Voronoi (Objects)** to open the **Data Aggregation** dialog box.

To save the Voronoi polygons you create to a new table, see [Saving your Voronoi Polygon as a New Layer](#).

3. Select a column from the list and select the data aggregation method for that column by selecting one of the following:

Note: Not all of these data aggregation methods display. The options depend upon the kind of data you are aggregating and whether the columns match.

- Click **Blank** to store blank values in the selected columns.
- Click **Value** to enter an appropriate value to be stored in the new row.

Note: You can specify the data aggregation method to be performed for one column or for more than one by following these directions:

- Click a column name to select a single column
- **Shift-click** columns to select contiguous column names and apply the selected aggregation method to all of them
- **Ctrl-click** to de-select a column

Note: To create a voronoi table of the selected objects with no data in them, click the **No Data** check box. Selecting this check box disables the column selection in the **Data Aggregation** list.



This is a sample of a Voronoi polygon based on the capitals in northern Africa.

[Saving your Voronoi Polygon as a New Layer](#)

The Table Voronoi operation provides an another way to create Voronoi polygons from a table and provides a mechanism to place the results into a new table. This process is not directly available using the Objects Voronoi operation.

Note: You cannot place Voronoi polygons in the Cosmetic Layer.

To set up a Voronoi polygon in new table or in an existing table:

1. Open and display the table for which you want to create Voronoi polygons.

Note: If you want to use a selection to create the Voronoi polygon, hold down the **Shift** key and select the points you want. This is not required. If you do not make a selection at this point, MapInfo Pro will use all of the points on the selected layer to create the polygon.
2. To create a boundary for the Voronoi polygon layer you are creating, use the Target Object feature described in [Adding Nodes to an Object](#). This is not required.
3. On the **SPATIAL** tab, in the **Create** group, click **Regions**, and **Voronoi (Objects)** to open the **Data Aggregation** dialog box.
4. Select the layer you want to create the Voronoi polygon with in the **Perform Voronoi using objects from table** drop-down list. If you selected points you want to use to create this polygon, choose the **Selection** entry in this list.
5. Select the table type for the results of the Voronoi polygon from the Store results in table drop-down list:
 - **New table** - allows you to save the Voronoi polygon in a new table
 - **tablename** - allows you to save the Voronoi polygon into one of the currently open tables that contain point objects
6. After you make this selection, click **Next** to continue. Do one of the following:
 - If you selected the **New table** option, go to [Save the Voronoi Polygon to a New Table](#).
 - If you selected the **<tablename>** option, go to [Save the Voronoi Polygon to an Existing Table](#).

[Save the Voronoi Polygon to a New Table](#)

To save the Voronoi Polygon to a new table:

1. In the **New Table** dialog box, follow these directions:
2. Use the **New Table** check boxes to indicate where you want the new Voronoi polygon to display. You can click more than one option. The options include:
 - **Open New Browser** - Click this check box to display the new Voronoi polygon in a new Browser window only.
 - **Open New Mapper** - Click this check box to display the new Voronoi polygon in a new Map window.
 - **Add to Current Mapper** - Click this check box to display the new Voronoi polygon in the current Map window.
3. Choose one of these options to specify the table structure for the new table:
 - **Create New** - Click this option to create a new table structure and add the new fields in the **New Table Structure** dialog box.

- **Use Table** - Click this option to create the new table structure based on the fields in an existing table. You can base your new table structure on any open table.

4. Click **Create**. The **New Table Structure** dialog box displays.

Fields	Type	Indexed
Name	Character(30)	<input type="checkbox"/>
CFCC	Character(3)	<input type="checkbox"/>
SmartLabel	Character(35)	<input type="checkbox"/>

Field Information

Name:

Type:

Width:

☒ Table is Mappable

Click the **Projection** button to set the projection for this table. For more about Projections, see [Coordinate Systems, Projections, and their Parameters](#).

Note: If there are entries in this dialog box, you are copying the table structure of an existing table. If you opted to create a new table structure, there are no fields to list.

5. In the **New Table Structure** dialog box, you can add and remove fields to create a new table structure. Click the **Add** button and type a name, field type, and field width in the fields and drop-down list provided to create a new field in the new table.
6. When you have completed the table structure, click **Create** to create the table and display the Voronoi polygon according to the display settings you specified. The **Create New Table** dialog box opens so you can save the name of the new table.
7. Type the name you want the new table to have in the **File Name** field and click **Save** to save it. You can choose a new directory in this dialog box as well.

Save the Voronoi Polygon to an Existing Table

1. When you choose to store the table results in the existing table, the Data Aggregation box opens.
 - a. Select the field from the **Destination** list.
 - b. Specify the data **Aggregation Method** to use.
 - c. If the columns in the tables you are combining do not match, specify the source column in drop-down list (located to the right of the Value field).

Note: If you selected tables with disparate values, there may be additional fields in this dialog box. You need to reconcile these table values using this dialog box.

2. To specify the data aggregation you want MapInfo Pro to use to create the new table structure, highlight each field in turn and do one of the following:
 - **Blank** - Use this option to indicate that this field should remain blank.
 - **Value** - Use this option to indicate that this field should contain a specific value or should retain its existing value. If the field should contain a specific value, enter that value into the Value field.

Note: Other aggregation methods may be available based on the data columns in the tables. See [Aggregating and Disaggregating Data](#) for these details.

3. If the new table information should add no data to the existing table, select the **No Data** check box to disable the other field options.
4. After you have completed these selections and entries, click **OK**.

Grouping Objects using Multipoint and Collection Object Types

The Multipoint and Collection object types allow you to group multiple objects into a single object. One way to create multipoints and collections is by using a **Combine** command (on the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Selected Objects** or **Combine Using Column**). These object types aid in the translation and live access of other GIS data formats, such as ArcView Shape Files, and are more compatible with GIS standards. This is particularly useful for sharing maps with others using different software.

A Multipoint object consists of a number of points that have been grouped into a single object. The Multipoint object displays in a **Browser** window as a single record, and all the points within the object have the same symbol. One method you can use to create a multipoint object is to select a group of point objects and combine them.

A Collection object consists of multipoint objects, zero or one polyline objects, and zero or one region objects that have been grouped into a single object.

MapInfo Pro automatically converts homogeneous Collection objects to a more specific type, for example, a Collection object that contains only polylines is automatically converted to a multi-polyline object.

To create a Multipoint or Collection object using a **Combine** command:

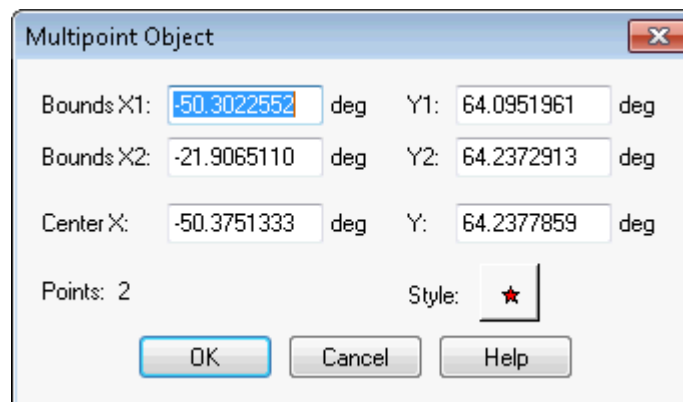
1. Make the layer that you are going to select from editable if it is not already.
2. Select the objects you want to combine.
3. On the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Selected Objects** to open the **Data Aggregation** dialog box.

Note: Text objects cannot be used as input in a **Combine** operation.

4. Select the column(s) that you want to use in the aggregation and an aggregation method.
5. Click **OK**. The objects are combined into a single object.

Any point objects selected are combined to form a multipoint object. Any polyline objects selected are combined to form a new region object. The resulting multipoint (if one exists), polyline (if one exists) and region (if one exists) are grouped together to form a new collection object.

For an existing multipoint or collection object, you may need to change its styles or view the bounds information. To do so, either double-click the object, or right-click the object to display the shortcut menu and choose **Get Info** to open the **Object Info** dialog box for the selected object. If the object is not editable, the controls in the **Object Info** dialog box are read only.




In multipoint objects, you can change the style of the symbol that represents the multipoint. Click the **Style** button to open the **Symbol Style** dialog box.


In a collection object, you can change the styles of the different object types in your collection. Click the corresponding **Style** button for each object type you want to change.

Collection Object

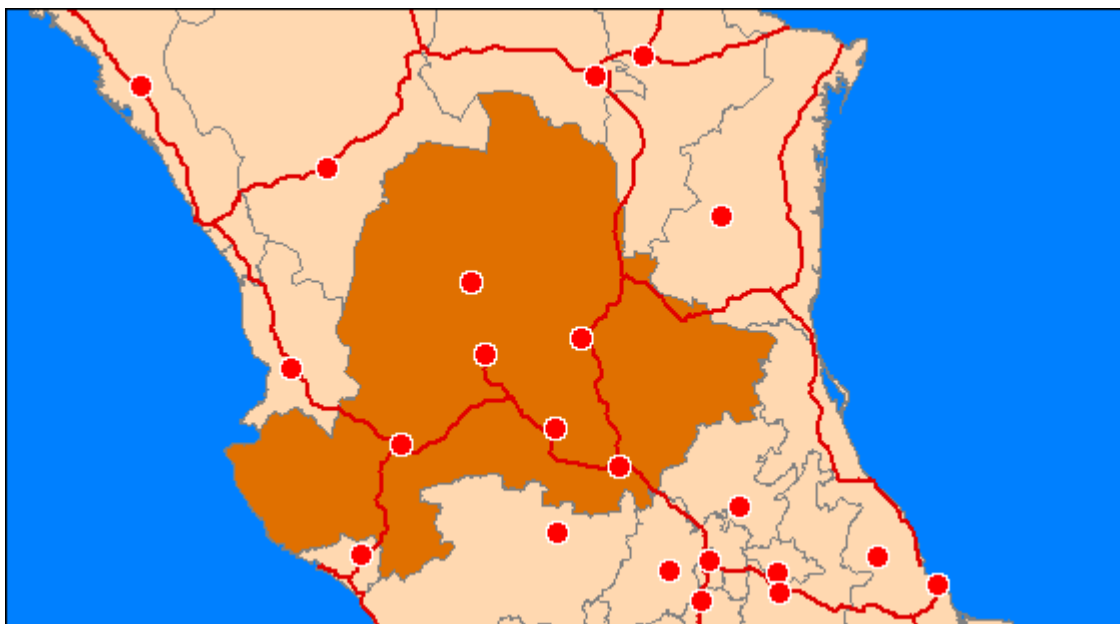
Bounds X1: -46.90657849 deg Y1: 56.75142550 deg
Bounds X2: -21.90651098 deg Y2: 64.23729133 deg
Center X: -32.29283520 deg Y: 59.56066325 deg

Region
Total Area: 90,030 sq mi (Spherical)
Total Perimeter: 1,254 mi (Spherical)
Line Segments: 4
Polygons: 1 Style: 

Polyline
Total Length:
Line Segments:
Sections:
☐ Smooth

Multipoint
Points: 2 Style: 

OK Cancel Help



Combining Objects with Multipoint and Collection Objects

The **Combine** commands makes use of the Multipoint and Collection object types. You can use Points, Multipoints, and Collections as input in a **Combine** operation.

In addition, heterogeneous combines are possible using any combination of input objects, including Multipoints and Collections.

Note: Text objects cannot be used as input in a **Combine** operation.

The result of such a **Combine** is a Collection object.

Multipoint Objects

If you are combining point or Multipoint objects, the **Combine** operation produces a single Multipoint object comprising all input points. Combining points is similar to other **Combine** operations in that the symbol style of the resulting object is the same as that of the first object to be combined. This object is normally the first object, in row order, of the table being combined.

Specifying Multipoint Object Attributes

A multipoint object is the result of combining points into a single object. The multipoint object must be editable (reside in an editable layer) before you can specify attributes.

1. Make the table containing the multipoint object editable.
2. Do one of the following:
 - Select a multipoint object and press **F7** to open the **Multipoint Object** dialog box.
 - Double-click the MultiPoint object to open the **Multipoint Object** dialog box.
3. Specify attributes for the multipoint object.
4. Click **OK**.

Collection Objects

The result of a **Combine** operation that uses heterogeneous object types as input is a Collection object. The input objects of a Collection object can be a mix of any of the following:

- Point or multipoint objects (zero-dimensional)
- Linear objects - lines, polylines, and arcs (one-dimensional)
- Closed objects - regions, rectangles, rounded rectangles, and ellipses (two-dimensional)
- Collection objects

Heterogeneous **Combine** operations take place in stages. First, all objects of the same dimension are combined separately. The **Combine** operations are done in the following manner:

- All point and Multipoint objects, as well as the Multipoint component of any Collection object in the input are combined into a new Multipoint object.

- All line, polyline, and arc objects, as well as the polyline component of any Collection objects in the input are combined into a new polyline object.
- All regions, rectangles, rounded rectangles, and ellipses, as well as the region component of any Collection objects in the input are combined into a new region object.

Note: As in other **Combine** operations that involve rounded rectangles, all rounded rectangles are treated as rectangles.

The resulting Multipoint, polyline, and/or region objects are then assembled into a new Collection object.

The styles for the new Collection object are derived from the styles of the separate **Combine** operations. These styles are assigned according to the style of the first object, in row order, of the table being combined. Keep in mind that the row order of an object may have nothing to do with the order in which you selected the objects for the Collection.

For example, the style of a Multipoint component of a Collection object is the style of the first point, Multipoint, or Multipoint component of a Collection encountered in row order. The style of a polyline component of a Collection object is the style of the first linear object or polyline component of a Collection encountered in row order. The style of a region component of a Collection object is the style of the first closed object or the region component of a Collection encountered in the input, in row order.

Creating and Manipulating Objects

The operations in this section do not make use of a target object to perform analysis or data aggregation. These tasks use selections to create new objects so that you can perform further mapping operations on those objects. The results of the operation are placed in the editable layer. The original objects remain unchanged.

Enclosing Objects

Use the **Enclose (Polylines to Regions)** command to create regions from polygonal areas formed by intersecting polylines. You can form a new region network anywhere where the polylines form an enclosed area. For example, you could create regions from a road net, where the regions are the parcels of land between the roads.

You can also use the **Enclose (Polylines to Regions)** command with region objects.

This command is modeled after the Combine command, but has two important differences:

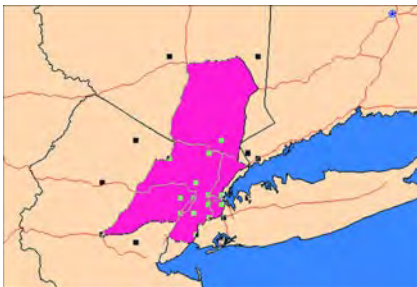
- Combine always produces one object, while **Enclose (Polylines to Regions)** may produce many objects.
- No data aggregation is performed with the **Enclose (Polylines to Regions)** command.

To use the **Enclose (Polylines to Regions)** command, your **Map** window must be active, it must contain an editable layer, and objects in the editable layer must be selected. This is a highway map of the greater New York City metropolitan area. A number of the highways have been selected.



To form regions from the selected polylines:

1. In the active **Map** window, make the layer you want to select from editable.
2. Select the objects you want to enclose.
3. On the **SPATIAL** tab, in the **Create** group, on the **Regions** list, click **Enclose (Polylines to Regions)** from the list to open the **Create Region Objects from Enclosed Areas** dialog box.
4. To ignore region objects in the operation, leave the box checked. To include region objects, clear the box. If regions are to be used as input objects, they are automatically converted to polylines for the **Enclose (Polylines to Regions)** operation.
5. Your map displays. The newly formed polygons are selected.



Enclose (Polylines to Regions) preserves the original objects. The selected objects are used as the input objects, and the results of the operation are placed in the current editable layer in the active **Map** window.

When you include regions and other closed objects in the **Enclose (Polylines to Regions)** command (regions, rectangles, rounded rectangles, and ellipses), the input regions are considered polylines for the purposes of this operation. The regions are converted to polyline objects, and then the **Enclose (Polylines to Regions)** operation is performed. It is the same as if you were to first convert any closed objects to polyline objects, and then perform the **Enclose (Polylines to Regions)** operation.

If your selection contains objects that are not linear and are not closed (for example, points, multipoints, collections or text objects), you will get an error. If the selection contains closed objects, and the **Ignore Region Objects** check box is selected, then these closed objects will be ignored.

Checking Regions

You can check region maps for possibly badly formed objects with the Check Regions command, which is available by selecting the object you want to check and on the **SPATIAL** tab, in the **Edit** group, click **Check Regions** from the list.

Check Regions detects errors in your data that may produce problems or incorrect results when various operations are performed. There are a couple of rules associated with the **Check Regions** dialog box. You must select the regions you want to check before you use the **Check Regions** command. The objects must reside in one layer, and they must all be closed objects. MapInfo Pro places the **Check Regions** results in the current editable layer in the active **Map** window. There is no data aggregation or disaggregation performed on this data and no data is associated with the objects created. The options for the **Check Region** dialog box are explained in detail in this section. To see examples of the gap and overlap regions, see the illustrations at the end of the **Cleaning Objects** section.

The **Self-Intersection Detection** option helps you to check your regions for areas that cross over themselves, which could cause errors later on. When you use this option, the **Check Regions** command creates a point at the location where the data may self intersect. To change the symbol used to indicate self intersections, click the **Style** button in the **Self-Intersection Detection** group to display the **Symbol Style** dialog box. You can make the desired changes here.

The **Overlap Detection** option checks the data for places where regions overlap each other. When you use this option, the **Check Regions** command creates regions that represent any areas of overlap. To change the fill of the overlap regions, click the **Style** button in the **Overlap Detection** group to display the **Region Style** dialog box. You can make the desired changes here.

The **Gap Detection** option checks the data for places where region boundaries do not line up, causing a space or gap between regions. Some gaps in boundary data may be naturally occurring, such as a lake. Generally, gaps that are errors are caused by misaligned boundaries, and are generally small. A maximum gap area must be entered for gap detection. Gaps larger than this area are ignored and not flagged. This should help differentiate natural gaps, such as lakes, from misalignment errors. To change the fill of the gap regions, click the **Style** button in **Gap Detection** group to display the **Region Style** dialog box.

To use the **Check Regions** command:

1. Make sure your **Map** window is active and that you have an editable layer.
2. Select the region object(s) that you want to check.
3. On the **SPATIAL** tab, in the **Edit** group, click **Check Regions** to open the **Check Region Objects** dialog box.
4. To check for self-intersections, select the **Detect Self-Intersection** check box. The **Symbol Style** button enables. The check box is set by default.
5. To check for region overlaps, select the **Detect Overlays** check box. The **Style** button for Overlap Detection enables. The check box is cleared by default.
6. To check for gaps, select the **Detect Gaps** check box. The **Region Style** button, the **Maximum Gap Area**, and the **Area Units** are activated. The check box is cleared by default.

- Click the **Symbol Style** button to change the symbol style used to indicate the location style of the self intersections.

If you specified Overlap Detection, click the **Region Style** button to change the fill pattern for the regions that represent the areas of overlap.

- Click **OK**. Your map redraws, and the self intersections, overlapping regions and gaps, if specified, are displayed.

If you specified Gap Detection, check the **Region Style** button in the Gap Detection group to change the fill pattern and color used to represent gaps.

The settings are retained per session and per layer. When you close MapInfo Pro and reopen the program, the **Overlap Detection** check box is reset to the default. If you select another layer, **Overlap Detection** is also reset to the default (not selected). This per-session and per-layer scheme is also used in other operations such as **Buffer Objects** and **Convex Hull**.

Check Regions does not correct your data; it only shows the location of the incorrect data.

Checking Regions/Tables for Incorrect Data

You can check regions/tables for various aspects of incorrect data, or possible incorrect data, which may cause problems and/or incorrect results in various operations. Only region objects will be checked. The region objects will be checked for self-intersections and will check for overlapping objects if desired.

Some of the problem areas checked include:

- Line segments within a region, which cross each other.
- Nodes within a single polygon of a region where the polygon touches itself. The node will have more than 2 line segments emanating from it. This case can be broken down into two other instances. Given a polygon that has 2 looped sections, if the path traced by the nodes of the polygon follow a cursive figure 8, then this is called a figure 8. If the same 2 looped polygon can have its path traced as a cursive capital letter B, then this is termed a Bow Tie. Figure 8's are considered to be worse than Bow Ties. For example, the Area of a Figure 8 will always be incorrect, while the area of a Bow Tie will be correct and accurate. Figure 8's and Bow Ties are both detected.
- Gaps that are closed areas between regions that do not contain objects. While some gaps may be legitimate (e.g., the Great Lakes between the United States and Canada in the `WORLD.TAB` map), small gaps often reflect poor boundary matches between regions. Overlaps may similarly represent poor boundary matches.

To check for incorrect data:

- Select the **Map** window you want to check, making it the active window.
- Select an object in the **Map** window.
- Make the map layer with the selected object editable.
- On the **SPATIAL** tab, in the **Edit** group, click **Check Regions** to open the **Check Region Objects** dialog box.

5. You can change the symbol used to denote self-intersections by clicking the **Self-intersection Detections** button. The **Symbol Style** dialog box displays, which allows you to select your own symbol. Once a symbol is selected you can continue.
6. Check the **Overlap Detection** box and click **OK**.

If there were no data problems, a dialog box displays with the message,

Check region did not find any data problems.

If there were data problems, a point object is created and placed into the output table. If you select to check for overlapping objects, then the overlapped regions will be placed in the output table.

Detecting and Correcting Self-Intersections, Gaps, and Overlaps

When you add a street to a map, it may cross existing streets. Usually, this indicates that the streets intersect (except in the case of an overpass, where there is no intersection). You may want to perform **Overlay Nodes onto Target** so that MapInfo Pro adds a node to each street at the point of intersection. Once the streets have a common node, MapInfo Pro's Find command is able to locate the intersection of the two streets. To find an intersection, enter two street names in the **Find** dialog box, separated by a pair of ampersand characters (e.g. "Broadway && River St").

To detect and correct self-intersections, gaps, and overlaps:

1. Select the objects you want to work with.

Note: All of the objects selected must either be closed objects (for example, regions, rectangles, rounded rectangles or ellipses) or linear objects (for example, lines, polylines, or arcs). The selection cannot contain a mixture of closed and linear objects.
2. Make the table containing the objects editable.
3. On the **SPATIAL** tab, in the **Edit** group, click **Clean Objects** in the list to open the **Clean Objects** dialog box.
4. Check **Remove Overlaps and/or Gaps**. If you choose **Gaps**, you need to specify **Maximum Gap Area** and **Area Units**.
5. Click **OK**.

See Also:

Clean Objects Dialog Box

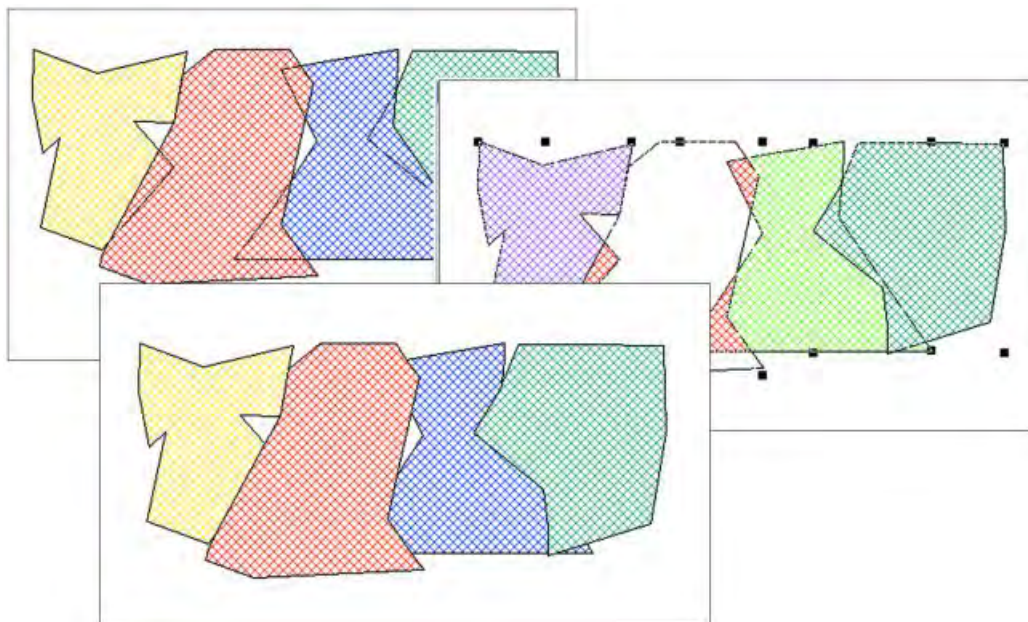
Cleaning Objects

The **Clean Objects** command removes any self-intersections in your region data and optionally alter region data to remove overlaps and/or gaps. **Clean** is available whenever there are objects selected, and the table that the objects are in is editable. The **Clean Objects** command is located on the **SPATIAL** tab, in the **Edit** group, click **Fix/Clean**.

Note: All of the objects selected must be closed objects (for example, regions, rectangles, rounded rectangles or ellipses).

To use the Clean command:

1. Open any **Map** window that includes a region layer.
2. Make the region layer editable if it is not already. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window. Click the **Editable** icon for the layer.
3. Select the objects that you want to clean. Ideally, all the objects in the table would be selected.
4. On the **SPATIAL** tab, in the **Edit** group, click **Clean Objects** from the list to open the **Clean Objects** dialog box.
5. Click the **Enable Overlap Removal** check box to remove any overlapping areas. The area of overlap will be retained in the region that has the largest area; the overlap will be removed from any other overlapping regions.
6. Click the **Enable Gap Removal** check box to remove any gaps between regions, where the area of the gap is less than the area provided. The area of the gap will be added to the adjacent region with the longest shared edge. Specify a maximum gap area and the area units you want to use.
7. Click **OK**.



- 1 Objects before Clean operation overlap.
- 2 Objects selected for Clean operation.
- 3 Objects after Clean operation do not overlap.

There are several things you should be aware of when using the **Clean Objects** command. Although **Clean Objects** works on a selection of objects, it is designed to be used on an entire table at once. If **Clean Objects** is used on a selection, rather than on the whole table, problems can occur. For example, if not all the objects are included in the **Clean Objects** operation, some of the object intersections can be missed.

In addition, **Clean Objects** could introduce new overlaps and gaps if not all of the objects in the table are used as input. The **Clean Objects** operation places new nodes at the point of each intersection it encounters. The presence of these nodes can slightly change the size and shape of objects, although you would have to zoom in very closely to the site of the new nodes to notice it. These slight alterations have the potential to create small gaps and overlaps in what were previously common boundaries with other objects not included in the **Clean Objects** operation.

Clean Objects also removes the overlap when one object is completely inside another, however, if one object is completely inside another object, the object which is inside (often smaller than the containing object) remains, while a hole is punched in the containing object. The result does not contain any overlaps.

Snapping Nodes and Thinning Objects

The **Snap/Thin** command sets snap tolerances for nodes in different objects, and node and polygon thinning settings for your data. **Snap/Thin** also removes any self-intersections and overlaps in region data. The overlap removal is automatically done after any of the node snap and thin operations and will remove any overlaps, which survive these processes.

The **Snap/Thin** command has three main functions:

- The Inter-Object Node Snap - Snaps nodes from different objects together.
- The Node Thinning/Generalization - Removes nodes from objects while retaining their shape. When you thin region objects, shared boundaries are retained.
- Polygon Area Thinning - Removes small polygons from selection.

The **Snap/Thin** command is available whenever objects are selected in an editable table. These objects must either be all closed or all linear objects. You cannot use **Snap/Thin** a mix of closed and linear objects.

To Use **Snap/Thin**:

1. Select the objects you want to work with.

Note: All of the objects selected must either be closed objects (for example, regions, rectangles, rounded rectangles or ellipses) or linear objects (for example, lines, polylines, or arcs). The selection cannot contain a mixture of closed and linear objects.

2. Make the table the objects are in editable.
3. On the **SPATIAL** tab, in the **Edit** group, click **Snap/Thin** to open the **Set Values for Node Snap & Thinning** dialog box.
4. Check **Enable Node Snap**, **Enable Node Thinning/Generalization**, or **Enable Polygon Area Thinning**.

For more information, see [Set Values For Node Snap & Thinning Dialog Box](#).

5. Click **OK**.

Why Use Snap/Thin?

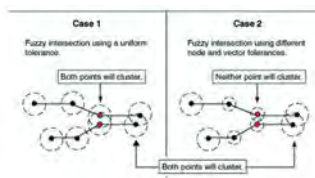
Nodes from different objects that are very close to each other may have resulted from object creation or editing issues, and can result in small overlaps and gaps between objects. Using appropriate tolerance values will snap the nodes together and eliminate such overlaps and gaps.

Some objects may contain nodes that do not contribute to the object and/or application. The appearance of these nodes could be due to the resolution of the data. In some cases, the resolution may not be great enough to register subtle differences in node positions. In other cases, the objects may contain more resolution than is required for the application. This unneeded or unwanted resolution can add overhead in the display, manipulation, and storage of the objects. Thinning the data can remove nodes and reduce the complexity of the objects, and if done properly, can retain the shape and features of the object.

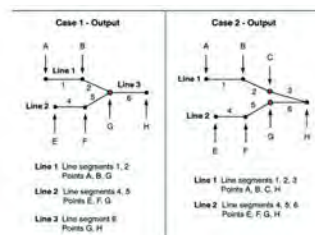
Inter-Object Node Snap

In addition to snapping nodes of different objects together, **Inter-Object Node Snap** eliminates small overlaps and gaps in region objects as well as connect polyline objects that are close, but do not touch each other.

The **End Node Tolerance** setting is the tolerance value for the end nodes of a polyline. If there is another node in the same object or a different object that is within the specified tolerance of an end node of a polyline, one or both of these nodes will be snapped together so that they occupy the same point. The **Internal Node Tolerance** is used for all other non-end point nodes of a polyline.



For polylines, the **End Node Tolerance** must be greater than or equal to the Internal Node tolerance. You will receive a warning message if they are not. In many instances, the **End Node Tolerance** and **Internal Node Tolerance** should be set to the same value, although they can be set separately.



For regions, the designation of end nodes and internal nodes is irrelevant, since the nodes of regions form closed loops. Therefore, when you specify tolerance settings for regions, the **End Node Tolerance** field is unavailable. The only tolerance value you specify is the **Internal Node Tolerance**. This value is used for all nodes in region objects.

Specify the unit of measurement for the snap tolerance in the **Tolerance Units** drop-down list.

Node Thinning and Generalization

In node thinning and generalization, nodes are removed using a **3-Node Collinear Deviation** value. This value is determined by connecting three nodes to form a triangle and measuring the perpendicular distance between the second node and the line segment connecting the first and third nodes. If this distance is less than or equal to the **3-Node Collinear Deviation** distance, the three points are considered co-linear and the middle (second) point is removed from the object.

The **Node Separation** tolerance is used to thin nodes within an object that are close together. If two successive nodes in an object are closer than the distance tolerance, then one of the nodes is removed from the object. Set the unit of measurement for the Thinning/Generalization values in the **Distance Units** drop-down list.

Polygon Area Thinning

In polygon area thinning, polygons that are smaller in area than the **Minimum Area** value will automatically be removed. The polygon can be part of a multi-polygon region, in which case only that polygon is removed from the region, and the rest of the polygons in the region are retained. Set the unit of measurement polygon thinning in the **Area Units** drop-down list.

You toggle **Snap to Node** by pressing the `S' key. If snap mode is active for a window, "Snap" displays in the **Status** bar.

- You can perform **Snap to Node** in more than one window at a time (only **Map** windows can use the snap feature). If you switch from a window that has snap on, to another window and then back, **Snap to Node** now stays on.
- **Snap to Node** tolerance is saved in the workspace.

To use **Snap/Thin**:

1. Open a **Map** window containing the layer whose objects you want to work with.
2. Make sure the layer is editable.
3. On the **SPATIAL** tab, in the **Edit** group, click **Snap/Thin** to open the **Set Values for Node Snap & Thinning** dialog box.
4. Specify the **Inter-Object Node Snap** settings and select the **Enable Node Snap** check box to activate the settings.
5. Specify the **End Node Tolerance**, **Internal Node Tolerance**, and the **Tolerance Units**.
6. Specify the **Node Thinning/Generalization** settings, and select the **Enable Node Thinning/Generalization** check box to activate the settings.
7. Specify the **3-Node Collinear Deviation**, **Node Separation**, and **Distance Units** values.
8. Specify the **Polygon Area Thinning** settings and select the **Polygon Area Thinning** check box to activate the settings.
9. Specify the **Minimum Area** and **Area Units** for the polygons to be removed.

Note: Distance measurements for all three **Snap/Thin** operations are calculated using the Cartesian method. Tables that are in a Latitude/Longitude coordinate system will not measure these tolerances accurately.

The **Snap/Thin** command will clean bad data (self-intersections and overlaps), even if no snap or thin values are used. It uses a related, but not identical, mechanism as is used in the **Clean** command, and thus may produce similar, but different, results than can be obtained using **Clean**. For example, overlapping polygons have the overlap removed, but which region retains the overlap, and which region it is removed from often are different from those that result from the **Clean** command. It is generally not easily determine this before the operation.

See Also:

Why Use Snap/Thin?

Disaggregating Objects

The **Disaggregate** feature breaks apart objects and their data into their component parts.

You can use object Collections as input, ignoring all other objects, to produce a region object, a polyline object, and a multipoint object, if each exists in the Collection. As many as three new objects will be created from disaggregating the Collection.

You can also break any multi-part object into its components:

- Regions produce new region objects with one polygon per object. Optionally, holes (interior boundaries) of the original object can be retained as a hole in the result object. Otherwise, a hole will produce a separate, single (solid) polygon region.
- Polyline objects produce new Polyline objects with one, single segment, polyline per object.
- Multipoint objects produce Point objects, with one new Point object produced for each node.
- Collections will be recursively broken up. If a Collection contains a region, then that region will be broken up into multiple region objects as noted above. If the Collection contains a polyline, then it will be broken up into multiple polyline objects as noted above. If the Collection contains a Multipoint, then it will be broken up into point objects as noted above.

All other object types, including Points, Lines, Arcs, Rectangles, Rounded Rectangles, and Ellipses, will remain unchanged. This is only for Regions, Plines, Multipoints, and Collection objects.

To disaggregate objects:

1. Select the objects you want to disaggregate.
2. Make the table containing the objects editable.
3. On the **SPATIAL** tab, in the **Edit** group, click **Disaggregate** to open the **Disaggregate Objects** dialog box.
4. Choose one of the following:
 - Select the **All Objects** button to break up a multi-part object into its component parts.

If you select **All Objects**, select the **Retain Holes in Region** check box to retain holes in the output objects. If you do not select the check box, a series of single polygon region objects are produced, one object for each polygon in the original object. Holes, or interior boundaries, will produce solid polygon regions. No output region object will contain any holes.
 - Select the **Collections Only** button to break up Collection objects.

5. Click **Next** to open the **Data Disaggregation** dialog box.
6. Select **No Data** to prevent input table columns from being carried to the output table.
7. Select a Disaggregation method, **Value**, **Blank** or **Area Proportion**, and click **OK**.

Erasing Objects

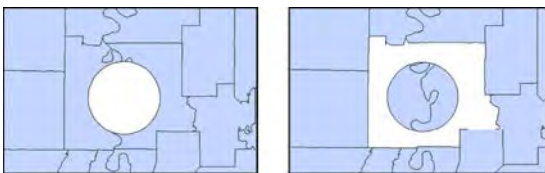
You have two choices when you want to remove some portion of the target map object. Use **Erase Target** to erase the portion of the target object that is overlapped by the cutter object. Use **Erase Outside Target** to remove the portion of the target object that is **not** overlapped by the cutter object.

For example, to add a lake to a region, create the lake as the cutter, position it appropriately and use the **Erase Target** command to remove that portion of the target object under the lake.

Both the **Erase Target** and **Erase Outside Target** commands support point, multipoint, and collection objects.

To erase map objects using Set Target:

1. Select the object(s) in an Editable layer to be the target.
2. On the **SPATIAL** tab, in the **Edit** group, click **Set Target**. The object(s) displays in a different style to indicate that it is the target object.
3. Select (or create and select) one or more map objects from any layer in the **Map** window to be the cutter object. The object must be a closed object.
4. On the **SPATIAL** tab, in the **Edit** group, click **Erase**, and **Erase Target** (or **Erase Outside Target**) to open the **Data Disaggregation** dialog box.
5. Choose the appropriate disaggregation method (or **No Data**) for each field in the Destination list.
 - **Shift**-click to apply the same method to consecutive fields
 - **Ctrl**-click for non-consecutive fields
6. Click **OK**.



1 End result of Set Target - Erase Target. Circular object is removed.

2 End result of Set Target - Erase Outside Target. All but circular object is removed.

MapInfo Pro will compute the new object and display it. Use the **Info** command to view the disaggregated data (if any) of the split objects.

Adding Nodes to an Object

Overlay Nodes onto Target allows you to add nodes to the target objects at the points where the target intersects the cutter object.

For instance, when adding streets to a map that cross existing streets at intersections, use the **Overlay Nodes onto Target** command on the new street to add nodes that exactly overlay the nodes from the existing street.

To add nodes to an object with Set Target:

1. Select the object(s) in an editable layer as the target. This is the object to which you want to add nodes. The objects may be closed or linear objects.
2. On the **SPATIAL** tab, in the **Edit** group, click **Set Target**. The object(s) displays in a different style to indicate that it is the target object.
3. Select as the modifying object one or more map objects that intersects the target from any layer in the **Map** window. The cutter object may be closed or linear objects.
4. On the **SPATIAL** tab, in the **Edit** group, click **Nodes**, and **Overlay Nodes onto Target**.

MapInfo Pro adds the intersecting nodes to the target object(s).


Note: No data aggregation or disaggregation is performed with **Overlay Nodes onto Target**. The data after the operation remains unchanged.


Displaying and Selecting an Object's Nodes

By joining line segments, you can create regions and polylines. The lines that make up these objects have nodes at their endpoints. You change the shape of regions and polylines by moving, adding, or deleting these nodes. You can select as many object nodes as you want, however, the nodes must be contiguous and belong to the same region or replace.

To display an object's nodes:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

(You can also see map layers in the **Explorer** window.)

2. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.
3. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** from the list to display all of the object nodes.

To display a single node on the object, on the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the node to select it.


4. In the **Layers** or **Explorer** window, double-click on the layer name to open the **Layer Properties** dialog box.
5. On the **Layer Display** tab, select the **Show Nodes** check box.
6. Click **OK**.


The map refreshes and highlights the object's nodes in a different color.

Moving an Object's Nodes

To move an object's nodes:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

(You can also see map layers in the **Explorer** window.)

2. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.
3. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** from the list to display all of the object nodes.
4. Click and drag a selected node or **Shift**-click to select more than one node (all the selected nodes move).

Note: To prevent accidental moving of nodes, MapInfo Pro does not move them until you hold down the mouse button for one (1) second.

Copying and Pasting an Object's Nodes

If you copy and paste a single node, a point object is created. If you copy and paste multiple nodes, a polyline object is created.

To copy and paste nodes:

1. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**.
2. On the map, select the object that you want to reshape.
3. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** to see small filled boxes at each node in the object.
4. Select the nodes to be copied.

Press the **Ctrl** key to select a series of points along the object.


5. On the **SPATIAL** tab, in the **Clipboard** group, click **Copy** to copy the selected nodes to the clipboard as a point or polyline.
6. On the **SPATIAL** tab, in the **Clipboard** group, click **Paste** to copy the node(s) as a point or polyline on to the map.


Note: The tabular data is not copied to the clipboard. When you paste the nodes, the resulting object has an empty tabular row.

Deleting an Object's Nodes

To delete nodes from an object:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.

Click the **Editable**  icon beside the layer name to turn **On** editing.

Click the **Selectable**  icon beside the layer name to turn **On** selection.

(You can also see map layers in the **Explorer** window.)

2. On the **SPATIAL** tab, in the **Selection** group, click **Select**, and **Select**. Click on the object in the map.
3. On the **SPATIAL** tab, in the **Edit** group, click **Reshape** from the list to display the object nodes. Click on a node to select it.
4. Press the **Delete** key or press **Backspace** to delete the selected nodes.

When you want to put the nodes on the clipboard and also delete them from the object, on the **SPATIAL** tab, in the **Clipboard** group, click **Cut**.

Note: The tabular data is not copied to the clipboard. When you paste the nodes, the resulting object has an empty tabular row.

If all nodes are deleted, the region or polyline is deleted. If only some nodes are deleted, the region or polyline is redrawn to reflect the deletion(s).

When nodes are deleted from a region, the resulting object is still a region. If you want to turn the region into a polyline, then on the **SPATIAL** tab, in the **Edit** group, click **Convert to Polyline**.

Redistricting: Grouping Map Objects into Districts

One popular use of MapInfo Pro is to group map objects with a common field into districts or territories. MapInfo Pro's Redistricting feature allows you to create new districts, realign existing districts, all the while doing calculations of the attached data on the fly for instant analysis and decision-making.

What is Redistricting and How Can I Use It?

Redistricting is the process of assigning map objects to groups. As you assign map objects to groups, MapInfo Pro automatically calculates totals for each group of objects, and displays the totals in a special **Browser** window called the **Districts Browser**. This process is sometimes known as load-balancing.

When you perform redistricting, you create a number of districts. The exact number of districts needed depends on the nature of your work. You can assign a unique name to each district; thus, if you want to work with four districts, you might call the districts Northeast, Southeast, Northwest, and Southwest. Each district appears as one row in the **Districts Browser**.

The **Districts Browser** is different from other **Browser** windows in several respects:

- You only can select one row at a time from the **Districts Browser**. You cannot **Shift-click** to select multiple rows.
- The **Districts Browser** always has one row selected; you cannot cancel the selection of this row by choosing the **Clear** command.
- When you select a row from the **Districts Browser**, that row becomes the target district. The target district is the district that will be affected by subsequent redistricting operations.

Once you have selected a target district, you assign map objects to that district by selecting the map objects. You can select objects by pointing and clicking, or by performing queries such as SQL Select.

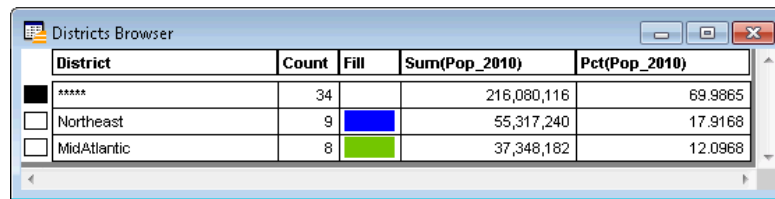
When you select map objects, MapInfo Pro tentatively assigns the selected objects to the target district. MapInfo Pro then recalculates the totals for each district, and displays the new totals in the **Districts Browser**. You can then examine the contents of the **Districts Browser** to decide whether you want to make the district assignments permanent.

To cancel the tentative district assignment, cancel the selection of the map objects.

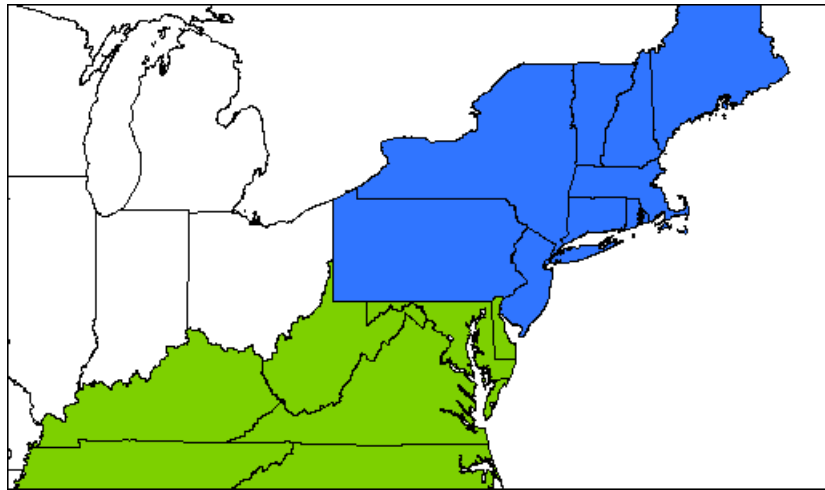
To make the tentative district assignment permanent, on the **MAP** tab, in the **Options** group, click **Redistricter**, and **Assign District**. When you choose **Assign District**, MapInfo Pro stores the target district's name in the rows of the selected objects. Thus, if you assign map objects to a district called Northwest, MapInfo Pro stores Northwest in each object's row.

Each district has its own set of fill, line, and symbol styles. When you assign a map object to a district, the object subsequently appears in the style of the district. Thus, if you choose a solid blue fill for the Northeast district, objects that you assign to Northeast appear in solid blue.

For example, if you have a layer of states, you might want to combine the state boundaries to create sales territories. Each state record includes a field, TOT_SALES, which contains the total sales for the previous year. You would ultimately like to sum up the TOT_SALES field for each state in a given sales territory. Redistricting gives you the tools for creating the sales territory and combining those TOT_SALES fields from each state's data into one table.



District	Count	Fill	Sum(Pop_2010)	Pct(Pop_2010)
*****	34		216,080,116	69.9865
Northeast	9	Blue	55,317,240	17.9168
MidAtlantic	8	Green	37,348,182	12.0968



But that is only one part of the redistricting process. The real power lies in the **Districts Browser** where you can see on-the-fly updates of district record counts and data totals when you click a map object and assign it to another district. This allows you to perform visual "what if" analysis to achieve district realignments, a process sometimes referred to as load balancing.

When you are satisfied with the distribution, you can make the district assignments permanent. Later, as the need arises, you can change the assignments and try out new distributions.

Redistricting does not create new map objects or permanently change the style of the map objects. Redistricting is simply a dynamic grouping tool that displays map objects that share the same district information as a group. While the map objects are not permanently affected, you can make the district assignments permanent by saving the table.

You can redistrict any mappable table containing region, line, or point objects. The redistrict map will reflect the appropriate fill, line, or symbol style for the objects. The Redistricter limits the number of districts in a table to 594.

You can use redistricting in a wide variety of applications such as creating and managing sales territories, school or voter districts, emergency service coverage areas, delivery routes, natural resource management areas, etc. Use it wherever there is a high degree of fluctuating data and the need to try out different realignment scenarios.

You can use redistricting whether you need to create districts from scratch or realign existing districts.

Before we get into the process, however, there are two key concepts to introduce: the Districts Browser and Target District.

Using the Districts Browser

The Districts Browser is the key to the process of creating and changing districts. While looking like other browsers in MapInfo Pro, the Districts Browser is actually a dynamic window that allows you to make changes to the groups and recalculates total values on the fly. You can immediately see the results of your changes. You then have the option to make the changes permanent or continue to try out new district realignments.

The Browser window lists the districts as specified in your table, the record count for each district, and aggregate expression columns that contain the net total values of your data. You specify these columns in the **New Redistrict Window** dialog box when you begin the redistricting session.

District	Count	Fill	Sum(Pop_2010)	Pct(Pop_2010)
*****	34		216,080,116	69.9865
Zone 1	9	Blue	55,317,240	17.9168
Zone 2	8	Green	37,348,182	12.0968
Zone 3	0	Orange	0	0

Beginning a Redistricting Session

To begin a redistricting session:

1. On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Redistricter** from the list, to open the **New Redistrict Window** dialog box.
2. Choose the table from the Source Table drop-down list that contains the map objects you wish to redistrict.
3. Choose the column from the District Field drop-down list that MapInfo Pro should use to store district names.

CAUTION: During the redistricting process, MapInfo Pro automatically overwrites the contents of the District field. Therefore, you must choose a District field carefully.

If you are performing redistricting for the first time, you may want to add a new column to your table, and then use the new column as the district column. To add a new column to your table, on the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**. If the **View/Modify Table Structure** dialog box opens, then select a table from the list and click **OK**.

The **Available Fields** list and the **Fields to Browse** list work together. **Available Fields** contains a list of column expressions. You can move some or all of these column expressions to the

Fields to Browse list. Each column that you move to the **Fields to Browse** list displays in the **Districts Browser**.

4. Move an expression to the **Fields to Browse** list.
5. Choose an expression from the **Available Fields** list.
6. Choose the << button or remove an expression from the **Fields to Browse** list.
7. Choose an expression from the **Fields to Browse** list.
8. Choose the >> button to add fields.
9. Choose **Up** or **Down** to reorder fields and click **OK**.

When you choose **OK**, MapInfo Pro builds a special table called Districts, and displays the table in a Districts Browser. As long as the Districts Browser is on the screen, MapInfo Pro performs districting calculations every time you select or de-select map objects.

Setting up the Target District

The target district is the selected record shown in the **Districts Browser**. One record is always selected as the target. In redistricting, the target district receives the map object(s) that you assign from another district(s). MapInfo Pro automatically sets the target district to be the first district in the **Districts Browser**, but you can change it to any district you desire by clicking on a district record's selection box in the first column of the **Districts Browser**.

There are two ways to set the target district:

- Select a record from the **Districts Browser**.
- Select a map object on the **Map** window, make the **Districts Browser** active, and on the **MAP** tab, in the **Options** group, click **Redistricter**, and **Set Target**. The district that owns the map object becomes the target district.

The target district is identified in the **Districts Browser** as the selected record. The target district is also identified on the **StatusBar** in the lower-left corner of the screen.

It is very easy to select a target district in the **Districts Browser** when you have a small number of districts. However, when you have many districts (the limit is 594), you may find it quicker to select a map object and choose the **Set Target** command. If your default setting is **Most Recently Used** (**MAP** tab, in the **Options** group, click **Redistricter**, and **Options**), when you select a map object that is out of view in the Browser, MapInfo Pro will bring the corresponding record up near the top of the **Districts Browser**. You can then use either method described above to set the target district.

To change the target district, simply select another district in the **Districts Browser** or select a map object in a different district and choose **Set Target**.

There is always one (and only one) target district selected at a time. You cannot unselect the district.

When you select map objects, MapInfo Pro temporarily assigns them to the target district and recalculates the totals for each district. The changes are instantly reflected in the **Districts Browser**. The object count for the target district increases as do the totals for the data columns to reflect the

addition of the selected objects. At the same time, the object count and data totals for the source district decrease to reflect the removal of the object from that district.

Adding a New District

To add a new district when a redistricting session is in effect:

1. With the **District Browser** as the active window, on the **MAP** tab, in the **Options** group, click **Redistricter**, and **Add District**. MapInfo Pro creates a new district and adds the district to the bottom of the **Districts Browser**. MapInfo Pro assigns a default name to the new district, such as **District 7**.

To change the new district's name:

1. Click on the name as it appears in the **Districts Browser**.
2. Type the new name.

Assigning Map Objects to the Target District

If you select map objects while a redistricting session is in effect, MapInfo Pro tentatively assigns those objects to the current target district.

To make this assignment permanent, on the **MAP** tab, in the **Options** group, click **Redistricter**, and **Assign District**.

When you choose **Assign District**, MapInfo Pro stores the target district's name in the row of each of the selected objects. Thus, if you assign objects to a district named Northeast, MapInfo Pro stores Northeast in the row of each selected object.

Changing the Name of a District

To change the name of a district:

- Click the district name as it appears in the **Districts Browser** window and type in a new name.

Changing the Fill Color of a District

To change the fill color of a district, click the **Brush** sample that appears in the **Districts Browser** window.

For a description of Pattern, Foreground, and Background see, [Region Style Dialog Box](#).

Choosing the Target District

To choose the target district, do one of the following:

- Check the box of the appropriate row of the **Districts Browser** window.

- Select a map object, making the **Districts Browser** window active, and on the **MAP** tab, in the **Options** group, click **Redistrict**, and **Set Target**.

Ordering Districts and Grid Display

To order districts, do one of the following from the **Redistrict Options** dialog box:

- Choose **Most Recently Used** to display districts in the order that you most recently used them.
- Choose **Alphabetical** to display districts alphabetically. The **Districts Browser** is sorted and redisplayed when you click **OK**.
- Choose **Unordered** to display districts in the order they were created.

To save the display order:

1. Choose **Save as Default** to save the display order setting as the default.
2. Leave unchecked to use for current session only.

Deleting the Current Target District

To delete the current target district, on the **MAP** tab, in the **Options** group, click **Redistrict**, and **Delete District**.

The **Delete District** command deletes the district that is currently designated as the target district. Any objects that belong to the target district are reassigned to the **Unassigned** district. It is not possible to delete the **Unassigned** district.

Ending a Redistricting Session

To end a redistricting session, close the **Districts Browser** window.

Using Redistricting

When you calculate the percentage of partial columns (such as population columns that cite income, gender, age, ethnic background, or religious affiliation) you have two calculation methods available. One method calculates the percentage by column so that the sum of all of the entries in every column would be 100%. Another method calculates the percentage by row based on your selected row entry (or sum of entries) so that each percentage entry in the row is calculated based on that row (or sum of entries). For example, in the following table:

A	B	C
1	1	1
2	2	2

The Column method determines the percentages of entries in Column A:

$$\text{Percentage (A1)} = A1 / (A1 + A2) \times 100\%; \text{Percentage (A2)} = A2 / (A1 + A2) \times 100\%$$

The Row method determines the percentage for entries A1 and B1 based on C1 as a total column:

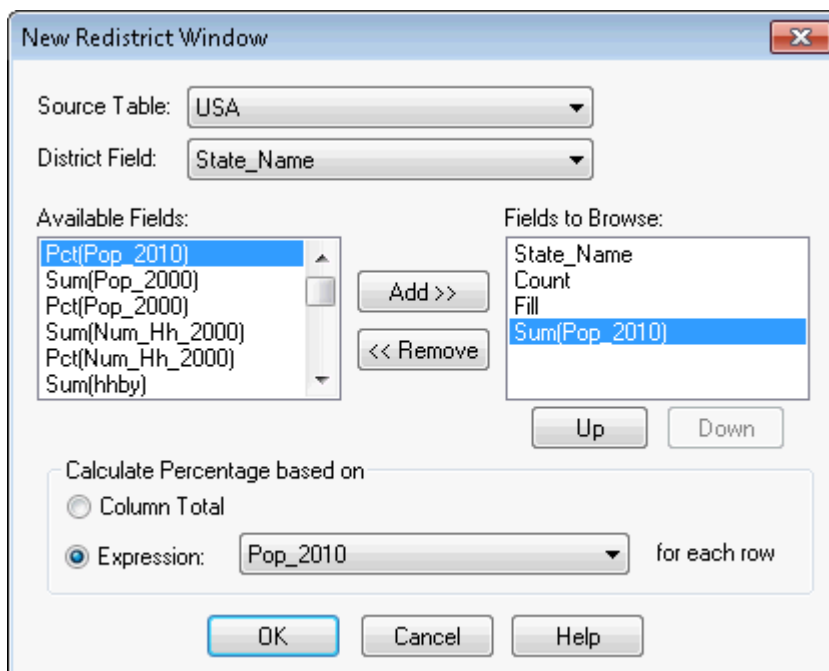
$$\text{Percentage (A1)} = A1 / C1 \times 100\%; \text{Percentage (B1)} = B1 / C1 \times 100\%$$

Note: Selecting a valid base entry (or the sum of the entries) is crucial to returning meaningful results. For example, if you choose a value in a population column and a base value from an income column, your results will not be meaningful.

Redistricting using the Row Method

To redistrict using the row method:

1. Open a new redistrict window with a file containing columns with partial percentage entries in it. (We used the USA.TAB file that ships in the Introductory Data on the MapInfo Pro DVD.)



- For the **Row or Column** method, select the field to calculate the percentage for from the **Fields to Browse** list.
- For the **Row method**, select the base field (or sum of fields for an expression) for your calculation from the **Expression** drop-down list.

2. Select one of these two options:

- **Column Total** - Use this method to calculate the partial percentage of the selected column based on the sum of the other column entries. This is the original calculation method.
- **(Field or Expression) for each row** - Use this method to calculate the partial percentage of the selected column based on a particular field or expression based on that row of data.

When you select the **Expression** option at the bottom of the list, the **Expression** dialog box displays. Complete your expression and click **OK** to return to the **New Redistrict** window. This is the new calculation method.

Note: When you create an expression for this operation, the only valid operation is a sum.

3. Click **OK** to calculate the percentage you selected.

For example: To calculate the percentage of the urban population of each state based on the total urban population for all states, select the `Pop_Urban_2000` field in the Fields to Browse list and choose the Column Total option in the Calculate Percentage based on section. MapInfo Pro calculates the percentage for the urban population on each state (Alabama `Pop_Urban_2000`) based on the total urban population for all states (`Pop_Urban_2000`).

To calculate the percentage of the urban population for each state based on the total population of that state, choose the `Pop_Urban_2000` field in the Fields to Browse list and in the (Field or Expression) for each row option, select the `Pop_2000` field. MapInfo Pro calculates the percentages based on each state's population data only. So for Alabama, the calculation would be the urban population row entry (Alabama `Pop_Urban_2000`) based on the data in the total population column for the same state (the Alabama `Pop_2000` column). This calculation would be performed for all states in the table.

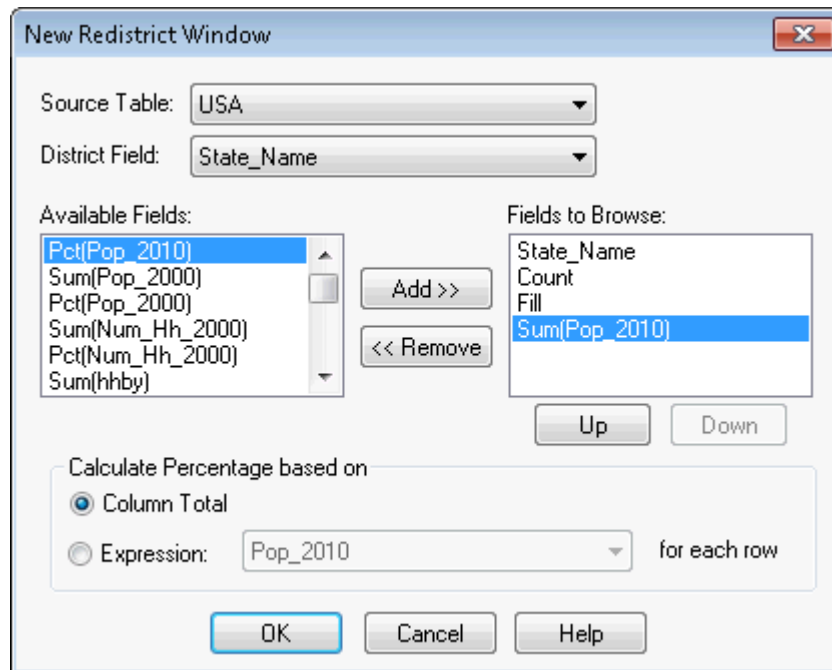
Note: We recommend that you install the Introductory Data from the MapInfo Pro DVD before using this example.

Creating New Districts

If you do not have any established districts in your table, you can create them as you go during the redistricting session. You should first, however, prepare your table to store the new district names by adding an empty column to your table. To do so, on the **Table** tab, in the **Maintenance** group, click **Table**, and **Modify Structure**.

With that done, on the **HOME** tab, in the **Windows** group, click **New Document**, and click **Redistricter** from the list, to open the **New Redistrict Window** dialog box. Choose your table from the drop-down

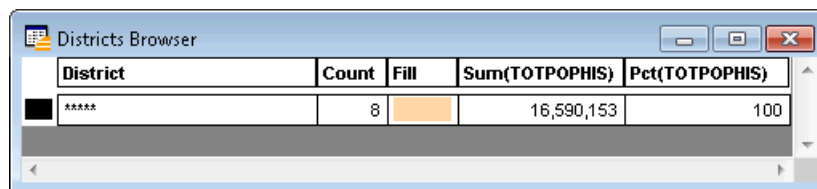
list. Choose the district field from its drop-down list. The district field is the empty field you created in your table to hold the district names.

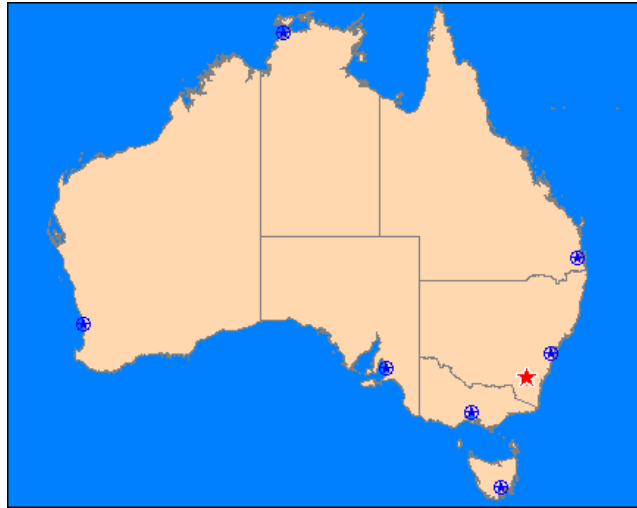


A powerful feature of redistricting is the ability to calculate net total values from the data in your table. Any numeric field can be aggregated by sum or percent during the redistricting session. The Available fields list shows you what calculations are possible for the given table. Choose from this list and click **Add >>** to move the expression to the Fields to Browse list. Only those items listed in the Fields to Browse list will be acted upon and displayed in the Districts Browser.

You can reorder the fields using the **Up** and **Down** buttons to list them in a certain order in the Browser. When you are satisfied with the choices in the dialog box, click **OK**. MapInfo Pro performs the redistricting operation.

When processing is finished, MapInfo Pro displays a map of your table with a single color and a Districts Browser with a placeholder for a district entry. This is because you told MapInfo Pro to carry out the redistricting on a column with an empty field.





To create another district, make sure the Districts Browser is active so that the **Redistricter** command list is available on the **MAP** tab. Click **Add District**. The new district displays in the District Browser with the name DistrictN, where N is the next higher number. Continue to add districts until you feel you have enough to begin reassigning objects to them. Enlarge the Browser, if necessary, to see the new district records.

Note: Each district you add will display with a generic name DistrictN, where N is the next higher number. To change the names, highlight the name and type in the new name.

To begin building your districts, make one of them the target district. Next, select map objects in the Map window to add objects to the new district. Notice how the values in the target district increase as the object(s) are selected.

At this point the objects are only temporarily assigned to the district. When you have made all the additions to the district that you want for the moment, make the Districts Browser active and on the **Redistrict** command list, click **Assign District** to make the assignment permanent. You cannot build another district until you complete the current one.

You must save the table at the end of the redistricting session to retain the new districts.

Continue to add and assign objects to districts until you have created as many districts as you need. You see the geographic extent of each color-coded district in the map window. You can also see the results of the expression calculations in the Browser showing the new total values for each district.

Now you can reassign districts to more equitably distribute resources, to include or exclude certain information, whatever your needs call for.

Reassigning Existing Districts

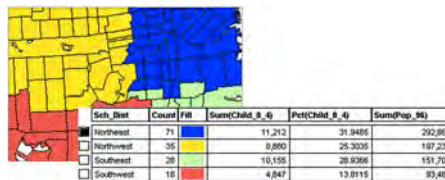
If you already have districts in your table, or have a column that contains values that are shared among the records, you can use those as the basis for your districts. When you activate the Redistricter, these values display as color-coded districts on a map.

For example, choose a column that contains information that will make up groups of more than one record each, such as sales reps, postal codes, area codes, states. If you choose a column containing unique values like customer names you will create districts that only contain one record each, not very useful for creating districts.

Note: When you perform redistricting, MapInfo Pro alters the values in whatever column you choose. You may want to make a copy of the column so that you retain the column values. In addition, do not name your tables "Districts." MapInfo Pro uses "Districts" internally as a system table when beginning a redistricting session.

On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Redistricter** from the list, to start the redistricting session. In the **Redistrict** dialog box, specify your table and field that contains the district names. From the Available Fields list, choose the fields you want displayed during redistricting. Reorder the fields as necessary. The fields will display in the Districts Browser in the order specified in the Fields to Browse list. Click **OK**. MapInfo Pro creates an individual value theme and the Districts Browser.

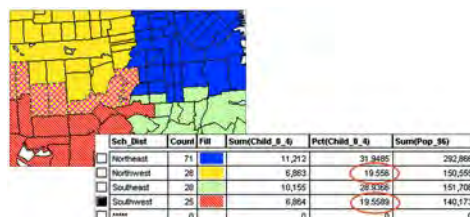
Now to begin the actual redistricting, or load-balancing, set the district that you want to add objects to as the target district. Select the map object(s) and watch the data change in the Districts Browser. You can select objects from more than one district and assign them to the same target district. Simply **Shift-click** each additional map object after the first one.



Before realignment, children under 4, in the column Sum(Child_0_4), were unevenly distributed among the districts.

As you choose map objects, the Browser immediately reflects the changes among the districts with new counts per district and new totals based on expressions you specified in the **Redistrict** dialog box, such as the sum or percent of a column value.

When you are satisfied with the reassigned objects for the target district, on the **MAP** tab, in the **Options** group, click **Redistricter**, and **Assign District** to make the changes permanent. You can choose a different target object and add other map objects to it. Continue until you are satisfied with the new distribution of map objects.



*After adding the selected objects to the target district, the **Southwest** (in red) and **Northwest** (in yellow) districts contain about the same percentage of children under 4 as shown in the column titled `Pct(Child_0_4)`.*

Creating New Objects

Keep in mind that MapInfo Pro's redistricting operation does not actually create new map objects. To combine objects in a district into a single object, on the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Using Column**. You will be prompted to save the table first before proceeding with the combine. For details, see [Combining Objects Using Column](#).

Note: You can only use Combine Objects Using Column for two dimensional objects such as regions.

Options in Redistricting

To control the order of districts in the Districts Browser, on the **MAP** tab, in the **Options** group, click **Redistricter**, and **Options** to open the **Redistricter Options** dialog box. Choose your preferred sort order from among: most recently used, alphabetical, or unordered. You can also choose to show the Browser grid lines and save the options as your default.

The Most Recently Used option can greatly aid you if you have more districts than the Districts Browser can display in a window. Whenever you select a map object that belongs to a district that is not currently visible in the Browser, MapInfo Pro will move that record near the top of the Browser window. You can then more easily set the new target district or view the changes in the data fields as you carry out your load-balancing scenario.

Changing the display of your districts is simple. Click the fill pattern, line style, or symbol in the Districts Browser that represents the district. The **Region Style**, **Line Style**, or **Symbol Style** dialog box displays, where you can change the tools used to display the district.

To save the style changes, you must save the redistricting session as a workspace. **Save Table** will only save the district assignment changes. The styles belong to a thematic layer, not to the table itself. The district changes are applied to the table and, thus, can be saved to the table.

Records with No Graphic Objects

Redistricting involves grouping map objects into districts. If you are redistricting a table that contains records that do not have graphic objects associated with them, keep in mind that MapInfo Pro includes them as well in the Districts Browser. You cannot assign these records to new districts. They will affect your data calculations when you move objects into new districts.

If you have numerous records without graphic objects in your table, it may be best to create and save a subset of the table and run the Redistricter on the new table.

Combining a District's Objects

Once you have finalized your districts, you can combine each district's group of objects into a single object.

To combine a district's objects:

1. On the **SPATIAL** tab, in the **Edit** group, click **Combine**, and **Combine Objects Using Column** to open the **Combine Objects Using Column** dialog box.
2. Choose your districting column from the Group Object By Column drop-down list.

There are some restrictions as to the types of objects that **Combine Objects Using Column** can combine. If your districts contain only closed objects such as regions, you can combine the objects.

Saving New Districts

Once you have settled on the new districts, you must save the changes to the table that contains the districts using **Save Table**. This will save the objects with the new district name. If you created new districts, you can change the generic DistrictN names before saving the table.

Exiting the Redistricter

To end the redistricting session, close the Districts Browser. The redistrict thematic layer is removed from the Map window. You must end the current redistricting session before beginning a new one.

5 - Working with Web Services

This section describes how to work with a software system that is accessible using an intranet or Internet connection. MapInfo Pro works with web services that provide data that you can view on your map.

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About Web Services

Working with Data from a Web Service

A web service is a software system that is accessible using an intranet or Internet connection. MapInfo Pro supports the Web Map Service (WMS), Web Feature Service (WFS), and Web Map Tile Service (WMTS), which allow you to retrieve data that others are sharing internally or world-wide. The power of web services is that you can use them to create more powerful maps or in the case of geocoding services get more accurate and precise results using the same data.



You can also work with Geocoding and Driving Region web services. A Geocoding web service lets you geocode with greater accuracy, because the maps on a service are more precise. A Driving Region web service lets you create time- and distance-based buffers around a site to determine proximity to a location. You might use this service to find the customers closest to a store, or to determine which insured customers are closest to a weather pattern.







A mapping tile server provides cartographic maps of geo-referenced data, in the form of raster images (tiles). In MapInfo Pro, you can add map tiles as a base layer to your map to provide a visual reference for your data. This gives you a real-world reference for viewing your data, such as for viewing store locations or maintenance routes.

Note: For a description of how to use a raster image as the base layer and detailed backdrop for your other map layers, see [Using Raster Images as a Backdrop for MapInfo Pro Maps](#).

Accessing Web Services in MapInfo Pro

There are several ways to access web services from MapInfo Pro:

Open a WMS table:	HOME/TABLE/MAP/LAYOUT Open Mapping (WMS)	
Open a WFS table:	HOME/TABLE/MAP/LAYOUT Open Feature (WFS)	

Open a WMTS table:	HOME/TABLE/MAP/LAYOUT Open Mapping (WMTS)	
Find an address:	MAP Selection Find Find Address	
Geocode addresses using a server:	TABLE Geocode Geocode Geocode using Server	
Create a driving region:	SPATIAL Create Driving Regions (Objects)	
Set preferences for web services:	PRO Options Web Services	
Search a Catalog Service for the Web (CSW):	HOME Open Catalog (CSW)	

Web Service Authentication

A web service, such as a WFS, WMS, WMTS, geocoding server, routing server, or tile server, may require authentication in the form of a user name and password.

Server-Side Authentication

You can access WFS, WMS, and tile servers that require basic authentication using the built-in standard mechanism for Internet servers. To connect to a web service that requires authentication, complete the **Connect** dialog box that displays.

Enter the appropriate user name and password and select the **Remember my password** check box to have the site "remember" your password for you. Click **OK** to enter the site. If you do not have a valid user name and password, you cannot connect to the site.

Accessing Secure Web Sites

SSL is an international standard security protocol for exchanging sensitive information between a web site and your computer. You know SSL-enabled sites by the https: address. When you connect to an SSL-enabled server, your computer and the server exchange digital certificates, which minimize

the threat of theft of sensitive data. If you try to connect to a server and you have a valid SSL certificate, you should be able to connect to the web site.

Proxy Server Authentication

Your local LAN may use a proxy server to connect to the Internet. Web client applications such as Internet browsers provide a mechanism for specifying a proxy server, and MapInfo Pro does as well. By default, MapInfo Pro uses your system settings-the same settings used by Internet Explorer-for a proxy server. Those settings can be accessed via the **Connections** tab under **Internet Options** in the Control Panel, or via the same dialog invoked in Internet Explorer on the **Tools** menu by clicking **Internet Options**. Ask your system administrator for the correct settings.

You can override these settings in MapInfo Pro via their Web Services preferences. On the **PRO** tab, click **Options**, and **Web Services**. The first tab in the **Web Services Preferences** dialog box displays Proxy Server settings.

There are several options for a proxy server.

- Use **System Settings** is the default option which uses the system settings for a proxy server, such as the same settings as Internet Explorer.
- Use **Direct Connection** bypasses any system proxy server settings and connects directly to the Internet. This option will only work if your LAN allows direct connections.
- Use **Proxy Server** also bypasses the system settings and allows you to specify a proxy server to use for MapInfo Pro. Ask your system administrator for the settings to use.

If you do use a proxy server to connect to the Internet, the proxy server may also require authentication in the form of a user name and password. Your system administrator should tell you what these are. If a user name and password are required, you will be prompted for them via a dialog when MapInfo Pro attempts to connect to the Internet, such as when drawing a tile server layer.

Enter the appropriate user name and password. You may also choose the **Remember my password** check box so the system will remember these values between sessions of MapInfo Pro. Within a session you should only need to specify the user name and password once.

You can set automatic authentication for a proxy server when accessing Bing Map, Move Map, and the Web Feature Service (WFS). For details, see [Single Sign-On Credentials for Proxy Servers Accessing Map Services](#).

Single Sign-On Credentials for Proxy Servers Accessing Map Services

You can set automatic authentication for a proxy server when accessing Bing Map, Move Map, and the Web Feature Service (WFS).

MapInfo Pro supports single sign-on authentication with proxy servers while accessing tile map services, such as Bing Map. MapInfo Pro signs on to the proxy server for you by automatically passing your Windows Authentication credentials (your Windows user name and password), so that you do not have to type your proxy user name and password.

Support for single sign-on authentication for proxy servers is in addition to our existing support for basic authentication for proxy servers. If you have your proxy server set up with basic authentication, then you still need to enter a user name and password. For automatic authentication, you must have NTLM, Kerberos, or Negotiate authentication set up on the proxy server, and your proxy access credentials must be the same as your Windows Authentication credentials.

This single sign on experience does not apply to Tile Server authentication when the Tile Server you are using requires you to sign on before accessing map tiles.

Note: Microsoft ISA and TMG Proxy servers use Negotiate authentication when authentication mode is set to **Integrated**.

Setting the Proxy Server Preferences

To set your proxy server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **Proxy** tab, set your preferences for the server:
 - **Use System Settings** - Click to use the LAN settings in the system registry. This is the default preference.

You can review the current LAN settings in the **Control Panel**. On the **Start** menu, click **Control Panel** and type *Internet Options* in the **Search** box. In the search results, click **Internet Options**. On the **Connections** tab, click **LAN Settings**.

- **Use Direct Connection** - Click to override the system LAN settings and try to connect directly to the Internet (not through a proxy server).
- **Use Proxy Server** - Click to set and use the proxy server settings to connect to the Internet. Ask your system administrator for the settings to use.

If you use a proxy server to connect to the Internet, the proxy server may require authentication in the form of a user name and password. Your system administrator should tell you what these are. If a user name and password are required, you are prompted for them via a dialog when MapInfo Pro attempts to connect to the Internet, such as when drawing a tile server layer. Within a session you only need to specify the username and password once.

- **Settings** - Click to set the proxy server options. See [Setting the Custom Proxy Server Preferences](#) for instructions on completing these settings.
3. Click **OK** to close the dialog and save your settings.

Working with a Web Feature Service (WFS)

Introduction

MapInfo Pro provides a Web Feature Service (WFS) client to retrieve geospatial GML data (Geography Markup Language) using HTTP GET and HTTP POST requests over the Internet or through a private intranet. The WFS client was developed in accordance with the 1.0.0, 1.1.0 and 2.0 OpenGIS® Web Feature Service Implementation Specifications, which are available online at:

<http://www.opengeospatial.org/standards/wfs>.

The WFS client supports GML 2 and GML 3. The client returns GML 3 by default when using WFS 2.0 or 1.1.0, and returns GML 2 when using WFS 1.0.0. The OGS WFS Specifications state that all servers should support GML2, but may also support other formats. The server provides information on the formats available, and the client makes the request for the data in the format it can use. If the server does not support GML 2 or GML 3, it will not be supported by the MapInfo WFS client.

Note: Using this client you cannot retrieve data from sites that are compliant with earlier or later versions of the OGC specification.

WFS is similar to WMS (Web Mapping Service), in that both can provide geographic data via the Internet. But while a WMS server provides raster maps, a WFS server provides raw coordinate data that the client uses to produce a map.

A WFS request contains a description of query operations that can be applied to one or more features. The client generates the request and posts it to a WFS using HTTP. The web feature server then reads and executes the request.

The **GetCapabilities** operation queries the WFS server for capabilities. Then the MapInfo Pro WFS client can generate a query appropriate for the WFS server and table.

Each table in the WFS server can result in a single MapInfo table. The mapping is always 1-to-1 (unlike WMS, which is many-to-1). The TAB file retrieved from a WFS server resembles a read-only DBMS linked table. It contains a MAP file and a DAT file, and acts like a read-only native table. Information is stored so that the table can be refreshed from the WFS server. GML does not contain any style information. You can provide style information to associate with a particular WFS table.

The sequence of actions can be summarized as follows:

1. After sending a **GetCapabilities** request to a WFS server, the server returns a list of WFS layers (FeatureTypes) that it can provide.

2. The user picks a WFS layer to fetch from the server, MapInfo Pro then sends a **DescribeFeatureType** request to the server. This response is an XML schema that describes the feature.
3. The user can then select which columns and/or rows to fetch.
4. MapInfo Pro sends a **GetFeature** request to the WFS. If the user did not select a subset of columns, all columns will be requested by default.
5. The response is a GML document containing the feature collection. Each feature represents one "record" in the MapInfo table.

There is a list of WFS servers in the client to help you get started in using this functionality.

Note: Since the data you retrieve using the WFS is remote, it may change from time to time. You can refetch your WFS data manually using the refresh process (see [Refreshing your WFS Data](#)).

Before You Begin

WFS Server Requirements

You must have a working Internet connection whenever you retrieve WFS data. To display GML data correctly in the MapInfo Pro Web Feature Service, the server you are requesting information from must:

- **Support versions 1.0.0, 1.1.0, or 2.0 of WFS.** The MapInfo Pro WFS client sends the initial GetCapabilities request and specifies the highest version that the server supports (unless version 1.0.0 is set in MapInfo Pro as a preference). If the server you are requesting information from does not support 2.0, 1.1.0, or 1.0.0 MapInfo Pro cannot use that server and no further operations are allowed.
- **Respond to GetCapabilities request using HTTP GET in XML.**
- **Respond to the GetFeature request by returning GML.** By default a WFS 2.0 or 1.1.0 server will return GML 3. The server's GetCapabilities response should include this information. If the server does not claim to use GML 3 as the Result Format for GetFeature, then MapInfo Pro cannot use the server and no further operations will be allowed.
- **Conform to the OGC GetCapabilities schema.** If the server GetCapabilities response does not conform to the schema, MapInfo Pro may not be able to read portions of it. This may mean that MapInfo Pro misses items that the server is trying to communicate, such as feature types (tables), or filters. In some cases, MapInfo Pro will not be able to deal with the server, since necessary information cannot be found. In other cases, MapInfo Pro may miss functionality that the server is trying to provide, such as filters.
- **Support HTTP GET and/or HTTP Post for the DescribeFeatureType and GetFeature requests.** The MapInfo Pro client supports both HTTP GET and HTTP POST. The server should advertise what it accepts for each request in its GetCapabilities response. MapInfo Pro prefers HTTP POST

for both operations, so if the server advertises that it supports both HTTP POST and HTTP GET methods for these operations, MapInfo Pro uses HTTP POST.

- **Supply the URL for both the DescribeFeatureType and GetFeature in their GetCapabilities response.** The URL provided must be valid for that request. If the server provides an invalid URL, MapInfo Pro's WFS client cannot work and displays a suitable error message.

The DescribeFeatureType response should be:

- **An XML Schema that contains the information for the table specified only.** If the server returns a schema that contains descriptions for multiple tables, MapInfo Pro cannot parse it correctly, and the operation will fail.
- **A Valid XML Schema.** If not, no further operations can be allowed for that feature type. Without a valid schema, MapInfo Pro cannot create or populate the table. In this case you can either select another table, select another server, or cancel the **WFS** dialog box.

Note: MapInfo Pro may not handle schemas that are "well formed" but contain invalid XML.

MapInfo Pro checks that the schema returned for DescribeFeatureType is well formed XML, but does not validate the XML. Our WFS client works correctly with many servers that return schema's which contain invalid items. We thought that eliminating these servers, because they did not contain 100% valid XML, was too limiting.

Note: MapInfo Pro cannot successfully handle schemas that contain invalid items, such as an invalid character in an element name; For example, "City Type" where the space in the element name is not valid XML.

While MapInfo Pro may be able to process a schema that contains well-formed but invalid XML, this may cause problems elsewhere, such as during the GetFeature processing. This may cause some confusion. If the XML returned during GetFeature does not match the schema, MapInfo Pro may create an empty table without displaying an error.

MapInfo Pro:

- **Supports all row filters that the server advertises in the GetCapabilities response with the following constraints:**
 - The filters are OGC-defined filters as specified in the OGC WFS Specification or the OGC Filter Encoding Implementation specification.
 - The filter takes zero (0) or one (1) arguments beyond the column name. This is a user interface constraint. MapInfo Pro's interface is unable to address such filters. This includes the **A Between** filter, which requires two (2) values.
- For WFS 1.1 and 2.0, the only spatial filter that MapInfo Pro supports is BBOX (bounding box).
- **Supports MaxFeatures, but not all WFS servers support this option.** While the OGC WFS Specification states that the server should implement this option, some servers ignore MaxFeatures. For WFS 1.1 and 2.0, the server may specify a default MaxFeatures. If that is the case, the field in the dialog is pre-populated, and that is the number of records returned by default.
- MapInfo Pro does not support the WFS 2.0 Response Paging feature.

- **Treats the Geometry column as mandatory.** While you can filter specific columns, MapInfo Pro always requests the Geometry column from the server. Many servers seem to treat the Geometry column as mandatory and return this column whether it is requested or not.

Note: The GML returned during the GetFeature request should validate against the schema returned during the DescribeFeatureType request. If this is not the case, then MapInfo Pro may not be able to create a table.

If a MapInfo WFS table is open, the user interface automatically enables the refresh process. During the refresh process, you cannot change the query that is sent to the WFS server. The data will be refetched from the server using the original query. This refreshed information can then be saved to the table.

How to determine which version of WFS you are using

Since there is a version negotiation process between the Web Feature Service (WFS) server and MapInfo Pro, It is not always clear what version of WFS is in use with the server. To determine the WFS version in use:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Feature (WFS)**.
2. In the **Open WFS Table** dialog box, click **Details**.
3. In the **WFS Server Details** dialog box, the **Version** section provides the version number of the WFS server.

The **WFS Server Details** dialog box provides information for the server URL location, name, and version number. If the server has an abstract, then there is also a brief description of the server's purpose.

Setting the WFS Server Preferences

MapInfo Pro has software preferences that let you:

- Use a WFS Refresh option to retrieve updated GML information from the web feature service pertaining to the current layers.
- Set the default WFS timeout values (in seconds) for the WFS servers you use. You can set per-server defaults based on particular WFS servers in the **Override Timeout Values** section of the **WFS Services Preferences** dialog box.
- Add, edit, and delete WFS servers.

To set your WFS Server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WFS** tab, set your WFS refresh, timeout, and server options.
 - **Update Mapper Filters with Current Mapper** – Select this check box to use the current filter settings to refresh the **Map** window. If you select this check box and the table has already been refreshed, the current bounds of the front-most **Map** window are used. If the check box is

cleared and the table is refreshed, the bounds of the **Map** window (at the initial WFS request) are used.

Note: The original map bounds are used, regardless of the current **Map** window bounds.

- **Connect Timeout** – Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
- **Send Timeout** – Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
- **Receive Timeout** – Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
- Click the **Servers** button to display the **WFS Servers List** dialog box, where you can add, edit, and delete WFS servers.

3. Click **OK** to close the dialog and save your settings.

See Also:

[Setting Your Directory Preferences](#)

Retrieving Map Data from a WFS

For existing WFS-T users, MapInfo Pro continues to support WFS-T when using WFS 1.0. To set a preference to continue using WFS 1.0 and continue supporting WFS-T, do the following:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. Select the **WFS** tab and then click **Servers**.
3. In the WFS Servers List, highlight the server you are working with (a check mark displays beside the server name in the list) and then click **Edit**.
4. In the **WFS Server Information** dialog box, select **Prefer Version 1.0**.

Existing WFS-T users should choose **Prefer Version 1.0** to continue to use WFS-T with the servers you are using.

5. Click **OK** to save this setting.

After selecting **Prefer Version 1.0**, MapInfo Pro communicates with the WFS server using WFS 1.0. If the server does not support 1.0, but does support other versions, then MapInfo Pro switches to another version that both the server and MapInfo Pro support (such as 1.1 or 2.0).

If you select the **Automatic** option instead of the **Prefer Version 1.0** option, MapInfo Pro communicates with the server using the highest version of WFS that both MapInfo Pro and the server support.

Adding a WFS Server

If you do not see the server you are looking for in the **WFS Servers List** dialog box, you can add a server.

1. On the **PRO** tab, click **Options**, and **Web Services**.
2. In the **Web Services Preferences** dialog box, select the **WFS** tab.
3. Click **Servers** to open the **WFS Servers List** dialog box.
4. Click **Add** to open the **WFS Server Information** dialog box.

In the **WFS Server Information** dialog box you can add the new web server address and description in the fields provided. This same dialog box opens when you click the **Edit** button in the WFS Servers List.

5. Enter the WFS server's URL in the **Server URL** field.

Click **Test URL** to ensure that MapInfo Pro can locate the server.

Click **Get Description** to get the server-provided description, or enter your own description.

Click **OK** when you are finished, to save your changes and close the **WFS Server Information** dialog box.

6. In the **WFS Servers List** dialog box, click **Set Default** to select a default server in the list.

The default server will be selected the next time you open the **Open WFS Table** dialog box.

When you set a default WFS server, a check mark appears beside it. If you do not select a default server, MapInfo Pro displays the first server in the list when you begin your WFS Server session.

7. When you have completed your work in the WFS Servers List, click **OK** to return to the **Web Services Preferences** dialog box.

To edit a WFS server, select the server from the **WFS Servers List** dialog box and click **Edit** to open the **WFS Servers Information** dialog box. From here you can test the URL and get detailed information on the server.

Removing a WFS Server Entry

To remove a WFS Server from the WFS Servers List:

1. Click the WFS server entry you want to remove from the list.
2. Click the **Remove** button to remove the entry you selected.

CAUTION: When you click the Remove button, MapInfo Pro removes the server entry that is highlighted from the list without prompting you to reconsider. Make sure you are ready to remove the entry from the list before selecting the Remove button.

3. Click **OK** to save your changes and return to the **WFS Servers** List.

Accessing WFS Data

To open a Web Feature Service table:

1. On the **HOME** or **TABLE** tabs, on the **Open** list, click **Feature (WFS)** to open the **Open WFS Table** dialog box.
2. Select a server from the **WFS Server** drop-down list to see the WFS layers that are available.

Note: The WFS Servers that display in the **WFS Server** list are based on a list we have compiled for you. Precisely has no control over the availability of these servers at any given time. The availability of WFS data depends upon the status of the server and the status of the maps on those servers. You can customize this list to suit your needs.

To see the details of a particular WFS Server, including the Server URL, the Server Name, version, and usually a server supplied description, click **Details**.

3. Select a layer in the **WFS Layers** list.
4. Take note of or change the path and file name in the **Table Filename** field. This is where MapInfo Pro will save the layer as a .TAB file.
5. Click **OK** to save the layer as a .TAB file, so that you can work with it in MapInfo Pro.

If you do not see the server you are looking for in the **WFS Server** list, click the **Servers** button to display the **WFS Servers List** dialog box.

The check mark to the left of the server description indicates the default WFS server, which is selected when you first launch **WFS**. You can also choose **Set Default** to change the default WFS server. If you do not see the server you are looking for, you can add a server. See [Adding a WFS Server](#).

Note: If you work with a non-default WFS server, MapInfo Pro remembers that new server for the rest of the session and uses it when you return to the **Open WFS Table** dialog box.

Applying a Coordinate Order Override to Correct how Objects Display on the Map

After creating a Web Feature Service (WFS) table, the geographic objects might not be located properly or rotated 90 degrees due to the coordinate order. If this occurs, you can use MapInfo Pro to override coordinate order at either the server or table level when working with WFS 2.0 and 1.1 servers.

Applying a Server Override

If the coordinate order is incorrect for a WFS table retrieved from a server, then it may also be incorrect for other tables retrieved from that server. In this case, you can override the coordinate order at the server level.

Note: Information about WFS servers is stored in a file called MIWFSServers.xml. By default this file is located in the %APPDATA%\MapInfo\MapInfo\Professional\<versionum> folder. More information on where this file is located can be found in *Advanced Configuration Options for System Administrators* in the *MapInfo Pro Install Guide*.

You can make changes to the XML file in an XML editor, and then restart MapInfo Pro to apply the changes.

In the MIWFSServers.xml file, each server specification begins with a <Server> node. This node will have child nodes for the URL <HTTP> and a description <Description>. There may also be other child nodes as well. To override the coordinate order for a server, you will add a new child node <OverrideCoordinateOrder> with the value **true**.

For example:

```
<Server>
  <HTTP>server URL</HTTP>
  <Description>server description</Description>
  <OverrideCoordinateOrder>true</OverrideCoordinateOrder>
</Server>
```

If you have a local copy of the table you can refresh it, or download the table again, to apply the coordinate order override.

Applying a Table Override

If the coordinate order is incorrect for only some tables retrieved from a server, you can apply a coordinate order override at the table level instead of at the server level. A clause has been added to the MapBasic **WFS Refresh Table** statement so you need not edit an XML file to apply the override. This command can be issued via the **MapBasic** window or can be included in a MapBasic application. The syntax is:

```
WFS Refresh Table alias [Override Coordinate Order { On | Off } ]
```

The new clause can be used in conjunction with other optional clauses on the **WFS Refresh Table** command, for example, the **Using Map** clause.

Testing the Coordinate Order of a WFS Table

Before applying any spatial filters, you can download a table to see if the data is in the correct coordinate order. If the data on the WFS server contains thousands of records, use the Max Features preference described under [Setting the Number of Records \(Features\) that a WFS Server Returns](#) to limit the number of records that the server returns. This lets you test a small subset of the data and avoid long download and processing times. If the coordinate order is incorrect, then on the **TABLE** tab, in the **Maintenance** group, click **WFS Refresh** to fetch the data switching the coordinate order.

Once you are happy with the coordinate order, on the **TABLE** tab, in the **Maintenance** group, click **WFS Table Properties** and disable or change the **Max Features** value and add a spatial filter.

Changing a WFS Coordinate System

The **Projections** button is enabled *only if* the projection provided by the WFS server cannot be properly interpreted by the WFS client. If the projection provided by the WFS server can be properly understood, this button will be disabled and can be ignored.


If the Projections button is active, you must use it to specify a known projection from the list of supported projections so that the GML image can be imported correctly. Select the coordinate system that you believe matches to the data returned by the server.

1. After selecting a layer in the **WFS Server Properties Map** dialog box, click **Projection** (if the button is enabled) to display the **Choose Projections** dialog box.
2. From the **Choose Projection** dialog box, select the **Category** and **Category Member** that corresponds to the projection of the returned data. Click **OK** to return to the **WFS Server Properties Map** dialog box.

Working with WFS Data

Saving to a TAB file

Use the **Table Filename** field to specify the name and path that you want to save the GML data to, once it is retrieved. The default is the selected layer's given name with the .TAB extension. You may wish to change this and give the table a more meaningful file name. The default directory is determined by the preference (on the **PRO** tab, click **Options**, and **Directories**, and then locate **WFS Tables**

in the list). You can select the  button to open a dialog box that allows you to specify a file name and navigate to a folder.

Use the **Use Preferred View** field to indicate where and how you want to display the retrieved data. Options include: **Automatic**, **Browser**, **Current Mapper**, **New Mapper**, and **No View**. **New Mapper** is the default selection.

Opening WFS .TAB Files

Opening a previously saved WFS TAB file is similar to the instructions under [Accessing WFS Data](#).

1. On the **HOME** tab, in the **File** group, click **Open**, and **WFS**.
2. Select a server to work with from the **WFS Server** list.
3. Select a layer from the **WFS Layers** list box.
4. Click **OK**.

Note: Accessing WFS layers requires a working connection to the Internet or intranet.

Using Spatial Row Filters to Limit the Size of Data from the WFS

One of the main purposes of spatial filtering is to limit the size of the data that the WFS server returns, because large amounts of data can take a long time to download and process. After downloading a smaller subset of data to MapInfo Pro, you can use a local query to obtain the exact subset of data you need.

MapInfo Pro sends spatial row filters with geometry to the server. If a server does not follow the OGC specification regarding coordinate order, then MapInfo Pro uses the overrides as discussed under [Applying a Coordinate Order Override to Correct how Objects Display on the Map](#). When opening a table for the first time, MapInfo Pro uses any override that exists from the MIWFSServers.xml file for that server. If no Table XML file exists yet to retrieve an override from, then you can add the table override via the WFS Refresh Table command (as described under [Applying a Coordinate Order Override to Correct how Objects Display on the Map](#)).

When using a WFS 2.0 or 1.1.0 server, MapInfo Pro only supports the BBOX spatial filter (with WFS 1.0.0, it uses any filter). A WFS 2.0 or 1.1.0 server defines the types of GML (Geographic Markup Language) Geometry objects that it supports. That list is limited to a predefined subset of all GML Geometry types. The GML Geometry type that maps closest to MapInfo Pro's region (MultiSurface) and polyline (MultiCurve) object type are not part of this predefined list, so MapInfo Pro uses the BBOX spatial filter.




The BBOX filter is useful with complicated spatial queries, such as when you want all of the data that is within a region. For this query, you would pick the region and do a BBOX filter. This returns data that is outside of the region, but it is less data than everything that is outside the region. When this data is in MapInfo Pro, you would then do a query to get everything that is inside the region.

There are no limitations on WFS 2.0 and 1.1.0 for non-spatial row filters.

Editing WFS Layer Settings

The styles are initialized to the default object styles, which are set on the **PRO** tab, by clicking **Options**, and **Styles**. You can change the object styles as shown in the following steps. Objects in the created WFS table use the established styles.

To change the styles used in WFS layers:

1. From the **WFS Server Properties Map** dialog box, click  to open the **Symbol Style** dialog box. From here you can change the font, point size, symbol, color, and other attributes of the symbol.
2. Click  to open the **Line Style** dialog box. From here you can change the style, color, width, and other attributes of the line style.
3. From the **WFS Server Properties Map** dialog box, click  to open the **Region Style** dialog box. From here you can change the fill and border attributes of the region style.

Setting the Number of Records (Features) that a WFS Server Returns

A WFS server can limit the number of records it returns to a client (such as MapInfo Pro) by using a default setting called **DefaultMaxFeatures**. If a server does not limit the number of records it returns, so that it returns all of the records from a layer, then you can specify the number it returns.

You would limiting the number of records (features) to reduce the time it takes to download and display a table when a table is very large (and contains many features). This lets you quickly judge the value of the data. However, you cannot control which features are downloaded.

Note: While, the OGS WFS Specification mandates that WFS servers must support Max Features, some WFS servers do not seem to support it.

To specify the number of records that a WFS server returns:

1. On the **HOME** or **TABLE** tabs, on the **Open** list, click **Feature (WFS)**.
2. In the **Open WFS Table** dialog box, select the server from the **WFS Server** drop-down list.

To add the server to the list, click **Servers**.

3. If the **Max Features** check box is enabled, then select it and enter the number of records you want the server to return.

If the **Max Features** check box is disabled, then you cannot specify a Max Features value for this server. The WFS server has set the maximum number of records it will return and the field beside the check box shows the maximum number that the server has set.

4. Click **OK**.

Refreshing Your WFS Data

The WFS Table Properties give you more control over refreshing your WFS table and allow you to change the original retrieval options and filters.

To refresh the currently selected WFS table using the new retrieval options:

1. On the **TABLE** tab, in the **Maintenance** group, click **WFS Table Properties**.

If more than one WFS table is open, a **Select WFS Table** list opens. Select the table you want to refresh and click **Select**.

2. In the **WFS Table Properties** dialog box, make your changes to the column filter (click **Column Filter**), the server time outs (click **Server**), and the object styles following the typical behavior for these entries.
 - Click **Server** to change server time outs and the server description.
 - Click **Column Filter** and **Row Filter** to change retrieval options. When you change the **Column Filter** options, you can also change the **Preferred View** options. (The Preferred View drop-down list enables.)

- Select the **Max Features** check box to change the number of maximum number of features (records) that the server returns. For instructions, see [Setting the Number of Records \(Features\) that a WFS Server Returns](#).
- Click the buttons in the Object Styles pane to change the styles of the refreshed table.

Note: If the **Projection** button is enabled, then the projection of the WFS is unsupported, choose another projection from the list.

3. Click **OK** to save your changes.

You can also refresh your WFS data automatically by selecting the Auto Update check box in the **WFS Table Properties** dialog box. This would send a request to fetch features based on the following scenarios:

Auto Update: Select to send an automatic request to fetch features based on the following scenarios:

- Fetch all features (If the **Max Features** check-box is unchecked):
 - With Zoom-In there will be no automatic request to fetch records.
 - With Zoom-Out until the last fetched MBR is within the existing MBR, no request will be sent. Once the new view MBR is outside the last fetched MBR, an automatic request will be sent to fetch more features.
 - While Panning an auto request will be sent to fetch record if new view MBR is outside the last fetched MBR.
- Fetch limited features (If the **Max Features** check-box is selected):
 - While Zoom-in, Zoom-out and Panning, an auto request will be sent to fetch features based on the new view MBR.

Row Filter Options

If you select **Row Filter**, the **Row Picker** dialog box opens. You have the following options depending on whether you are working on objects on the **Map** window, or objects in a selection:

- Filtering objects on the **Map** window:

If the original display option for the Row Filter was the **Map** window:

- To refresh the row filter to display the object the way it did in the first retrieval, select **Previous Mapper**. This is the default option.
- If the original map that was used for selection has been zoomed or panned, select **Current Mapper** to ensure that all visible objects from the remote table display. If there is no current **Map** window, then this option does not display.
- To refresh the row filter option in a **Selection** window, select the **Selection** option. If there is no current selection, then this option does not display.

- Filtering objects in a selection:

If the original object display option for the Row Filter was Selection:

- To refresh the row filter to display the object the way it did in the first retrieval, select **Previous Selection** from the **Value** field. This is the default option.
- To retrieve a new set of objects from the WFS table into the current selection, select the **Selection** option. If there is no current selection, then this option does not display.
- To retrieve the objects specified in the row filter into the currently selected **Map** window, select the **Current Mapper** option. If there is no current **Map** window, this option does not display.

Once these options are set, click **OK** to save these refresh options. **WFS Table Refresh** will use the values that are set in **WFS Table Properties**.

Adding Column Indexes to WFS Tables

You can add an index to a WFS table so that you can perform Finds and other useful operations on WFS layers.

To create an index for a WFS table:

1. Open a WFS table from the **HOME** or **TABLE** tabs, on the **Open** list, by clicking **Feature (WFS)**.
2. From the **Open WFS Table** dialog box, select a layer you want for the new .TAB file and click **OK** to save it.
3. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Modify Table Structure**.
4. From the **Modify Table Structure** dialog box select the Indexed check box beside the column you want to index and click **OK**. You should select a column you want to use to perform the Find or other operation you are interested in.

Indexes will be automatically rebuilt whenever you refresh a WFS table because the data may be different after the refresh process.

Working with WFS Tables that have Nested Structures

Web Feature Service (WFS) table definitions can contain nested structures. The following example shows a **Parcel** table that contains a column called **Occupant**.

```
Parcel Information Table
  Street_Address
  City
  State
  Zip_Code
  Occupant
    Person
      Name_First
      Name_Last
      Age
```

The **Occupant** column refers to a structure or table called **Person**. The **Person** structure contains columns called **First_Name**, **Last_Name**, and **Age**. Depending on how the schema of the table is defined, the column (**Occupant**) can occur multiple times per row (record). To address nested

structures, the column names in WFS tables may use delimiters (such as Occupant/Person/Name_First), and may be lengthy.

MapInfo Pro has limitations on column names: it truncates column names that are longer than 32 characters, and it does not support the back-slash (/) character in column names (so it would not recognize Occupant/Person/Name_First as a valid column name). When MapInfo Pro encounters a WFS table with column names that conflict with these limitations, it uses the first and last names in the nested structure with a hash character (#) as a delimiter. As an example, MapInfo Pro creates the previous **Parcel** table with the following column names:

```
Street_Address
City
State
Zip_Code
Name_First#Occupant
Name_Last#Occupant
Age#Occupant
```

The hash character (#) in the column name indicates that it is a nested structure. If the data from the server contains more than one **Occupant** column per row, then MapInfo Pro brings in the last value it encounters.

MapInfo Pro ensures that all new column names are unique. If there are identical column names, then MapInfo Pro applies a numeric value as the last character of each of the identical column names (such as Age#Occupant1 and Age#Occupant2).

MapInfo Pro converts any unrecognized characters in a column name to an underscore (_).

The nested structure schema is more common among WFS 2.0 and 1.1 servers than WFS 1.0 servers. MapInfo Pro processes the schema for all the three servers WFS 1.0, WFS 1.1 and WFS 2.0, but only populates WFS 2.0 and 1.1 columns.

Overriding WFS Default Timeout Values Locally

To override the default timeout and pixel limit values for a WFS server:

1. From the **HOME** tab or **TABLE** tab, click the **Open** command drop-down arrow and choose **WFS** from the **Web Services** group.
2. In the **Open WFS Table** dialog box, click **Servers**.
3. In the **WFS Server List** dialog box, double-click the server (in the list) that you want to override the default timeout for.
4. In the **WFS Server Information** dialog box, select the **Override Default Values** check box and enter new override values (in seconds and pixels) for the server.
5. Click **OK** to save these values and close the dialog boxes.

Working with WFS-T Data

No Support for WFS-T with WFS 2.0 and 1.1

MapInfo Pro does not support Web Feature Service with transactions (WFS-T) for WFS 2.0 and 1.1. A WFS-T lets WFS clients apply edits (inserts, deletes, and updates) to the data in the source database through the WFS service. If you are using the WFS 2.0 or 1.1 protocol when communicating with a server, then you are unable to use a WFS-T.

For existing WFS-T users, MapInfo Pro continues to support WFS-T when using WFS 1.0. To set a preference to continue using WFS 1.0 and continue supporting WFS-T, do the following:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. Select the **WFS** tab and then click **Servers**.
3. In the WFS Servers List, highlight the server you are working with (a check mark displays beside the server name in the list) and then click **Edit**.
4. In the **WFS Server Information** dialog box, select **Prefer Version 1.0**.

Existing WFS-T users should choose **Prefer Version 1.0** to continue to use WFS-T with the servers you are using.

5. Click **OK** to save this setting.

After selecting **Prefer Version 1.0**, MapInfo Pro communicates with the WFS server using WFS 1.0. If the server does not support 1.0, but does support other versions, then MapInfo Pro switches to another version that both the server and MapInfo Pro support (such as 1.1 or 2.0).

If you select the **Automatic** option instead of the **Prefer Version 1.0** option, MapInfo Pro communicates with the server using the highest version of WFS that both MapInfo Pro and the server support.

Use WFS-T by Setting a Preference to use WFS 1.0

To set a preference for WFS 1.0 to continue using WFS-T, do the following:

1. On the **PRO** tab, click **Options**, and **Web Services**.
2. In the **Web Services Preferences** dialog box, select the **WFS** tab and then click **Servers**.
3. In the WFS Servers List, highlight the server you are working with (a check mark displays beside the server name in the list) and then click **Edit**.
4. In the **WFS Server Information** dialog box, select **Prefer Version 1.0**.

Existing WFS-T users, should choose **Prefer Version 1.0** to continue to use WFS-T with the servers you are using.

5. Click **OK** to save this setting.

After selecting **Prefer Version 1.0**, MapInfo Pro communicates with the WFS server using WFS 1.0. If the server does not support 1.0, but does support other versions, then MapInfo Pro switches to another version that both the server and MapInfo Pro support (such as 1.1 or 2.0).

If you select the **Automatic** option instead of the **Prefer Version 1.0** option, MapInfo Pro communicates with the server using the highest version of WFS that both MapInfo Pro and the server support.

Saving Data Changes to the WFS-T Server

If several groups are working with a single dataset, or you are building a centralized database of web-based map data, you may be using a Web Feature Service with transaction (WFS-T) server to manage that data. You can use MapInfo Pro to insert, update and delete records to and from a WFS transaction server. Users familiar with the Linked Tables functionality will find this work flow similar.

MapInfo Pro continues to support WFS-T when using WFS 1.0. You must specify that you prefer to work with WFS 1.0 servers by setting a preference in MapInfo Pro. How to do this is described under [Use WFS-T by Setting a Preference to use WFS 1.0](#).

MapInfo Pro does not support Web Feature Service with transactions (WFS-T) for WFS 2.0 and 1.1. If you are using the WFS 2.0 or 1.1 protocol when communicating with a server, then you are unable to use a WFS-T.

To retrieve layers from a WFS-T server and save your edits back to the server:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Feature (WFS)** to open the **Open WFS Table** dialog box.

If the WFS server accepts transactions, the **Allow Edits** check box enables.

2. Select the layer you want to edit from the list and click **OK**.

MapInfo Pro retrieve the WFS-T server records you selected and creates a .TAB file.

3. Make your data edits in MapInfo Pro.

Your edits are made locally in the .TAB file.

4. On the **HOME** tab, in the **Output** group, click **Save** to save your changes to the server.
5. If there are no conflicts, your changes are saved to the server and a dialog box opens asking if you would like to refresh the WFS table.

Note: Features that have changed on the server since you retrieved your local copy may be locked and you cannot update them.

6. Click **Yes** to refresh your table with data from the server, or click **No** to leave the current data as it is.

When the transaction is complete, the WFS displays a message to show any records that were not saved to the server.

MapInfo Pro checks to see if there are data conflicts for the features you are updating or deleting. If the server cannot commit these changes due to data conflicts, an error displays to inform you of any failures and, if possible, the reason(s) for those failures. Follow the Conflict Resolution steps in [Resolving WFS-T Data Conflicts](#) to decide whether to overwrite the server changes with yours, leave the data on the server and lose your changes, or skip the record and maintain your edits locally.

For more information, see [What to Do if You Cannot Complete Transactions using WFS-T](#).

Resolving WFS-T Data Conflicts

If the data on the WFS server has changed since you downloaded it, you may not want to make your changes right away. The Conflict Resolution subsystem allows you to review the changes to be made so you can determine whether to upload your changes anyway or refresh your local layers with the server's changes.

To resolve conflicts with data on the server:

1. On the **HOME** tab, in the **File** group, on the **Open** list, click **Feature (WFS)**, and select a WFS table in the **Open WFS Table** dialog box.
2. Make your changes to the WFS layer and click **Save**. If a conflict exists, the **Resolve Conflicts** dialog box displays.

Here, you decide to overwrite the servers data with your data, use the data on the server instead of yours, or save your data locally and leave the server data as it is. You can choose to resolve conflicts **Automatically** or **Interactively**.

- **Automatic Conflict Resolution:** Use this method to treat all of the changes you have made the same way and either upload them and overwrite the server's data or save your changes locally and leave the server records as they are. This method is faster but less flexible.
- **Interactive Conflict Resolution:** Use this method to investigate each record in conflict and decide individually which records to overwrite and which records to leave as they are on the server. This method is slower but more precise.

Automatic Conflict Resolution Method: If you know you want to overwrite the server data with your edited data in all cases, or if you want to keep the server data as it is in all cases, click **Automatic**.

In the **Resolve Conflicts Automatically** dialog box, select either **Current MapInfo Values** or the **Current Server Values** and then click **OK**.

After your conflicts are resolved, click **OK** to confirm your choices. The application applies as many changes to the server as possible.

Interactive Conflict Resolution Method: Each record displays individually. For each record, do one of the following:

- To overwrite the server's data with your changes, click **MapInfo**.
- To maintain the server's data, click **Server**.
- To save this data locally and skip this record, click **Stop Commit**.

Stop Commit stops the entire "save to the server" process. That is, if you are working in Interactive Mode and you select **Stop Commit**, any changes you have accepted up to this point are saved locally but are not saved to the server. If you want to commit these changes to the server later, begin this process again.

After your conflicts are resolved, click **OK** to confirm your choices. The application applies as many changes to the server as possible.

What to Do if You Cannot Complete Transactions using WFS-T

There are some reasons why you may not be able to update your dataset on a WFS-T enabled server, and it is good to keep these in mind:

- **Server implements Lock Feature.** If the server implements the LockFeature operation, another user may have locked a feature you are trying to change. This LockFeature prevents you from overwriting the other user's work. You can wait until the lock is cleared to update the server.
- **Server does not conform to standards.** Not all WFS servers support transactional capabilities. If the WFS-T server does not conform to the OGS specifications, MapInfo Pro may not be able to transact data with it. This is likely a permanent failure, until the WFS-T server conforms to the OGS standard.
- **Server is down.** You cannot connect to a server that is not on-line. When this occurs, the best practice is to wait until the server is available again to complete your transaction.

Who can Read .TAB Files Created using WFS-T

At Precisely, we try to keep .TAB files as backwardly compatible as we can to preserve your investment in our product. Some of the changes to the WFS-T do not allow us to do this for MapInfo Pro. These are the cases and their file format requirements.

If You open a WFS-T Layer and	Is this Table Compatible with Previous Versions of MapInfo Pro?
Save it locally and do not select the Allow Edits check box	Yes , previous versions can read this .TAB file
Make changes and commit them to the WFS-T server	Yes , previous versions can read this .TAB file
Make changes and do not commit them to the WFS-T server	No , version 9.5 and later cannot read this .TAB file

Note: If you edit a .TAB file with WFS-T data in it, you cannot open that .TAB file with an earlier version of MapInfo Pro.

Working with a Web Map Service (WMS)

Introduction

Web Services can provide more data for you to work with in MapInfo Pro. A Web Map Service (WMS) allows you to access maps and data through your local intranet or the Internet. This innovation is based on a specification from the Open GIS Consortium (OGC) that allows you to use raster map images from servers that also comply with the specification. You must specify the coordinate system within your data request to ensure that the images you retrieve "sync up" or register with your other map data.

Note: The WMS sites that we include in this documentation or in the standard installation of MapInfo Pro have been verified as part of the testing process. We cannot guarantee that these sites will remain active, only that they were active as of this writing.

Before You Begin

Supported Image Formats for WMS

MapInfo Pro supports the following image formats for WMS:

- PNG
- JPEG (JPG)
- TIFF (GeoTIFF AND TIFF)
- GIF.

Note: Not every format will be available from every Web Map Service.

The OGC WMS specification supports transparent pixel definition for image formats. This allows you to use the images you retrieve as overlays and not solely as the bottom layer of your map.

To set the background to transparent, click the **Transparent** check box in the **Open WMS Table** or the **WMS Table Properties** dialog boxes. You can also control the transparency and translucency of the image by double-clicking the layer in the **Explorer** window. In the **Layer Properties** dialog box, on the and selecting the **Layer Display** tab, select the **Style Override** check box.

Setting the WMS Server Preferences

MapInfo Pro has software preferences that let you:

- Set the default WMS timeout values (in seconds) for the WMS servers you use.
- Set the maximum number of pixels (in width/height) that a map request is limited to.

You can set default values for a specific WMS server in the **Override Timeout Values** and **GetMap Pixel Limits** sections of the **WMS Server Information** dialog box.

To set your WMS Server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WMS** tab, set your WMS timeout values:
 - **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
 - **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
 - **Receive Timeout** - Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
3. Set your GetMap pixel limits:
 - **Max Width** - Max Width specifies the maximum number of pixels for a GetMap request in the X direction.
 - **Max Height** - Max Height specifies the maximum number of pixels for a GetMap request in the Y direction.

The GetMap request is designed to retrieve the highest resolution map image as is necessary to render the image on the screen, for a printer, or for an export file. This option prevents the request from going higher than the specified values. Different servers have different limits, so you can set the limit that works best for your environment.

Note: You can also use this option to shorten the WMS map retrieval time, but remember that the resulting image will display at a lower resolution.

4. Click **Servers** to open the **WMS Servers List** dialog box, where you can add, edit, and delete WMS servers.
5. Click **OK** to close the dialog and save your settings.

Unfortunately, servers do not report their limits to us, so if the GetMap request fails, it means that you have entered a value that is too large. There are large GetMap requests when you are printing or exporting windows containing WMS images. This happens because printing and exporting occurs at larger sizes and/or higher resolutions than on-screen display requires.

See Also:

[Setting Your Directory Preferences](#)

Retrieving Map Data from a WMS

Adding a WMS Server

To access a WMS server, you must add it to the list of available servers. We have entered some servers for you to get started with. We cannot guarantee that these sites will remain active, only that they were active as of this writing.

To add a WMS server:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WMS** tab, click **Servers** to display the **WMS Servers List** dialog box.
3. Click **Add** to display the **WMS Server Information** dialog box. Here you can add the new web server address and description in the fields provided.

Note: The **WMS Server Information** dialog box also displays when you click the **Edit** button in the WMS Servers List to allow you to change these entries.

4. Type the WMS's URL in the **Server URL** field. Click **Test URL** to ensure that MapInfo Pro can locate the server. Click **Get Description** to get the server provided description or type in a description.
5. If you know the connect times, send times, or receive times for this server are particularly long or unusually short, you may want to override the default values for this server.

Note: This step is not required.

To establish specific overrides for this server, select the **Override Default Values** check box and enter new values, as appropriate, in the following fields:

Connect Timeout – Indicates the amount of time (in seconds) allowed to establish an Internet connection request to a Web Map server. If the request takes longer than this value, a timeout occurs. The default connect timeout is 60 seconds.

Send Timeout – Indicates the amount of time (in seconds) allowed to send an Internet request to a Web Map server. If the request takes longer than this value, a timeout occurs. The default send timeout is 60 seconds.

Receive Timeout – Indicates the amount of time (in seconds) allowed to begin to receive a response from a request from a Web Map server. The download can take longer than the timeout, but the response has to occur within the timeout setting. The default receive timeout is 300 seconds.

6. If you want to limit the amount of time it takes to retrieve a map or if your map does not require a great deal of detail, you may want to override the standard number of pixels that are retrieved.

Note: This step is not required.

To establish specific GetMap Pixel limits, select the **Override Default Values** check box and enter new values, as appropriate, in the following fields:

Max Width – Specifies the maximum number of pixels for a GetMap request in the X direction.

Max Height – Specifies the maximum number of pixels for a GetMap request in the Y direction.

Note: To set the default GetMap Pixel limits for all WMS servers, see [Improving WMS Map Image Resolution](#).

7. When you have completed these selections or entries, click **OK**.

In the WMS Servers List, click **Set Default** to select a default server. The default server will be selected the next time you open the **Open WMS Table** dialog box. When you set a default WMS server, a check mark displays beside it. If you do not select a default server, MapInfo Pro displays the first server in the list when you begin your WMS Server session.

Note: If you work with a WMS server that is not the default, MapInfo Pro remembers that new server for the rest of the session and returns to it whenever you return to the **Open WMS Table** dialog box.

Editing the WMS Servers List

To edit the list of Web Map Services servers:

1. From the **Open WMS Table** dialog box, click the **Servers** button to display the WMS Servers List.
2. Click the **Edit** button and make the changes in the **WMS Server Information** dialog box.
3. If you change the URL in the **Server URL** field, click the **Test URL** button to ensure that MapInfo Pro can find the server.
4. Click **OK** to return to the WMS Servers list.

If you want the server you edited to become the default server, click the **Set Default** button. When you set a default WMS server, a check mark displays beside it.

Note: If you do not select a default server, MapInfo Pro displays the first server in the list when you begin your WMS Server session. If you work with a WMS server that is not the default, MapInfo Pro remembers that new server for the rest of the session and returns to it whenever you return to the **Open WMS Table** dialog box.

5. Click **OK** to return to the **Open WMS Table** dialog box.

Accessing WMS Data

Once you have added a WMS server, you can retrieve map data from it. Keep in mind that the maps you are looking for may not exist for your geography. Further, the data that is provided is determined by the server.

Note: The available data is determined by the WMS Server. MapInfo Pro does not have control over the data itself.

When you retrieve map data from a WMS server, you actually create a .TAB file from the WMS layer(s) that you select. And when you create a .TAB file from WMS layer(s), you are actually creating a pointer to an XML file that keeps track of the data you selected, i.e., the server address, the selected layer(s), the styles, the format, and the projection settings. You never actually retrieve the data and save it on your computer.

Every time you add a WMS table as a layer to your map or you change the view of the map, the system generates a map request and retrieves the layer information. To do this, the .TAB file points to an XML file which retrieves the information from the WMS Server and displays it on your computer.

Note: You cannot use the .TAB file in either of the following scenarios:

- If you are not connected to the Intranet or Internet;
- If the server is unavailable;
- If the WMS layer(s) you are retrieving are not available

To access WMS data and build a .TAB file:

1. On the **HOME** tab, in the **File** group, click **Open**, and **WMS** to open the **Open WMS Table** dialog box.
2. Click the **Move Up** and the **Move Down** buttons to arrange the layers appropriately.

Note: The WMS servers that display in the WMS Server list are based on a list we have compiled for you. Precisely has no control over the availability of these servers at any given time. The availability of WMS data depends upon the status of the server and the status of the maps on those servers. You can customize this list to suit your needs. To add a WMS server, see [Adding a WMS Server](#).

3. To work with the layers from a particular server, select a WMS server from the drop-down list.

To see the details of a particular WMS Server, including the Server URL, the Server Name, version, and usually a server supplied description, click **Details**.

If you do not see the server you are looking for in the WMS Server drop-down list, click the **Servers** button to display the WMS Servers List.

4. When you have completed your work in the WMS Servers List, click **OK** to return to the **Open WMS Table** dialog box.
5. Review the list of available layers for the server you selected and do one of the following:

- Double-click one or more layer(s) you want to retrieve in the WMS Layers list to move them to the right pane
- Click each layer you want to retrieve from the server and click **Add** to move them to the right pane

Note: The topmost layers display over the bottom most layers.

6. Decide how you want to use these WMS server layers and do one of the following:

- To create a single .TAB file with several WMS layers in it, select all of the layers for that .TAB file so they display in the right pane. Then organize them in the order you want them to display using the **Move Up** and **Move Down** buttons.
- To create individual .TAB files for the WMS server layers you want, select one layer at a time, select the appropriate Style, Format, and Projection options from their drop-down lists and save the .TAB file. Repeat this process for each layer you want to retrieve.

Using either method, you move the layer(s) you selected to the right pane. The Style, Projection, and Image Format information associated this layer or layers change to reflect either the attributes of the single layer or the attributes that all the layers have in common. We describe the process for changing and selecting these attributes below.

Note: To remove a layer from the list in the right pane, select the layer you want to remove and click the **Remove** button.

7. If there are styles associated with the layer(s) you selected, they display in the Style drop-down list. Styles indicate the visual display options available with this layer and are supplied by the web server. Initially, we display the selected layer in the server's default style. The style that displays pertains to the currently selected layer.

To change the style of a layer, click it in the left or right pane and select the style from the Style drop-down list. The styles you select for a layer do not pertain to any other layer in the list.

Note: You can also change these image display style attributes later. On the **Layers** window, right-click on the WMS layer and choose **Layer Properties**. In the dialog box you can change the image's translucency and transparency as well as other raster display properties available in MapInfo Pro.

8. Choose a format for the layer from the Image Format drop-down list. The options that display in this list may differ depending upon the formats the server supports and the formats we support. We support: PNG, JPEG (JPG), TIFF (GeoTIFF and TIFF) and GIF formats, in that order of priority.
9. To change the background options, specify them in the **Image Background** box. To make the background of your layer transparent, click the **Transparent** check box and select the color of the background. Click the **Color** button to display the list of colors.

Note: The more color depth the image has, the more difficulty you have isolating the background for transparency purposes. If you experience problems with transparency with one image format, try another, if it is available.


10. The Coordinate Reference System Projections drop-down list displays all of the projections that the selected layers have in common. This list is disabled when the selected layers do not have any projections in common. If the Projections drop-down list is disabled, you cannot make a map request. The SRS Code is still indicated when you select the **Show Projection Description instead of SRS** check box.

Note: Selecting the **Show Projection Description instead of SRS** check box may slow down performance.

Select the **Show Projection Description instead of SRS** check box to display the projection name. If you clear this check box, the SRS codes display instead.

Note: To enable this list, try removing layers one at a time to see if the problem is caused by layers not having projections in common.

11. To enter a name for this table, do one of the following:

- Click the  button at the end of the **Table Filename** field to display the **Please specify a TAB filename** dialog box. Select the path and type the file name in the **Filename** field and click **OK**.
- Type the path into the **Table Filename** field.

Note: There are three conditions that might prevent you from saving the .TAB file at this point. To save the .TAB file you must:

- Select at least one valid layer from the WMS Server list.
- Layer(s) must contain a supported projection.
- Type a valid .TAB file name.

12. Select the view for this map in the Preferred View drop-down list to determine where the WMS table should display after you open it. Options include: **Automatic**, **Current Mapper**, **New Mapper**, and **No View**.
13. Click **OK** to generate the WMS map request.

Once you have saved a WMS table name, you can change its WMS layer settings using the **WMS Table Properties** dialog box. To access this dialog box, on the **TABLE** tab, in the **Maintenance** group, click **Web Services**, and **WMS Table Properties**. When this dialog box displays, select the layer you want to edit the settings for that layer. You can also add, remove, and reorder the WMS layers, change the projection, image formats, and background options of the layers. Remember, you can edit the display attributes for the WMS table by clicking the **Style Override** swatch for the layer in **Layers** window.

Setting Projections

Default WMS Maps Display Projection

Many times, when you are retrieving a WMS map, you are adding it to enhance the detail of a **Map** window that you are already working on. We have changed the default behavior of the Projection drop-down box. Now, this list defaults to the projection that matches the front-most **Map** window, if that projection is available in the list.

But What if a WMS Definition Already Exists or I am not Working in a **Map** Window?

- If you are retrieving a WMS map and there was a previous WMS definition (or you are modifying a WMS map), MapInfo Pro uses the coordinate system that matches the current projection (not necessarily the **Map** window's coordinate system).
- If there was no previous WMS definition, the current **Map** window's coordinate system is selected if it can be found in the Projection list.
- If the **Map** window's coordinate system is not in the Projection list or you are retrieving a WMS map when you are not working in a **Map** window, MapInfo Pro tries to default to EPSG:4326.
- Finally, if none of these projections are found, the first item in the **Projection** list is selected.

Setting the Projection for WMS Layers

To set the projection for a WMS layer:

1. In the **Open WMS Table** dialog box, highlight a layer in the left or right pane and choose a projection from the Coordinate Reference System drop-down list.
2. If you set the projection for a layer in the left pane and then move it to the right pane that already contains layers, all the layers in the pane will be set to the new projection. Any changes to the projection for one layer affects all the layers.
3. If there are multiple layers in the right pane, the Coordinate Reference System Projections drop-down list displays only the projections that the layers have in common.
4. To change the projection for a WMS layer, on the **TABLE** tab, in the **Maintenance** group, click **Web Services**, and **WMS Table Properties**. Choose a new projection from the **Coordinate Reference System** drop-down list.

Projection Issues with WMS Map Data

The coordinate system used in the WMS map image is very important. It is what enables the WMS layer to match up with your other layers. Make sure you retrieve WMS Server images that you can use with the other maps you use. Keep in mind that the raster layer always determines the projection of the map. If there is more than one raster layer in a map, the largest raster layer determines the projection of the map.

When choosing the projection for a WMS map that is made up of several layers, the projection choices available to you will be only those that are common to all the layers.

WMS servers may offer data in projections that we do not support. Be sure to choose a supported projection.

Working with WMS Data

Opening WMS .TAB Files

To open a previously saved WMS TAB file:

1. On the **HOME** tab, in the **File** group, click **Open**, and **Table** to open the **Open** dialog box.
2. Browse to the folder directory where you have the TAB file saved.
3. From the **Preferred View** drop-down list, select the view you want of this data. MapInfo Pro remembers your selection and uses it for every subsequent selection until you change it.
 - **Automatic** - MapInfo Pro chooses the most appropriate view. If the data is mappable, such as when graphic objects are attached to the data, MapInfo Pro opens the table in a **Map** window. If you have a **Map** window displayed and the table you want to open is mappable, MapInfo Pro automatically opens the table in the current **Map** window. If the data is not mappable, MapInfo Pro will attempt to open the table in a **Browser** window. If the table cannot be mapped or browsed, MapInfo Pro opens the table using the **No View** option (no data is displayed).
 - **Browser** - MapInfo Pro attempts to open the table in a **Browser** window.
 - **Current Mapper** - MapInfo Pro attempts to add your data to the current **Map** window.
 - **New Mapper** - MapInfo Pro attempts to open the table in a new **Map** window.
 - **No View** - MapInfo Pro opens the table making the data available for other uses, but no data is displayed. You will see it in the **Tables** list in the **Explorer** window.
4. Click **Open**.

To create a WMS layer, and to save it as a TAB file, follow the instructions in [Accessing WMS Data](#).

Note: Opening a previously saved WMS TAB file requires a working connection to the intranet or Internet.

Changing the Layer Display Style

If there are styles associated with the WMS map data you wish to retrieve, they display in the Style drop-down list in the **Open WMS Table** and the **WMS Table Properties** dialog boxes. Styles indicate the visual display options available for a WMS layer and are supplied by the WMS server. Initially, MapInfo Pro displays the selected layer in the server's default style.

To change the style of a WMS layer, do one of the following:

1. Highlight the layer in the left or right pane of the **Open WMS Table** or **WMS Table Properties** dialog box and select the style from the **Style** drop-down list. The styles you select for a layer pertain only to that layer.

2. You can also change these image display style attributes later. In the **Layers** window, double-click the layer to open the **Layer Properties** dialog box. You can change the image's translucency and transparency as well as other raster display properties available in MapInfo Pro.
3. To set the image background to transparent, click the **Transparent** check box and choose a color in the image that will be made transparent.

Using the Info Tool for WMS Layers

The Info Tool provides **GetFeatureInfo** support for WMS. When you click on the WMS layer with the Info tool, information displays about the features of each layer that you have retrieved from a WMS server. By default, when you open a WMS layer and add it to a map, it is selectable when it meets the following criteria:

- The WMS server must support GetFeatureInfo.
- The WMS server must return GetFeatureInfo data in a format that is supported by MapInfo Pro. These formats are text/plain and the XML and GML formats returned by MapXtreme.
- The WMS servers must specify that at least one of the WMS layers within the WMS table can be queried.

The WMS layer is selectable by default. You can toggle it from the WMS layer in the Explorer window. This is useful when multiple WMS layer are open in the same mapper and you want to see feature info of a particular WMS layer. The selectable On/Off for respective layers will persist in a workspace.

The WMS layer can also be made selectable using the MapBasic statement:

```
set map layer layer_id selectable on
```

After making the WMS layer selectable, you can use the Info command (on the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info**). Information will be returned only from layers that you can query. The WMS table treeview in the **Open WMS Table** and **WMS Table Properties** dialog boxes display an Information icon next to layers that you can query to indicate that the Info tool will work on those layers.

The supported GetFeatureInfo formats include:

- HTML
- Text/plain
- Text/XML (as returned by WMS servers using MapXtreme Java Edition)
- Application/x-mapinfo-GML3 (as returned by WMS servers using MapXtreme)
- Application/x.cubestor-GML.1 (as returned by WMS servers using CubeWerx CubeSERV® WMS)
- Application/vnd.ogc.gml

In some cases, the WMS server may return an error when the user clicks on the map. Error messages are displayed in the info tool window itself. Examples of errors include:

- The WMS Server does not support GetFeatureInfo requests.
- The WMS Server does not return GetFeatureInfo data in a format supported by MapInfo Pro.
- There are no layers that you can query in the WMS table for the GetFeatureInfo request

- The WMS Server returned data in `<returned-format>` format rather than the requested format of `<requested-format>`
- Unable to retrieve feature information from the WMS Server.

Setting HTML as Preferred GetFeatureInfo Format

You can specify that the preferred format for GetFeatureInfo is HTML, provided the format is supported by the server. MapInfo Pro will launch the returned HTML data using the default **Browser** on your system. This data is formatted by the server in a manner that may be easier to read compared to the data in the Info tool.

MapBasic Syntax

You must enter a MapBasic command in the **MapBasic** window after the WMS table is created to specify that HTML is the preferred format when using the Info tool.

```
Set Table tablename Info Tool Prefer HTML { On | Off }
```

Note: The table must be of type WMS.

Specify **On** to make the preferred format HTML. Specify **Off** to return the default behavior.

Note: Changing the table setting to **Prefer HTML On** does not guarantee that the HTML format will be used. The WMS server must support this format.

This command will change the XML associated with the .TAB file for this WMS server. This is a one time task as long as you continue to use the file.

Correcting the Display of Web Map Service (WMS) Images

After creating a Web Map Service (WMS) table, the map image might not display or might be in the wrong location and distorted due to the coordinate order in use by the server. Coordinate values are listed in the axis order as specified by the referenced coordinate reference system (CRS). However, not all servers follow the Open Geospatial Consortium (OGC) Web Map Service Interface Standard. As a result, coordinates for coordinate systems, such as latitude/longitude systems, may be in reverse order from what is expected when retrieving or saving map images with a WMS server. If after creating a WMS table, the map image does not display or is in the wrong location and distorted, then you may need to override the coordinate order.

The following sections describe how to apply a coordinate order override and correct the display of WMS map images:

- **Applying a Coordinate Order Override to a WMS Table or Server**
- **Testing the Coordinate Order of a WMS Table**

For more information about the Open Geospatial Consortium (OGC) and Web Map Service Interface Standard, see <http://www.opengeospatial.org>.

Applying a Coordinate Order Override to a WMS Table or Server

After creating a Web Map Service (WFS) table, the map image might not display or might be in the wrong location and distorted due to the coordinate order. If this occurs, you can use MapInfo Pro to override coordinate order at either the server or table level when working with WMS servers.

Server Override

If the coordinate order is incorrect for a WMS table retrieved from a server, then it may also be incorrect for other tables retrieved from that server. In this case, you can override the coordinate order at the server level.

Note: Information about WMS servers is stored in a file called MIWMSServers.xml. By default this file is located in the %APPDATA%\MapInfo\MapInfo\Professional\<versionum> folder. More information on where this file is located can be found in *Advanced Configuration Options for System Administrators* in the *MapInfo Pro Install Guide*.

You can make changes to the XML file in an XML editor, and then restart MapInfo Pro to apply the changes.

In the MIWMSServers.xml file, each server specification begins with a <Server> node. This node will have child nodes for the URL <HTTP> and a description <Description>. There may also be other child nodes as well. To override the coordinate order for a server, you will add a new child node <OverrideCoordinateOrder> with the value **true**.

For example:

```
<Server>
  <HTTP>server URL</HTTP>
  <Description>server description</Description>
  <OverrideCoordinateOrder>true</OverrideCoordinateOrder>
</Server>
```

If you have a local copy of the table, download the table again to apply the coordinate order override. If you do not want to download the table again, you can use the Table Override described in the next section.

Table Override

If the coordinate order is incorrect for only some tables retrieved from a server, you can apply a coordinate order override at the table level instead of at the server level. When creating a WMS table you specify the name and location of the TAB file that contains some of the information about the table. Additional information is stored in an XML file with the same name and located in the same folder. You will need to edit this xml file.

The XML file for the WMS table has a <SRS> node with a value of the coordinate system code for the table. To override the coordinate order for the table, you must add an **OverrideCoordinateOrder** attribute with a value of **true** to this node.

For example:

```
<SRS OverrideCoordinateOrder="true">EPSG:4326</SRS>
```

To have the coordinate override take effect after changing and saving the XML file, close and re-open the WMS table.

Testing the Coordinate Order of a WMS Table

You can check a WMS table to see if the data is in the correct coordinate order using the MapBasic **TableInfo** function. This function includes an attribute called **TAB_INFO_OVERRIDE_COORDINATE_ORDER** (43) that returns **TRUE** when the table is a WFS or WMS table with the coordinate order override turned on. This command can be issued via the **MapBasic** window or can be included in a MapBasic application.

The syntax is:

```
TableInfo(MyWMSTable, TAB_INFO_OVERRIDE_COORDINATE_ORDER)
```

Where *MyWMSTable* is the name of the table you are checking the coordinate order for.

Improving WMS Map Image Resolution

To improve your control of the image resolution for WMS map images, you can set the GetMap request pixel limits both globally and locally. In this case, more pixels means higher resolution, but it also means slower access time. Because WMS servers are not required to specify pixel width and height limits in their capabilities documents, you will have to experiment with the pixel limits of a particular server to get the highest resolution you can. When you send a request that exceeds the server's pixel limit, the server usually issues an error indicating the maximum allowable image size. This will help you adjust the pixel limits for the server.

You can set a Web Services preference to set the pixel limits for all WMS images and you can override these limits by setting the per-server limits on an individual image basis. These options allow you to control the resolution of the WMS maps and limit the size of the maps you receive.

Setting the GetMap Request Pixel Limit Globally

You can set the GetMap request pixel limit globally to affect the resolution of the WMS maps you receive. Remember that increasing the pixel limit also means the retrieval process will take longer, but will produce better quality images. To override these default limits, see [Adding a WMS Server](#).

To set the GetMap request pixel limit globally:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. Select the options in this dialog box according to your needs.

WMS GetMap Pixel Limits

The GetMap Pixel Limits option represents the maximum number of pixels (in width/height) that a map request is limited to. The GetMap request is designed to retrieve the highest resolution map image as is necessary to render the image on the screen, for a printer, or for an export file.

This option prevents the request from going higher than the specified values. Different servers have different limits, so you can set the limit that works best for your environment.

Unfortunately, servers may not report their limits to us, so if the GetMap request fails, it means that you have entered a value that is too large for that server. Typically, large GetMap requests occur when you are printing or exporting windows containing WMS images. This happens because printing and exporting occurs at larger sizes and/or higher resolutions than on-screen display requires.

Max Width – Specifies the maximum number of pixels for a GetMap request in the X direction.

Max Height – Specifies the maximum number of pixels for a GetMap request in the Y direction.

3. When you have completed your selections, click **OK** to save them.

Note: The WMS GetMap Pixel limits listed in the **Web Services Preferences** dialog box can be overridden on a per server basis in the **WMS Server Information** dialog box. You can find these instructions in [Adding a WMS Server](#).

Controlling WMS Image Quality When Printing

You can set the GetMap request pixel limits in MapInfo Pro both globally and locally for WMS images. In this case, more pixels means higher resolution, but it also means slower access time. Because WMS servers are not required to specify pixel width and height limits in their capabilities documents, you will have to experiment with the pixel limits of a particular server to get the highest resolution you can. When you send a request that exceeds the server's pixel limit, the server usually issues an error indicating the maximum allowable image size. This will help you adjust the pixel limits for the server.

You can set a Web Services preference to set the pixel limits for all WMS images and you can override these limits by setting the per-server limits on an individual image basis. These options allow you to control the resolution of the WMS maps and limit the size of the maps you receive.

Working With a Web Map Tile Service (WMTS)

Introduction

A tile server is a server that contains a collection of raster tile images. The tiles cover a given place on the earth. Tiles are organized in a row/column grid fashion. There are also multiple levels of tiles. Each level represents a different resolution of data, covering the same place on the earth. The level determines the number of tiles (number of rows and columns). As you zoom in or out, the level of data may change. As you pan around, the specific tiles that are needed may change. A collection of tiles forms a **Tile Matrix** having an exact bounding box. And a collection of multiple tile matrices forms a **Tile Matrix Set** that has an optional approximated bounding box.

MapInfo Pro provides a Web Map Tile Service (WMTS) client that retrieves tiled mapping data through your local Intranet or the Internet. The MapInfo Pro WMTS client provides opportunities for handling server specific details such as available number of zoom levels, map projections, image formats, and tile sizes.

This Web Map Tile Service (WMTS) client is based on standard specifications from the Open GIS Consortium (OGC) and provides a performance oriented and scalable service. A WMTS server achieves this by using image caching strategies to serve pre-rendered georeferenced map tiles. For more information about OpenGIS WMTS implementation standard, refer to:

<http://www.opengeospatial.org/standards/wmts>.

A WMTS server can serve a single tile of a single layer of a map in one request. You cannot request a server to combine and return a map tile with information coming from more than one layer in a single fetching process. If you want multiple tiled map layers from the server, then you must make independent requests for each layer and then can combine or overlay the responses.

About Tile Server Tables and Map Layers

MapInfo Pro has a table for tile servers that consists of a TAB file and XML file. These files contain the information necessary to communicate with a tile server and retrieve tiles correctly. This information includes server URL, coordinate system and bounds, and other parameters for retrieving the proper tiles.

After opening a tile server table in MapInfo Pro, you can add it as a layer to a map. Tile server layers act as an underlying base map, so they are added to the bottom of the layer list by default. Tile server layers do not have attribute data, so they cannot be edited and labeled. They are meant to be used as backdrop images.

Tile Server Display Properties

Display properties can alter the appearance of the tiles returned from a tile server. Tile server images are rendered using the same display attributes as raster images. This includes:

- Translucency
- Transparency - on/off and transparent color
- Brightness
- Contrast
- Grayscale versus color

Tile Server Coordinate System and Reprojection

Tile server layers do not support raster image reprojection. This means that a map's coordinate system will be set to use the tile server coordinate system if a tile server layer is visible in a map. If the map displays tiles from two different tile servers in different projection systems, then MapInfo Pro uses the projection system of the tile that is most visible on the map.

You cannot change the map coordinate system when a map has an active tile server layer.

Before You Begin

WMTS Server Requirements

You must have a working Internet connection whenever you retrieve WMTS data. To display the data correctly in MapInfo Pro, the WMTS server you are requesting information from must adhere to the following server requirements:

- MapInfo Pro can access WMTS servers with version 1.0.0. The MapInfo Pro WMTS client sends the initial GetCapabilities request to the server and the server responds with the specific version that it supports. If the server does not support 1.0.0, MapInfo Pro cannot use that server and no further operations are allowed.
- MapInfo Pro can access WMTS servers that has support for any of the following formats:
 - KVP (Key-Value Pair)
 - REST (Representational State Transfer)

MapInfo Pro does not support SOAP (Simple Object Access Protocol) format.

Supported Image Formats for WMTS

MapInfo Pro supports the following image formats for WMTS:

- PNG

- JPEG (JPG)
- TIFF
- GIF.

Note: Not every format will be available from every Web Map Tile Service.

Supported WMTS Operations

MapInfo Pro supports the following WMTS operations:

- **GetCapabilities:** MapInfo Pro sends a **GetCapabilities** request to the WMTS server when you select a server from the list of available servers in the **Open WMTS Table** dialog box. For details, see [Accessing WMTS Data](#).
- **GetTile:** MapInfo Pro sends a **GetTile** request to the WMTS server when you select a WMTS layer in the **Open WMTS Table** dialog box and click **OK** to display. For details, see [Accessing WMTS Data](#).
- **GetFeatureInfo:** MapInfo Pro sends a **GetFeatureInfo** request to the WMTS server when you use the Info command (on the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info**) to get information about the WMTS layer. For details, see [Using the Info Tool for WMTS Layers](#).

Setting the WMTS Server Preferences

MapInfo Pro has software preferences that let you set the default WMTS timeout values (in seconds) for the WMTS servers you use.

You can set default values for a specific WMTS server in the **Override Timeout Values** section of the **WMTS Server Information** dialog box.

To set your WMTS Server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WMTS** tab, set your WMTS timeout values:
 - **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
 - **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
 - **Receive Timeout** - Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
3. Click **Servers** to open the **WMTS Servers List** dialog box, where you can add, edit, and delete WMTS servers.
4. Click **OK** to close the dialog and save your settings.

See Also:

[Setting Your Directory Preferences](#)

Retrieving Map Data from a WMTS

Adding a WMTS Server

To access a WMTS server, you must add it to the list of available servers. We have entered some servers for you to get started with. We cannot guarantee that these sites will remain active, only that they were active as of this writing.

To add a WMTS server:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WMTS** tab, click **Servers** to display the **WMTS Servers List** dialog box.

Note: The default server is highlighted in the list with a check mark beside it.

3. Click **Add** to display the **WMTS Server Information** dialog box. Here you can add the new web server address and description in the fields provided.

Note: The **WMTS Server Information** dialog box also displays when you click the **Edit** button in the **WMTS Servers List** dialog box to allow you to change the entries.

4. Type the WMTS server's URL in the **Server URL** field. Click **Test URL** to ensure that MapInfo Pro can locate the server. Click **Get Description** to get the server provided description or type in a description.
5. If you know the connect times, send times, or receive times for this server are particularly long or unusually short, you may want to override the default values for this server.

Note: This step is not mandatory.

To establish specific overrides for this server, select the **Override Default Values** check box and enter new values, as appropriate, in the following fields:

Connect Timeout – Indicates the amount of time (in seconds) allowed to establish an Internet connection request to a Web Map tile server. If the request takes longer than this value, a timeout occurs. The default connect timeout is 60 seconds.

Send Timeout – Indicates the amount of time (in seconds) allowed to send an Internet request to a Web Map tile server. If the request takes longer than this value, a timeout occurs. The default send timeout is 60 seconds.

Receive Timeout – Indicates the amount of time (in seconds) allowed to begin to receive a response from a request from a Web Map tile server. The download can take longer than the timeout, but the response has to occur within the timeout setting. The default receive timeout is 300 seconds.

6. When you have completed these selections or entries, click **OK**.
7. In the WMTS Servers List, click **Set Default** to select a default server. The default server will be selected the next time you open the **Open WMTS Table** dialog box. When you set a default WMTS server, a check mark displays beside it.

Note: If you do not select a default server, MapInfo Pro displays the first server in the list when you begin your WMTS Server session. If you work with a WMTS server that is not the default, MapInfo Pro remembers that new server for the rest of the session and returns to it whenever you return to the **Open WMTS Table** dialog box.

Editing the WMTS Servers List

To edit the list of Web Map Tile Services servers:

1. From the **Open WMTS Table** dialog box, click the **Servers** button to display the WMTS Servers List.
2. Click the **Edit** button and make the changes in the **WMTS Server Information** dialog box.
3. If you change the URL in the **Server URL** field, click the **Test URL** button to ensure that MapInfo Pro can find the server.
4. Click **OK** to return to the WMTS Servers list.

If you want the server you edited to become the default server, click the **Set Default** button. When you set a default WMTS server, a check mark displays beside it.

Note: If you do not select a default server, MapInfo Pro displays the first server in the list when you begin your WMTS Server session. If you work with a WMTS server that is not the default, MapInfo Pro remembers that new server for the rest of the session and returns to it whenever you return to the **Open WMTS Table** dialog box.

5. Click **OK** to return to the **Open WMTS Table** dialog box.

Accessing WMTS Data

You can retrieve map data from a WMTS server after adding a WMTS server to MapInfo Pro.

Note: The available data is determined by the WMTS Server. MapInfo Pro does not have control over the data itself.

Note: You must have a working Intranet or Internet connection to retrieve data from a WMTS server.

When you make WMTS data part of your map, the TAB file goes out to the server each time to get the current layer from the web site. If that data is removed from the server, or if the site is down, the data you have saved cannot display.

To access WMTS data and build a TAB file:

1. On the **HOME** tab, in the **File** group, click **Open**, and **WMTS** to open the **Open WMTS Table** dialog box.
2. Select the WMTS Server that you want to access from the WMTS Server list.

Note: The WMTS Servers that display in the WMTS Server list are based on a list we have compiled for you. Precisely has no control over the availability of these servers at any given time.


MapInfo Pro sends a **GetCapabilities** request to the WMTS server when you select a server from the list. This request collects information about the available map tile types and supported operations from the server, and display it over the dialog box. The **GetCapabilities** request collects the following information from the WMTS server:

- **ServiceType**, and **ServiceTypeVersion**: **ServiceType** is OGC WMTS for a WMTS server. **ServiceTypeVersion** is the WMTS version supported by the WMTS server.
- **ServiceProvider**: This gives information about the name and contact details of the service provider.
- **OperationsMetadata**: This gives information about the operations supported by the WMTS server (like **GetCapabilities**, **GetTile**, **GetFeatureInfo**), and the formats supported by the WMTS server (like KVP, and REST).


3. The WMTS Layers field lists the layers available with the selected WMTS server. Select any of the layer to display. You can select only one WMTS layer to open at a time.
4. If there are styles associated with the layer that you have selected, they display in the Style drop-down list. Styles indicate the visual display options available with this layer and are supplied by the web server. To change the style of a layer, select the style from the Style drop-down list.

Note: You can also change these image display style attributes later. On the **Layers** window, right-click on the WMTS layer and choose **Layer Properties**. In the dialog box you can change the image's translucency and transparency as well as other raster display properties available in MapInfo Pro.

5. Choose a format for the layer from the Image Format drop-down list. The options that display in this list may differ depending upon the formats the server supports and the formats we support. We support: PNG, JPEG (JPG), TIFF and GIF formats, in that order of priority.
6. Certain WMTS servers supports dimensions for the WMTS layers they have. Some example dimensions are time, elevation, band, etc. The WMTS layers field displays a small circle for those

layers that supports dimensions. You can specify a dimension by selecting the  button beside the dimensions display box. This opens the **Select Dimensions** dialog box, where you can specify a dimension value.

Note: **Dimensions** remains active only for those WMTS layers that supports dimensions.

7. The **Coordinate Reference System** Projection display the projection of the selected layer.
8. To enter a name for this table, do one of the following:
 - Click the  button at the end of the **Table Filename** field to display the **Save As** dialog box. Select the path and type the file name in the **File name** field and click **OK**.
 - Type the path into the **Table Filename** field.
9. Select the view for this map in the Preferred View drop-down list to determine where the WMTS table should display after you open it. Options include: **Automatic**, **Current Mapper**, **New Mapper**, and **No View**.
10. Click **OK**.

MapInfo Pro sends a **GetTile** request to the WMTS server when you click **OK** after selecting the layer in the **Open WMTS Table** dialog box. This is a request to obtain an actual imagery tile from the WMTS server. For a single GetTile request, a WMTS server can serve a single tile for a single map layer. So, even for a single layer, if you need more than one tile, independent request needs to be sent.

Once you have saved a WMTS table, you can change its WMTS layer settings using the **WMTS Table Properties** dialog box. To access this dialog box, on the **TABLE** tab, in the **Maintenance** group, click **Web Services**, and **WMTS Table Properties**. When this dialog box displays, select the layer for which you want to edit the settings. You can also change the image formats, and style of the layers. Remember, you can edit the display attributes for the WMTS table by clicking the **Style Override** swatch for the layer in **Layers Properties** dialog box.

Working with WMTS Data

Opening WMTS .TAB Files

To open a previously saved WMTS TAB file:

1. On the **HOME** tab, in the **File** group, click **Open**, and **Table** to open the **Open** dialog box.
2. Browse to the folder directory where you have the TAB file saved.
3. From the **Preferred View** drop-down list, select the view you want of this data. MapInfo Pro remembers your selection and uses it for every subsequent selection until you change it.
 - **Automatic** - MapInfo Pro chooses the most appropriate view. If the data is mappable, such as when graphic objects are attached to the data, MapInfo Pro opens the table in a **Map** window. If you have a **Map** window displayed and the table you want to open is mappable, MapInfo Pro automatically opens the table in the current **Map** window. If the data is not mappable, MapInfo

Pro will attempt to open the table in a **Browser** window. If the table cannot be mapped or browsed, MapInfo Pro opens the table using the **No View** option (no data is displayed).

- **Browser** - MapInfo Pro attempts to open the table in a **Browser** window.
- **Current Mapper** - MapInfo Pro attempts to add your data to the current **Map** window.
- **New Mapper** - MapInfo Pro attempts to open the table in a new **Map** window.
- **No View** - MapInfo Pro opens the table making the data available for other uses, but no data is displayed. You will see it in the **Tables** list in the **Explorer** window.

4. Click **Open**.

To create a WMTS layer, and to save it as a TAB file, follow the instructions in [Accessing WMTS Data](#).

Note: WMTS uses caching strategies to serve pre-rendered georeferenced map tiles to you. So, you must be connected to the intranet or internet to access WMTS data that is not cached previously.

Using the Info Tool for WMTS Layers

The Info Tool provides **GetFeatureInfo** support for WMTS. When you click on a WMTS layer with the info tool selected, MapInfo Pro displays information in the **Info** window about the features of the layer that you have retrieved from the WMTS server. By default, when you open a WMTS layer and add it to a map, it is selectable when it meets the following criteria:

- The WMTS server must support GetFeatureInfo.
- The WMTS server must return GetFeatureInfo data in a format that is supported by MapInfo Pro. These formats are text/plain and HTML.
- The WMTS servers must specify that the WMTS layers within the WMTS table can be queried.

The WMTS layer can also be made selectable using the MapBasic statement:

```
set map layer layer_id selectable on
```

After making the WMTS layer selectable, you can use the Info command (on the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info**). The WMTS table treeview in the **Open WMTS Table** and **WMTS Table Properties** dialog boxes display an Information icon next to layers that you can query to indicate that the Info tool will work on those layers.

The supported GetFeatureInfo formats include:

- HTML
- Text/plain

If the WMTS server supports both HTML and Text/Plain formats, MapInfo Pro will give you options to select the preferred view by radio buttons at the bottom right corner of the **Info** window. By default, MapInfo Pro display information in HTML format. HTML data is formatted by the server in a manner that may be easier to read compared to the data in the text/Plain format.

In some cases, the WMTS server may return an error when the user clicks on the map. Error messages are displayed in the **info** window itself. Examples of errors include:

- The WMTS Server does not support GetFeatureInfo requests.
- The WMTS Server does not return GetFeatureInfo data in a format supported by MapInfo Pro.
- The WMTS Server returned data in <returned-format> format rather than the requested format of <requested-format>
- Unable to retrieve feature information from the WMTS Server.

Changing the WMTS Layer Display Style

If there are styles associated with the WMTS layer you wish to retrieve, they display in the **Style** drop-down list in the **Open WMTS Table** and the **WMTS Table Properties** dialog boxes. Styles indicate the visual display options available for a WMTS layer and are supplied by the WMTS server. Initially, MapInfo Pro displays the selected layer in the server's default style.

To change the style of a WMTS layer, do one of the following:

1. Highlight the layer in the **Open WMTS Table** or **WMTS Table Properties** dialog box and select the style from the **Style** drop-down list.
2. You can also change these image display style attributes later. In the **Layers** window, double-click the layer to open the **Layer Properties** dialog box.
3. On the **Layer Display** tab, check the **Style Override** check box and click the **Style** button to open the **Adjust Image Styles** dialog box. You can change the image's translucency and transparency as well as other raster display properties available in MapInfo Pro.
4. Click **OK**.

Working with a Mapping Tile Server (MTS) and Microsoft Bing

Introduction

Tile Map Service (TMS) is an Open Source Geospatial Foundation specification to manage cartographic data. TMS is similar to the other **LevelRowColumn** types of tile server protocols that MapInfo Pro supports, such as Google Enterprise.

A tile server is a server that contains a collection of raster tile images. The tiles cover a given place on the earth. Tiles are organized in a row/column grid fashion. There are also multiple levels of tiles. Each level represents a different resolution of data, covering the same place on the earth. The level

determines the number of tiles (number of rows and columns). As you zoom in or out, the level of data may change. As you pan around, the specific tiles that are needed may change.

MapInfo Pro lets you use tile server data within the product. If you add a tile server layer to a MapInfo Pro map, then the application takes care of fetching the appropriate tiles from the server and displaying them. You only need to add the tile server layer and then pan/zoom.

MapInfo Pro supports TMS servers with either North-West or South-West origins.

MapInfo Pro has a table for tile servers that consists of a TAB file and XML file. These files contain the information necessary to communicate with a tile server and retrieve tiles correctly. This information includes server URL, coordinate system and bounds, and other parameters for retrieving the proper tiles.

You can use the TAB and XML file to view Google tiles within MapInfo Pro. Once the TAB and XML files are properly setup, you can open and use the TAB file just like any other tile server table.

After opening a tile server table in MapInfo Pro, you can add it as a layer to a map. Tile server layers act as an underlying base map, so they are added to the bottom of the layer list by default. Tile server layers do not have attribute data, so they cannot be edited and labeled. They are meant to be used as backdrop images.

Before You Begin

Tile Server Display Properties

Display properties can alter the appearance of the tiles returned from a tile server. Tile server images are rendered using the same display attributes as raster images. This includes:

- Translucency
- Transparency - on/off and transparent color
- Brightness
- Contrast
- Grayscale versus color

See also:

- [Setting Tile Server Layer Properties](#)
- [Setting Tile Server Preferences](#)
- [Adjusting the Contrast or Brightness of a Raster Image](#)
- [Adjusting the Translucency of a Raster Image](#)

Tile Server Coordinate System and Reprojection

Tile server layers do not support raster image reprojection. This means that a map's coordinate system will be set to use the tile server coordinate system if a tile server layer is visible in a map. If

the map displays tiles from two different tile servers in different projection systems, then MapInfo Pro uses the projection system of the tile that is most visible on the map.

You cannot change the map coordinate system when a map has an active tile server layer.

Tile Server Authentication

Since the tile server functionality uses internet connectivity to obtain the images to draw, it is possible that the connection may require layers of authentication. If authentication is required, MapInfo Pro prompts you when the tile server table is opened. If the authentication fails, the table does not open.

See also:

- [Web Service Authentication](#)

Setting the Tile Server Preferences

You can configure MapInfo Pro default preferences for the time-outs that are used when requesting tiles from a tile server.

To set up your time-out preferences for when requesting tiles:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **Tile Server** tab, set the following:
 - **Read Timeout** - Set the default value for attempting to read a specific tile from a tile server. The value should be between 1 and 3600 seconds.
 - **Request Timeout** - Set the default value for attempting to request a specific tile from a tile server. The value should be between 1 and 3600 seconds.
3. Click **OK** to close the dialog and save your settings.

Retrieving Map Data from a MTS

Creating a Map Tile Server Table for MapXtreme.NET Tile Server

MapInfo Pro provides access to the Microsoft Bing tile server, so there is no setup required to access it (see [Adding a Bing Layer to your Map](#)). Separate instructions are provided for setting up a mapping tile server table for use with a Google Enterprise tile server (see [Creating a Map Tile Server Table for Google Earth Enterprise Tile Server](#)).

For MapXtreme.NET tile servers, you must specify the exact information to use through a MapBasic command called Create Table.

To setup a tile server table:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic** from the list, to open the **MapBasic** window.
2. Use one of the following examples as a template to create a tile server table. Copy and paste the command in to the **MapBasic** window and then update the command with your information (change the text in **bold** in these examples). Run the command by pressing the **Enter** key.

MapInfo Developer tile server

```
Create Table MIDev_TileServer
File "MIDev_TileServer"
Type TILESERVERT
TileType "LevelRowColumn"
URL
"http://INSERT_SERVER_NAME_HERE/MapTilingService/MapName/{LEVEL}/{ROW}
:{COL}/tile.gif"
AttributionText "required attribution text"
Font("Verdana",255,16,0,255)
StartTileNum 1
MaxLevel 20
Height 256
CoordSys Earth Projection 10, 157, 7, 0 Bounds(-20037508.34,-
20037508.34) (20037508.34,20037508.34)
```

MapXtreme.NET tile server:

```
Create Table MXT_TileServer
File "MXT_TileServer"
Type TILESERVERT
TileType "LevelRowColumn"
URL
"http://INSERT_SERVER_NAME_HERE/TileServer/MapName/{LEVEL}/{ROW};{COL}
/tile.png"
AttributionText "required attribution text"Font("Calibri",255,16,0,255)
MaxLevel 20
Height 256
RequestTimeout 90
ReadTimeout 60
CoordSys Earth Projection 10, 157, 7, 0 Bounds(-20037508.34,-
20037508.34) (20037508.34,20037508.34)
```

Items in **bold** in these examples are necessary information that you supply for accessing a specific tile server:

- **Table** is the name of the table as you want it to appear in MapInfo Pro.
- **Type** is the name of the tile server this table will use (currently supports "LevelRowColumn"). This value represents the way the Tile Server retrieves the tiles.
- **URL** is the fully qualified URL to request a tile from a tile server. The URL will contain tags that are special strings that will be used to retrieve particular tiles. The placement depends on server URL syntax requirements.
 - {LEVEL} will be used internally to specify the level number (Z-value)

- {ROW} will be internally to specify the tile row number (Y-value)
- {COL} will be internally to specify the tile column number (X-value)
- **AttributionText** is the attribution text that will be displayed on the **Map** window. A *font_clause* can be used to set the font style when the attribution text will be displayed. The attribution text should be the attribution legally required by the provider of the server.

Syntax details for the **Create Table** command are provided in the *MapBasic Reference*.

MapInfo Pro cannot reproject a tile server, so it will reproject the map to match the coordinate system of the tile server data. You are unable to change the coordinate system for the map when it includes a tile server layer.

See also:

- [Adding a Tile Server Layer to your Map](#)

Creating a Map Tile Server Table for Google Earth Enterprise Tile Server

MapInfo Pro provides access to the Microsoft Bing tile server, so there is no setup required to access it (see [Adding a Bing Layer to your Map](#)). Separate instructions are provided for setting up a mapping tile server table for use with a MapXtreme .NET tile server (see [Creating a Map Tile Server Table for MapXtreme.NET Tile Server](#)).

You can access a Google Earth Enterprise tile server from MapInfo Pro. If you have access to a Google Earth server, then you would create TAB and XML files for each Google layer that you wish to use. There is no support for a public Google server; this feature lets you get data from a private Google Earth Enterprise Server.

A Google Earth Enterprise Tiling Server can contain image tiles for one or more layers. The tiles can be based on image or vector data. The URL to request individual tiles uses a slightly different format for Imagery versus Vector data requests. This impacts the <url> in the XML file. The data can be in two different projections.

A tile server can contain one or more layers (**Tile Server Layers**). Each tile server layer has its own information, including and not limited to: ID, label, version, type of data/request. Each tile server layer corresponds to a single MapInfo Table/Layer.

Google Enterprise supports two **projections**: flat and Mercator. This impacts the Coordsys clause in the TAB file (including the Bounds, which are different for flat and Mercator projections).

To use a Google server as a tile server within MapInfo Pro, you must have a TAB and XML file. This corresponds to one layer on the tile server. You can open and use the TAB file in MapInfo Pro just like any other tile server table. Currently, there is no automatic way to generate these files. The following sections explain how to get information about the server and how to construct TAB and XML files for your specific server.

Getting Information about a Tile Server

This section explains how to issue a command to get information about a server.

Sample web request to get server definition:

```
<Google tile server>/query?request=Json&vars=geeServerDefs
```

Actual request to get server definition:

```
http://gmdemo.keyhole.com/query?request=Json&vars=geeServerDefs
```

Specific items to look at in results of geeServerDefs request:

```
projection : "flat",
```

In the "layers : " section, for each layer:

```
id : 1029,
requestType : "ImageryMaps",
version : 20
```

Building a TAB file

There are two TAB file variations for a Google server based on the Google projection: flat and Mercator. It is important that the name of the "File" in the TAB matches the name of the XML file.

TAB File for Flat Projection

The Google flat projection corresponds to the MapInfo Longitude / Latitude (WGS 84) coordinate system. It is shown in geeServerDefs as:

```
projection : "flat",
```

Sample TAB file for Flat Projection:

```
!table
!version 1050
!charset WindowsLatin1
```

Definition Table

```
File "Google_Flat_Projection.xml"
Type "TILESERVER"
CoordSys Earth Projection 1, 104 Bounds(-180, -180) (180, 180)
RasterStyle 4 1
RasterStyle 7 0
RasterStyle 9 1
```

The RasterStyle clauses are optional. They are suggested for tiles that are based on vector data (requestType: "VectorMapsRaster"). They are provided to make pixels in the tile server images

transparent by default, by determining the transparent color from each image tile. For image based data (requestType: "ImageryMaps"), the RasterStyle tags may not be appropriate.

Note: The RasterStyle clauses are optional. They make black pixels in the tile server images transparent by default.

TAB File for Mercator Projection

The Google Mercator projection corresponds to the Popular Visualization CRS coordinate system. It is shown in geeServerDefs as:

```
projection : "mercator",
```

Sample TAB file for Flat Projection:

```
!table
!version 1050
!charset WindowsLatin1
```

Definition Table

```
File "Google_Mercator_Projection.xml"
Type "TILESERVER"
CoordSys Earth Projection 10, 157, "m", 0 Bounds (-20037508.342789244,
-20037508.343038857) (20037508.342789244, 20037508.343038857)
RasterStyle 4 1
RasterStyle 7 0
RasterStyle 9 1
```

The RasterStyle clauses are optional. They are suggested for tiles that are based on vector data (requestType: "VectorMapsRaster"). They are provided to make pixels in the tile server images transparent by default, by determining the transparent color from each image tile. For image based data (requestType: "ImageryMaps"), the RasterStyle tags may not be appropriate.

Note: The RasterStyle clauses are optional. They make black pixels in the tile server images transparent by default.

Building an XML File

There are two XML file variations for a Google server. The variation is based on the tile request type (image or vector). One major difference is how the tile requests are made (X/Y/Z versus Level/Row/Column).

XML File for Imagery Requests

This imagery request is denoted in the geeServerDefs as:

```
requestType : "ImageryMaps",
```

Sample XML file for imagery maps:

```
<?xml version="1.0" encoding="utf-8"?>
<TileServerInfo Type="LevelRowColumn">
<Url>http://gmdemo.keyhole.com/query?request=ImageryMaps&channel=1
029&version=20&x={ROW}&y={COL}&z={LEVEL}</Url>
<MinLevel>1</MinLevel>
<MaxLevel>23</MaxLevel>
<TileSize Height="256" Width="256" />
</TileServerInfo>
```

Note: The server URL, channel, and version parameters vary depending on the server and layer.

XML File for Vector Map Requests

This vector request is denoted in the geeServerDefs as:

```
requestType : " VectorMapsRaster",
```

Sample XML file for vector maps:

```
<?xml version="1.0" encoding="utf-8"?>
<TileServerInfo Type="LevelRowColumn">
<Url>http://gmdemo.keyhole.com/query?request=VectorMapsRaster&leve
l={LEVEL}&row={COL}&col={ROW}&channel=1005&version=4</
Url>
<MinLevel>0</MinLevel>
<MaxLevel>23</MaxLevel>
<TileSize Height="256" Width="256" />
</TileServerInfo>
```

Note: The server URL, channel, and version parameters vary depending on the server and layer.

XML Parameters for Server and Layer

There are parameters that are in common for both imagery and vector requests. These parameters relate to the server and layer. In the XML file, the <Url> also contains the following.

Specifying Server

The server is specified by the first part of the <Url>, such as:

```
<Url>http://gmdemo.keyhole.com/query?request=VectorMapsRaster&level={LEVEL}&row={COL}&col={ROW}&channel=1005&version=4</Url>
```

Specifying Layer and Version

The particular layer from the server is specified by the channel and version:

```
<Url>http://gmdemo.keyhole.com/query?request=VectorMapsRaster&level={LEVEL}&row={COL}&col={ROW}&channel=1005&version=4</Url>
```

The channel can be found from the id in the geeServerDefs:

```
{
  icon : "icons/road_yellow_1.png",
  id : 1005,
  initialState : true,
  isPng : true,
  label : "Labels",
  lookAt : "none",
  opacity : 1,
  requestType : "VectorMapsRaster",
  version : 4
}
```

Note: The version may change over time. If it changes, you must update the XML file to the correct version number.

See also:

- [Adding a Tile Server Layer to your Map](#)

Adding a Tile Server Layer to Your Map

To add a tile server layer to your map (using the same way you add any other TAB file as a layer in a map):

1. Open the tile server table, on the **HOME** or **TABLE** tabs, from the **Open** list, click **Aerial**, **Hybrid**, **Roads**, **GeoMap Bronze**, **GeoMap Steel** or **GeoMap Iron**.

If the tile server table is open, and you want to add the layer to one of several maps that you currently have open, then:

1. In the **Explorer** window highlight the tile layer in one map and drag it onto another map.

The tile server displays as the bottom-most layer on the map and as a tile server layer in the **Layers** window.

Adding a Bing Layer to your Map

With a single click, you can add a Bing layer from a map tile server to your map. You do not need to open the table prior to adding it to the map. If the current window is a map, MapInfo Pro adds the layer to it. If the current window is not a map or there are no windows open, then MapInfo Pro creates a new map with the layer.

To open and add an Aerial, Hybrid, or Roads layer to a map, on the **HOME** tab, in the **File** group, on the **Open** list, click **Aerial**, **Hybrid**, or **Roads**.

The map refreshes and displays the tile server layer as a base image (the bottom layer of the map).

Bing Tile Server Table Names and Location

There are three tables for Bing Aerial, Bing Hybrid, and Bing Roads installed in to a subdirectory called `TileServer` where MapInfo Pro is located. The files are:

BingAerial.TAB	BingHybrid.TAB	BingRoads.TAB
BingAerial.XML	BingHybrid.XML	BingRoads.XML

The following files are provided to connect to an OSM-based tile server:

OSMRoads.TAB
OSMRoads.XML

The following files for connecting to the Cyber Japan tile server. They contain data in the area of Japan, but not other parts of the world.

CyberJapanAerial.TAB	Aerial imagery for Japan at levels 15-17.
CyberJapanAerial.XML	
CyberJapanStandard.TAB	Road-like data for Japan at levels 5-18.
CyberJapanStandard.XML	

Performing Distance Calculations on Bing Maps

Bing Maps uses a slight variation of the Mercator projection. This is a conformal projection that is ideal for navigation, because shapes, directions, and angles on a map are constant. However, distance and scale distortion increases further away from the Equator. As a result, North-South lengths stretch in Northern Latitudes, such as in Finland, and in Southern Latitudes, such as in New Zealand. This is also why some areas, such as Greenland and Antarctica, appear huge on the map.

If you are experiencing inaccurate distance or line length calculations, because you are working in a location that is closer to the North or South pole and further away from the Equator, then use a spherical distance calculation.

To set the type of distance and area calculation to use:

1. On the **PRO** tab, click **Options**, and **Map Window**.
2. In the **Map Preferences** dialog box, select the **Projection** tab.
3. In the Distance/Area using pane, either of the following:
 - **Spherical** - The Spherical calculations measure distance according to the curved surface of the Earth. Spherical is the default. The data is first converted to Latitude/Longitude and then a calculation is produced. Lat/Long data will always use spherical calculations.
 - **Cartesian** - The Cartesian method performs calculations on data projected onto a flat plane. Cartesian coordinates (x,y) define the position of a point in two-dimensional space by its perpendicular projection onto two axes which are at right angles to each other. Long/Lat projections cannot use Cartesian calculations.
4. Click **OK** to save your setting.

Note: To specify a calculation method for the currently active **Map** window, use the **Map Options** dialog box (on the **MAP** tab, click **Map Options** in the **Options** group).

For more information about map preferences, see [Setting your Map Window Preferences](#).

Entering a License Key to use Bing Tile Services

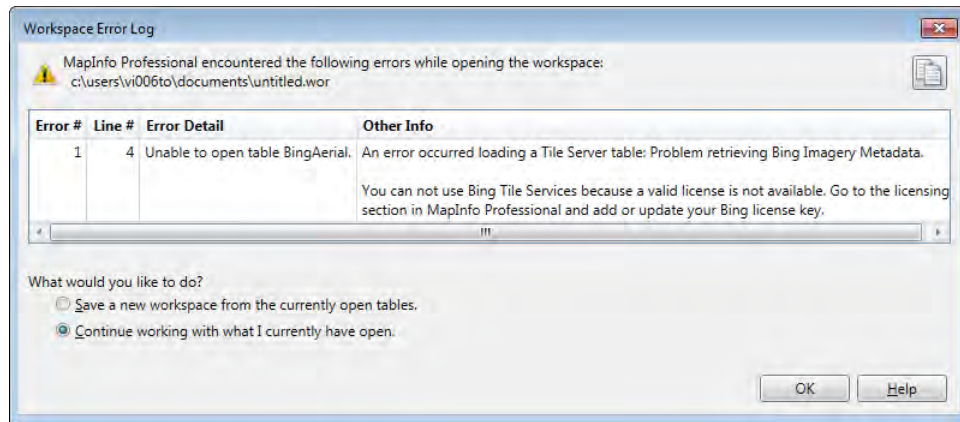
Bing License Key

If you do not have a valid Bing license key, you would be unable to use Bing Tile Services. In this case, accessing Bing Roads, Hybrid, and Aerial display the message:

An error occurred loading a Tile Server table: Problem retrieving Bing Imagery Metadata.

If you have a saved workspace containing a Bing Tile Server layer or a map with objects and vector layers on it, and your Bing key is invalid; you will be unable to open the workspace properly. The

workspace would open, but without the tile server layer. The following is an example error message that would appear:



To resolve these errors, re-enter a valid Bing license key to the Bing Tile Services.

To enter the valid key credentials:

1. On the **PRO** tab, click **Licensing**, and **Bing License Key** (you may need to scroll down your screen to see this option) to display the **Bing Key Credential** dialog box.
2. Type a valid value in the **Enter valid key** field and click **OK**.

The Bing Roads tile server also may require that you have a valid license for them. If you see a message that your service has expired, then contact your Precisely representative to learn about renewal options. The Add Bing Roads to Map feature is only available to MapInfo Pro Premium Option holders (this service requires an additional fee and do not come standard with the product). The evaluation version of MapInfo Pro includes a preview of this feature, but after activating your MapInfo Pro license, you require the Premium Option to access it.

Working with Tile Servers

Changing the Map Zoom to the Nearest Tile Server Level

Based on a selected zoom level, a tile server provides various types of information. In MapInfo Pro, you can zoom on a tile server layer to any specified scale. In doing so, the tile server images may stretch making them appear fuzzy and pixilated. To correct for this, you can select to display tile server images at an optimal zoom level based on the tile server and current screen resolution. This is a one-time adjustment to the current display.

To change the zoom to the nearest optimal display for the tile server image:

- In the **Map** window, right-click on the map and select **Zoom to Nearest Tile Server Level** from the pop-up menu.

- If there are multiple tile server layers in a map, the **Zoom to Nearest Tile Server Level** dialog box opens where you can choose a tile server layer.

The map redraws with a zoom to the nearest tile server layer level.

Setting Tile Server Layer Properties

Tile server layers offer the ability to alter display attributes of the image tiles. These are the same properties that are supported for raster layers and include: translucency, transparency, brightness, contrast and gray scale.

To access layer properties for a tile server layer:

1. From the **Layers** window, right-click on the tile layer and choose **Layer Properties**. The **Layer Properties** dialog box opens.
2. Check the **Style Override** check box.
3. Click the style button (below the Style Override check box). The **Adjust Image Styles** dialog box displays.
4. Change the image properties to suit your needs.

Tile server layers may be set as translucent.

Note: The sample image shown in this dialog is based on the current view in the map. If you wish to see a different sample image in this dialog, you will need to change the map view prior to bringing up this dialog. You may wish to change the view/image if selecting a transparent color because the transparent color picker selects a color from the sample image.

Geocoding Using a Geocoding Server

Introduction

Geocoding is the process of assigning geographic coordinates to your data, which can be street addresses. Point values assigned to each address turn each record into a geographic object that MapInfo Pro can display on a map. Visualizing your records on a map can make the relationships among your data clearer. You can display your geocoded records against a street map, a postal code centroid map, a county map, or whatever is most appropriate to your needs. You can then use the wide variety of functions available in MapInfo Pro mapping software to perform querying, create thematic maps, create territories, and perform many other types of geographic analysis.

Not everyone in a flood zone loses their homes in a disaster. Accuracy in address matching (geocoding) can mean the difference between an insured being in a flood plain or on dry land. Knowing that information quickly and precisely can mean the difference in thousands of dollars of risk or no risk at all.

For retail customers, an advanced geocoder could be the difference between finding your product in a local store or wasting a trip.

For financial services customers, it could mean locating your best customers quickly when you have an opportunity to share with them.

You can use MapInfo Pro to connect to the following geocoding servers to handle advanced geocoding functions:

- **MapMarker:** MapMarker is a powerful geocoding product that assigns coordinates to an address based on how well it matches entries in an Address Dictionary. The precision of the match can vary. For each address you geocode, you may get back a single perfect, street-level match, a list of street-level match candidates from which you choose the best match, or a less precise postal code centroid match, where the point would be located near the center of the postal code area. In the case of a ZIP + 4 centroid match, the location of the point corresponds to the address which is closest to the mid-address of the ZIP + 4 address range. You must have MapMarker 4.0 core to use this web service.
- **Envinsa:** Envinsa provides a wider range of web services than MapMarker and can even provide access to earlier versions of MapMarker. Envinsa can determine these values from a street address or postal code. Envinsa servers require more security than MapMarker, so you will need a user name and password to access them. Keep in mind that the services that are available on an Envinsa server depends on what was installed.
- **Precisely Global Geocoder:** Precisely Global Geocoder is a cloud based geocoding server from Precisely Sign-up for the service now and get a free limited number of geocodes (geocoding credits) per month. See [Using the Precisely Global Geocoding Server](#) for details.
- **Global Geocoder:** Global Geocoder is available when you add a new Geocoding server to the server list. The Global Geocoder Interface implementation connects MapInfo Pro with Global Geocoding making it easier for you to consume our geocoding assets. To geocode data from anywhere, choose to work with the Global Geocoder. This is a generic interface created by Precisely through which any or all of our country geocoders can be installed and accessed. It encapsulates around the U.S. geocoding through GEOSTAN and international geocoding through MapMarker.

Using the MapMarker, Envinsa, Precisely Global Geocoder, or Global Geocoder Web Services, you have more choices for geocoding. For example, you can choose to geocode your records by street address or by postal code centroid, or by geographic centroids. If you have geocoded some records and some did not geocode successfully, you can set fallback conditions to locate those records. If you geocode and there are no results, poor results, or multiple equal close results, the geocoding server can present you with interactive options so you can select among possible matches or change your input. Further, these web services allow you to set multiple matching conditions when more than one record matches the records you are geocoding and set offsets for placing points right in the geocode properties.

For companies and organizations that use MapMarker, Envinsa or other Global Geocoder servers as a geocoding engine, you can take advantage of the geocoding servers available to your whole enterprise. If your organization makes this server available on your intranet or over the Internet, you can use our geocoding web services from within MapInfo Pro to perform more sophisticated and accurate data geocoding. Precisely also provides a cloud based geocoding server to MapInfo Pro customers. See [Using the Precisely Global Geocoding Server](#) for details.

Note: IMPORTANT: If you are working with MapMarker and Envinsa servers, Precisely may not have a Geocoding Server with data that includes the geography you are interested in. Please check with your local Precisely sales personnel to ensure that web services exist for your geography.

Note: Although we continue to support MapMarker and Envinsa for backward compatibility, please note that the current Global Geocoder version does not support all the features exposed by MapMarker.

There are many reasons why using a geocoding service with MapInfo Pro is a good business solution.

- *Multiple Data Formats is OK.* Since MapInfo Pro can import or open data in many different formats, you can geocode almost any kind of geographically enabled file. You can take advantage of MapMarker or Envinsa's advanced geocoding options using Shapefiles, Excel files, ASCII, Access tables, Oracle and SQL Server tables.
- *Data filtering.* You can use the selection and subselection capabilities of MapInfo Pro to create input for the service using any MapInfo Pro "table," including queries created using SQL Select or commands. For example, if you want to geocode your data based on more than one column, you can specify an input address based on a MapBasic expression that could skip irrelevant characters.
- *Geocode a Little or a Lot.* You can geocode individual records or in batch mode.
- *Choose your own Symbols.* You have the full range of MapInfo Pro symbols to choose from when plotting your points, or you can create your own custom symbols for the points you are geocoding.
- *Undo works.* Because all of the geocoded results are transacted, you can use MapInfo Pro's revert capabilities to undo the transactions. You can save the geocoded results in the source table or into a completely new table.

See also: [Setting the Geocoding Server Preferences](#)

Before You Begin

Setting up a Geocoding Server

To use MapInfo Pro with a geocoding server, you need MapMarker Java Server 4.0 or later or Envinsa Server 4.0 or later or a Global Geocoding server. To use MapInfo Pro with the Precisely Global Geocoding server, you need to sign up for the service. See [Using the Precisely Global Geocoding Server](#) for details. MapInfo Pro supports any geography that is currently supported by Envinsa.

Envinsa supports MapMarker Java Server version 2, 3, and 4. Keep in mind that any Envinsa server only supports the data that is installed.

Before you can access a MapMarker, Envinsa or Global Geocoder geocoding service, you need to connect MapInfo Pro to its server. This process gives MapInfo Pro all the information it needs to access the geocoding service. You need to enter this information only once per service.

Note: If you are using Precisely Global Geocoding Server, you do not need to enter the server information manually. MapInfo Pro automatically adds it to the servers list.

To set up a geocoding server:

1. On the **SPATIAL** tab, in the **Create** group, click **Geocode**, and **Geocode Using Server** to open the **Geocode Using Server** dialog box.
2. Click **Servers** to open the **Geocoding Servers List** dialog box.

Note: Set the server that you will use the most as your default, by highlighting it in the list and clicking **Set Default**. A check mark displays beside the server to indicate it will open by default.

3. Click **Add** to open the **Geocoding Server Information** dialog box to add a new server.
4. Type the service URL and description in the fields provided. You can connect to a MapMarker, Envinsa or Global Geocoder geocoding service by making a selection in the Type of Service drop-down list.

When you select an Envinsa service, enter a user ID and password in the fields provided. Select the **Remember Password** check box to save the password in encrypted format in the server list. This option is selected by default. If you prefer to enter the password each time you access this server, clear this check box.

CAUTION: Anyone knowing this password will be able to use the Envinsa geocoding service.

5. Consider whether the default timeout values are appropriate for the service you are adding. The default values that display in each field are set in the geocoding web services preferences. You can change these global defaults using the instructions in [Setting the Geocoding Server Preferences](#).

To reset these entries for the current server, select the **Override Default Values** check box and enter new timeout values using these definitions:

- **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
- **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
- **Receive Timeout** - Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.

- When you have completed these entries, click **Test URL** to ensure that the connection is made. When you click **Test URL** and MapInfo Pro can connect to the service, the **Geocoding Server Details** dialog box opens.

If the URL is valid, the **Engine Info** list displays the service's available, country data, the supported geocoding types (Street, Postcode, Geographic), and the version information.

Click the column headings to sort the entries alphabetically. Click **Close** to return to the **Geocoding Server Information** dialog box.

Note: If you select **Test URL** and no service connection is found, an error message displays.

- Click **OK** to save the new geocoding server.

Setting the Geocoding Server Preferences

You can get more information about setting up a geocoding server in [Setting up a Geocoding Server](#). A table must be open to enable the **Geocode using Server** command.

To set the geocoding server preferences:

- On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
- Click the **Geocode** tab to display the Geocoding server options.

This tab sets the geocoding server timeout and maintenance options.

- Set any of the following preferences for your server:
 - **Offset From Road** - Use this field to indicate the default distance the geocoded point should be from the road, if applicable.
 - **Offset From Corner** - Use this field to indicate the default distance the geocoded point should be from the corner, if applicable.
 - **Units** - Use this field to indicate the units for the previous entries.
 - **Dictionary** - Use this drop-down list to choose the dictionary option that you want the geocoder to use (Address or User). These libraries exist on the service. Not all dictionary types may exist on all services. There are a maximum of five (5) options:
 - **Select All Dictionaries** - Select this option to use both the user and address dictionaries.
 - **Address Dictionary Only** - Select this option to use only the service's address dictionary and not the user's dictionary.
 - **User Dictionary Only** - Select this option to use only the user's address dictionary and not the service's address dictionary.
 - **Prefer Address over User** - Select this option to use the service's address dictionary before the user's address dictionary. This option is the default.
 - **Prefer User over Address** - Select this option to use the user's address dictionary before the service's address dictionary.

- **Number of Addresses to Batch** - Use this option to specify how many addresses you want to send to the geocoding service at a time. The number of addresses you send at a time can affect performance.
- **Default Timeout Values** - Use these timeout values to set the communication parameters for the geocoding service. You can override these defaults on a per-service basis locally by editing the service in the Services list and specifying the override.

Note: When you set the time out values locally, you may want to keep in mind the size of your request. The more complicated your request, the more time may be required for connection/sending/receiving.

- **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
- **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
- **Receive Timeout** - Use this setting to indicate the amount of time to begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
- **Mark Multiple Match when Automatic Geocoding** - Select this check box to display a result code of M when you are performing automatic geocoding and there are multiple matches for an address. If you do not select this option, and there are close matches, the system displays an S for street only. For more information, see [Understanding the Geocoding Result Codes](#).
- **Symbol** - Click to set the default symbol style for the points you are creating for geocoding. You can override it during a geocoding operation using **Symbol Style** in the **Common Options** tab.
- **Servers** - Click **Servers** to display the **Geocoding Servers List**, where you can add, edit, and delete MapMarker, Envinsa, or Global Geocoder geocoding servers. This list is the same as you would see when you select the **Servers** button in the **Geocode Using Servers** and the **Find Address** dialog box.

Note: If you are using Precisely Global Geocoding Server, you do not need to enter the server information manually. MapInfo Pro automatically adds it to the servers list.

4. Click **OK** to close the dialog and save your settings.

Geocoding a Single Address using a Geocoding Service

The process for geocoding a single address is the same for an Envinsa, MapMarker, Precisely Global Geocoder, or other Global Geocoder service. Keep in mind that you must set up a geocoding service before you can use this type of geocoding.

Note: If you are using Precisely Global Geocoding Server, you do not need to do anything for setting up of the geocoding service. MapInfo Pro automatically sets up the service for you.

For instructions, see [Setting up a Geocoding Server](#) and [Setting the Geocoding Server Preferences](#).

To geocode a single address and display it on the current map:

1. Open the map that contains the data you want to geocode.
2. On the **HOME**, **TABLE**, or **SPATIAL** tabs, in the **Selection** group, click **Mark**, and **Find Address**. The **Find Address** dialog box displays.

Note: If the geocoding service you are using requires authentication, the **Server Password** dialog box displays. Type in the user name and password. Click **OK** to save them.

Find Address

Server: Servers...

Geocoding Server:

Server URL: Server Info...

☐ Allow Advanced Address ☐ Close Matches Only

Country: Get Countries

Address:

Address 2:

City / Town Name:

City / Town Subdivision:

Country / Secondary Subdivision:

State / Province:

Postal Code:

Secondary Postal Code:

Result Code	Address	City / Town	City / Town Subdivi...	Country Secondary...	State / Prov

Options... Search Add to Map Cancel Help

Note: The column widths you select in this interactive list are maintained throughout the session.

The **Country** field is required for all geocoding. Click **Get Countries** to retrieve the list of countries supported by the selected server and select the country in which the geocoding is to take place.

3. Enter the address information you want to geocode in the fields provided.

Select the **Allow Advanced Address** check box to perform the geocode using the **City/Town Subdivision** or the **Country Secondary Subdivision** options.

Select the **Close Matches Only** check box to filter the list of matches based on a weighted criteria. The geocoding server determines close matching by reviewing the matches and scoring the results based on how much of the address matches the originally requested address.

For more options, click **Options**. The **Geocode Properties (Common Options tab)** displays.

The screenshot shows the 'Geocode Properties' dialog box with the 'Common Options' tab selected. The dialog has a title bar with a close button (X). The main content area is divided into several sections:

- Require Exact Match On:** A group box containing four unchecked checkboxes: 'Address Number', 'Street Name', 'City / Town Name', and 'Postal Code'.
- Fallback:** A group box containing two checked checkboxes: 'Fallback to Postal Code Centroid' and 'Fallback to Geographic Centroid'.
- Maximum Candidates:** A section with the label 'Number of Candidates:' followed by a dropdown menu currently set to '2'.
- Geometry Settings:** A group box containing:
 - 'Symbol Style:' with a red pushpin icon.
 - 'Projection...' button.
 - An empty text input field.

On the right side of the dialog, there are three buttons: 'OK', 'Cancel', and 'Help'.

4. Complete your selections in this dialog box. Click **OK** to return to the **Find Address** dialog box.

Require Exact Match On

Select the address check boxes you want the service to match exactly. Select:

Address Number to force the geocoding service to match the address number exactly.

Street Name to force the geocoding service to match the street name exactly.

City/Town Name to force the geocoding service to match the city/town name exactly.

Postal Code to force the geocoding service to match the postal code address exactly.

Fallback

If the service does not find an address match in a street-level geocoding session, select the data you want the service to use to geocode your entry:

Fallback to Postal Code Centroid - The data you are geocoding must include postal code information to use this fallback option.

Fallback to Geographic Centroid - The data you are geocoding must include geographic object information to use this fallback option.

Maximum Candidates - Number of Candidates

If the geocoding service finds more than one record that matches the address you entered, the number you enter into this field determines the greatest number of candidates that display. For example, the default is 2. If there are 5 addresses that match the address you entered, only the first two display, sorted in the order of best matching probability. This option is only enabled when you select the Interactive mode.

Geometry Settings

Symbol Style - Click this button to select the style properties of the point you want to display when the service geocoding is complete. The style you select here overrides the default symbol style.

Projection - This button is disabled for this process because the results are written to the Cosmetic layer of the selected **Map** window.

5. Click **Search** to begin the geocoding process. The geocoding results display in the list at the bottom of the **Find Address** dialog box.

If you selected **Close Matches Only** or you set up your preferences to restrict the number of matches that display, your list may be shorter.

A check mark displays beside the result that most closely matches the requested address.

The Result Codes that display beside the address evaluate the match accuracy. See [Understanding the Geocoding Result Codes](#) for more information about the meaning of these codes.

If you entered a maximum candidates entry greater than one and the geocoding service found more than one match, the candidates display in the list at the bottom of the dialog box. To select a candidate, highlight it in the list and click Add to Map to display the geocoded address on the map.

Geocoding a Table using a Geocoding Service

The process for geocoding a table of addresses is the same using an Envinsa, MapMarker, Precisely Global Geocoder, or the Global Geocoder service. There are two processes for geocoding. The instructions in this section describes both of these processes.

1. You can geocode a table automatically, which means the service does its best to match the addresses in the table without your help.
2. You can geocode a table interactively, which means the service gives you choices when there are multiple matches and you select the best match.

Frequently, users perform an automatic geocode and then an interactive one to match the records that the service could not match the first time. This method has been very successful in achieving the most accurate geocoding results.

To geocode a table of data using a geocoding service:

1. Open the table that contains the data you want to geocode.
2. On the **SPATIAL** tab, in the **Create** group, click **Geocode**, and **Geocode Using Server** to open the **Geocode using Server** dialog box.

Note: You may notice that the **Add** button in the **Create Driving Regions** dialog box or the **Geocode using Server** dialog box is disabled if you have reached the limit on the number of request values (number of address batches, times, or distances) you have sent to the server. Newer versions of Envinsa allow the server to set limits on the server side, and MapInfo Pro uses these limits. You may see some changes in behavior when you switch servers and the new server has different limits. Another difference you may see is that a particular quantity of address batches, times or distances may work for one server but not for another.

3. Select a service from the Geocoding Server drop-down list and select the table you want to geocode in the Geocode from Table list.
4. From the **Store Results in Table** box, select one of the following:
 - Select **Update Input Table** to update the current column information with the newly geocoded data.
 - Select **Insert into Table** and then choose the name of the table you want to use from the drop-down list to store the geocoding results into. Selecting **<New>** from the drop-down will allow you to create a new table for storing the geocoding results.

Note: The output table must be writable.

5. Select the type of geocode you want to perform from these options:

Street Level - Use street data as the basis for geocoding the data in the selected table.

Note: **Street Level** type of geocoding is not allowed when you select **Precisely Global Geocoder City/Postal Level** in the Geocoding Server drop-down list.

Postal Centroid Level - Use postal code data as the basis for geocoding the data in the selected table.

Geographic Centroid Level - Use the City/Town Subdivision as the basis for geocoding the data in the selected table.

Note: The option you select in this list determines which data (fields) are enabled and required in the next dialog box. The Fallback options are disabled if you select the Postal- or Geographic-level geocoding methods.

6. To specify the country, select one of the following options. This option is required.

Specify Country - Use this option to select the appropriate country abbreviation for the data you are geocoding from the drop-down list. Click **Get Countries** to retrieve a list of countries available from the selected geocoding service.

From Column - Use this option if the country you are geocoding is listed in a column of the table you are geocoding.

7. Click **Next** to continue. The **Geocode Properties** dialog box displays.

The screenshot shows the 'Geocode Properties' dialog box with the 'Input' tab selected. The dialog has five tabs: 'Input', 'Output', 'Table Options', 'Common Options', and 'Advanced Output'. The 'Input' tab contains the following fields and options:

- Input Table Name:** A text box containing the word 'Selection'.
- Allow Advanced Address:** An unchecked checkbox.
- Address:** A dropdown menu.
- Address 2:** A dropdown menu.
- City / Town Name:** A dropdown menu.
- City / Town Subdivision:** A dropdown menu.
- Country Secondary Subdivision:** A dropdown menu.
- State / Province:** A dropdown menu.
- Postal Code:** A dropdown menu showing 'Name_Code'.
- Secondary Postal Code:** A dropdown menu.
- Country:** A text box containing 'USA'.
- Save Settings to Input Table Metadata:** A checked checkbox.

On the right side of the dialog, there are four buttons: '< Back', 'Geocode' (highlighted in blue), 'Cancel', and 'Help'.

Note: To change a geocode type or service selection, click **Back** to return to the **Geocode using Server** dialog box.

For more information about the options of the **Geocoding Properties** tabs, see:

- [Setting the Input Options for Service Geocoding](#)
 - [Setting the Output Options for Service Geocoding](#)
 - [Setting the Table Options for Service Geocoding](#)
 - [Setting the Common Options for Service Geocoding](#)
 - [Setting the Advanced Output Options for Service Geocoding](#)
8. When you have set your options and selections in the tabs of this dialog box click **Geocode** to begin the geocoding process. A progress bar displays the status of the geocoding process. A summary dialog box displays to report the geocoding results.
- If you selected **Automatic** mode, the geocoding process runs to completion.
 - If you selected **Interactive** mode, and there is more than one matching record for an entry an **Interactive Geocode** dialog box displays.

Interactive Geocode

Server: Servers...

Geocoding Server: Server Info...

Server URL: http://

☐ Allow Advanced Address ☒ Close Matches Only

Country: USA Get Countries

Address: 2701 K ST

Address 2:

City / Town Name: WASHINGTON

City / Town Subdivision:

Country Secondary Subdivision:

State / Province:

Postal Code: 20037

Secondary Postal Code:

Result Code	Address	City / Town	City / Town Subdivi...	Country Secondary...	State / Prov
✓ SS-PNT-CZA	2599 K St NW	Washington		DISTRICT OF COLU...	DC

Options... Search Ignore All Ignore Accept Cancel Help

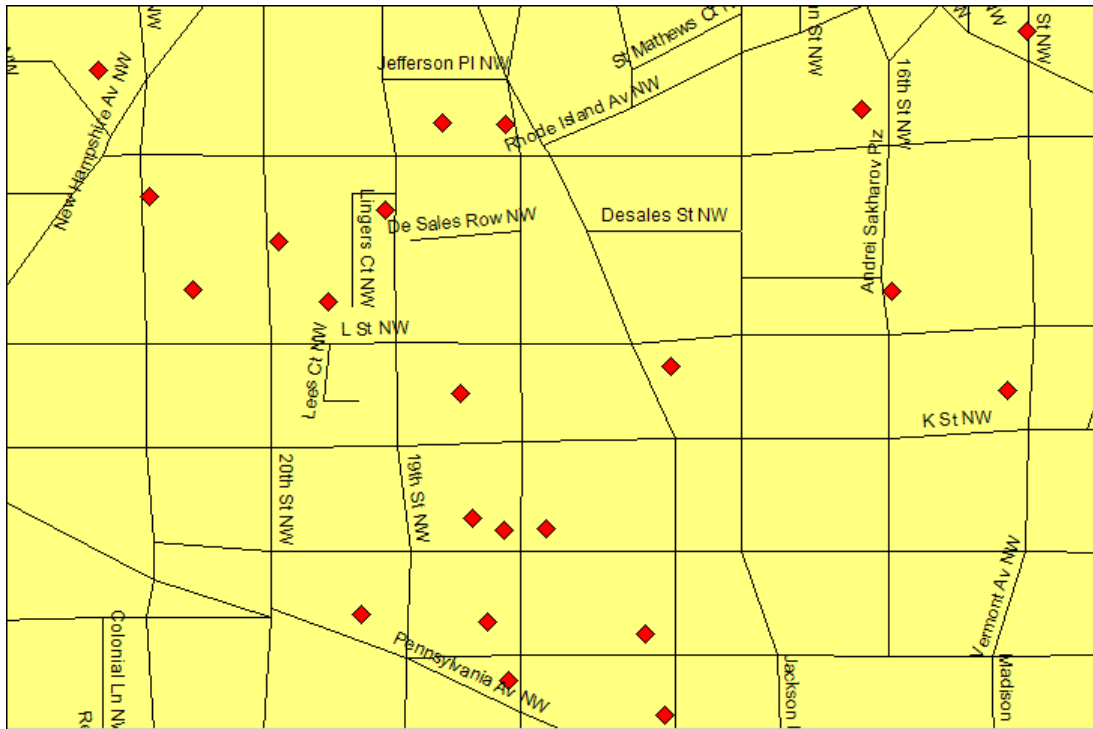
Note: The column widths in this interactive list are maintained throughout the session. Any changes you make here remain.

- If you do not like the results returned by the geocoding server, enter more complete address data in the selection fields or change the options you selected in the **Options** dialog box. Then click **Search** to perform the geocode again.
- Review the entries on the list to determine which is the closest match. Then do one of the following:

Highlight the closest match and click **Accept** to move on to the next record.

If none of the matches is close enough, click **Ignore**. If you want to skip the interactive mode process, click **Ignore All** to run the rest of the process in automatic mode.

- Once you have matched all of the records in interactive mode, the summary dialog box displays reporting the results of the geocoding process. Click **OK** to close this dialog box.



Geocoding Server Results

Note: If you geocode a table and then geocode it a second time using different switches, you may see fewer results compared to the first time. Records with a geocoding result of N (No close match) have output, so that they are not left blank. They contain the input address, which the geocode process does not delete. Results are not left blank so that you can specify the same columns for your input and output to clean the input addresses. To work around this, select all rows that did not geocode and delete the information in their output columns.

Setting the Input Options for Service Geocoding

The Input tab of the **Geocode Properties** dialog box displays the table structure for the file you specified in the Geocode from Table field (from the **Geocode using Server** dialog box). You use the Input tab to specify the input table columns you want the server to use to perform the geocode. If there are entries in these drop-down lists already, MapInfo Pro may prefill them using the metadata available from the input table. It is a good idea to review the data selected in these drop-down lists to ensure that the data you are geocoding is appropriate.

To set the input options for service geocoding:

1. Complete the instructions in [Geocoding a Table using a Geocoding Service](#) to display the **Geocode Properties** dialog box, **Input** tab.

When you select the **Allow Advanced Address** check box, the **City/Town Subdivision** and **Country/Secondary Subdivision** fields enable. You can use them to specify this data. Not all countries use all of these fields.

2. Use the fields in this dialog box to identify the input criteria for the geocoding search. Select the column headings you want to use in geocoding by selecting them from the drop-down lists. Some of the entries may be prefilled with metadata from your .TAB file.

Note: Some of the fields are enabled or disabled based on the type of geocoding you specified.

Input Table Name - Name of the table you are geocoding. This field is prefilled from your selection in the **Geocode Using Server** dialog box.

Allow Advanced Address - Select this check box to enable the City/Town Subdivision and Country Secondary Subdivision drop-down column selection. If you do not need these options to perform the geocode, we recommend you clear this check box.

Note: Some countries require these fields, others do not.

Address - This field contains the street address column name. This field is required for street-level geocoding.

Address 2 - This field contains the secondary street address column name for building number, apartment number-type information.

City/Town Name - This field contains the town or city column name to be geocoded. This field is required for geographic centroid level geocoding.

City/Town Subdivision - This field contains a subdivision of the city. This is used in the U.S. for Puerto Rican urbanization areas but may be used in other geographies as well.

Country Secondary Subdivision - This field contains the column name of subdivision of a country; in the U.S. the country secondary subdivision is a county.

State/Province - This field contains the column name for the country's states or provinces. This field is required for geographic centroid level geocoding.

Postal Code

This field contains the column name for the unique identifier for postal mailing zones. In the U.S. it is a 5- or 9-digit ZIP Code. This field is required for postal centroid level geocoding.

Secondary Postal Code - This field contains the column name for the additional postal zone identifier. In the U.S. it is a 4-digit extension to the Primary Postal Code.

Country - This field contains either the country code or the column name for the country based on the country information from the **Geocode Using Server** dialog box.

Save Settings to Input Table Metadata - Select this option to save the settings you have selected in this dialog box to the input table you are geocoding. If you select this check box, when you geocode this table again, MapInfo Pro "remembers" these settings.

- When you have completed these selections and entries, you are ready to select the output settings. See:

- [Setting the Output Options for Service Geocoding](#)
- [Setting the Advanced Output Options for Service Geocoding](#)
- [Setting the Table Options for Service Geocoding](#)
- [Setting the Common Options for Service Geocoding](#)

Setting the Output Options for Service Geocoding

Many of the output options are the same as the input options, so when the definition is the same, we do not repeat them.

Note: Expressions cannot be used for output.

To set the output options for table-based service geocoding:

- Complete the instructions in [Geocoding a Table using a Geocoding Service](#) to display the **Geocode Properties** dialog box, **Output** tab.
- Click the **Output** tab to specify the names of the output columns for the geocoded data.

Output Table Name - Specifies the output table you selected in the **Geocode Using Server** dialog box. This field is read only.

Update Input Columns with Output Values - Select this check box to replace the address column entries in the input table with the geocoded results from the service. Clear this check box to place the results in new columns. This option is only available when the input and output tables are the same.

CAUTION: Consider carefully before selecting this option. If the geocoding server does not find an exact match, you may lose input data.

Country - Places the country result to be placed into a column in the output table. This is most useful when the geocode request contains addresses from several countries.

Result Code - Directs the service to place the result code for each input address in this column.

Longitude (X) - Directs the service to place the longitude value in this column.

Latitude (Y) - Directs the service to place the latitude value in this column.

Create Points in Output Table - Select this check box to add the point geometries to the output table. Clear this check box to ignore the point geometries.

Add Columns - Use this button to add fields to the output table using the **Modify Table Structure** dialog box. This is useful when you want to set the Result Code, the Longitude, or the Latitude but the output table does not contain these columns.

Save Settings to Output Table Metadata - Select this check box to save the geocoding settings to the metadata in the output table you specified.

3. When you have completed these selections and entries, you are ready to select other geocoding settings or click Geocode to begin the geocoding process. See:
 - [Setting the Advanced Output Options for Service Geocoding](#)
 - [Setting the Table Options for Service Geocoding](#)
 - [Setting the Common Options for Service Geocoding](#)

Setting the Table Options for Service Geocoding

To set the table options for service geocoding:

1. Complete the instructions in [Geocoding a Table using a Geocoding Service](#) to display the **Geocode Properties** dialog box, **Table Options** tab.
2. Click the **Table Options** tab to specify the following table options.

Geocoding Mode - There are two ways to geocode your records using the server: **Automatic** or **Interactive**. Automatic mode usually moves faster, but may geocode fewer records. Interactive mode takes longer but the resulting matches allow you more choice in determining the results.

Automatic - Select this option to geocode street level records of the selected table automatically. If no records match the data in the table, the service skips the record. If multiple records match the data in the table, you can either select:

- **Do Not Match** - Use this option if you want to perform an interactive geocode with all of the multiple matching records later.
- **Accept First** - Use this option to select the first matching address.

Interactive - Select this option to geocode the records of the selected table interactively. When you select this option, the geocoding service lists all close matches for a given address so you can choose the one you want to accept. This option is selected directly when you select the **Postal Centroid** or **Geographic Centroid** options.

Close Matches Only - Select this option to restrict the number of matches that the service displays. The geocoding server determines close matching by reviewing the matches and scoring the results based on how much of the address matches the requested address.

Mixed Case - Select this check box to display the results of your geocoding in mixed case (for the U.S. and Canada only). You might want to select this if you are going to export this data into a report or some other presentation application. If you do not select this option all information in the output fields display in capital letters.

3. When you have completed these selections and entries, you are ready to select other geocoding settings or click Geocode to begin the geocoding process. See:
 - [Setting the Common Options for Service Geocoding](#)
 - [Geocoding a Table using a Geocoding Service](#)
 - [Geocoding a Single Address using a Geocoding Service](#)

Setting the Common Options for Service Geocoding

To set the common geocoding options for service geocoding:

1. Complete the instructions in [Geocoding a Table using a Geocoding Service](#) to display the **Geocode Properties** dialog box.
2. The Common Options tab allows you to specify the matching criteria and fallback options for the data you are geocoding. These options are described in depth in the [Geocoding a Single Address using a Geocoding Service](#).
3. When you have completed these selections and entries, you are ready to select other geocoding settings or click Geocode to begin the geocoding process.

Setting the Advanced Output Options for Service Geocoding

To set the advanced output options for service geocoding:

1. Complete the instructions in [Geocoding a Table using a Geocoding Service](#) to display the **Geocode Properties** dialog box, **Advanced Output** tab.

Note: Click the **Advanced Output** tab to specify the advanced output features of the geocoded data.

Output Table Name - Specifies the output table you selected in the **Geocode Using Server** dialog box.

Key Column - Entering data here is optional but allows you to relate the data from the input table column to the output table column. This is useful for joining the two tables later.

Note: The **Input Table Column** and **Output Table Column** options only enable when you select different input and output tables.

Input Table Column - Use this drop-down list to specify the input table column for the geocoding process. When you scroll to the bottom of this list, there are two additional entries: **RowID** and **Expression**. The RowID option places the row number from the input table into the output table. The Expression option allows you to create an expression (such as; FirstName + LastName) of data from the input table and places the results in the specified output table.

Output Table Column - Use this drop-down list to specify the output column into which the geocoding results should be placed.

Local Geocoder Options - Used to output additional information that is specific to a certain geocoder (as in Census). In the left column, select the geocoder fields you would like to track data from and in the right column select the output column for the results.

Note: You need to know the geocoder specific tag, which can vary by geocode server and country.

You can select up to 4 additional input geocoder fields and associated output columns.

- When you have completed these selections and entries, you are ready to select other geocoding settings or click **Geocode** to begin the geocoding process. See:

- [Setting the Table Options for Service Geocoding](#)
- [Setting the Common Options for Service Geocoding](#)

Geocoding a Table using the Geocode Tool

If the Geocode tool is loaded, on the **SPATIAL** tab, in the **Create** group, click **Geocode**, and **Geocode Using Server** to open the **Geocode** window.

To geocode a table of data using the Geocode Tool:

- Open the table that contains the data you want to geocode.
- On the **Geocode** Tool window, click on **Server** at the bottom to display the **Geocoding Servers List** dialog.
- Select a service from the Geocoding Server list and click **OK**.
- From the **Input Table** drop-down list, select the table to be geocoded.
- Field Mapping**: Select a specific country or select **Multi Country** and specify mapping.
- Address Style**: Choose whether input address is multi line or single line.
- Records to Geocode**: Select records to geocode. You can choose all records or selected rows.
- Geocode Level**: Select the precision level of the geocoder.
- Matching**: Select Matching options when multiple candidates are selected.
- Symbol Style**: Apply style to the selected symbols.
- Use **Advanced Options** to configure Match Mode (determines the leniency used to make a match between the input address and reference data) and point creation settings.
- When you have set your options and selections, click **Process** to begin the geocoding process. A progress bar displays the status of the geocoding process. A summary dialog box displays to report the geocoding results.

Using the Precisely Global Geocoding Server

Precisely offers you a cloud based Geocoding server to geocode your data. Sign up now and get an account with free limited number of geocodes (geocoding credits) per month. You can also buy more geocoding credits from the Precisely website, or from the **Upgrade Plan** command in MapInfo Pro backstage. See *Upgrade Plan command* in the *Help System* for details.

The number of free monthly geocoding credits that you receive depends on the type of your MapInfo Pro license. A **Basic** MapInfo pro license holder receives 1000 geocoding credits per month, and a **Premium** MapInfo Pro license holder receives 2000 geocoding credits per month.

Note: Precisely replenishes your free geocoding credits automatically every month, until you have a valid MapInfo Pro license under maintenance.

Key features of using the Precisely Global Geocoding server from Precisely:

- Get access to over 140 countries to geocode your data.
- The Precisely Global Geocoding server offers two types of geocoding precision levels: Precisely Global Geocoder City/Postal Level and Precisely Global Geocoder Street/Rooftop Level.
- Geocode your data to a higher precision level by using the Precisely Global Geocoder Street/Rooftop Level of geocoding.

Types of Geocoding Precision Levels

The Precisely Global Geocoding server offers two types of geocoding precision levels:

- **Precisely Global Geocoder City/Postal Level:**

You can use this to geocode your data to Geographic or Postal code level. Geocoding your data by using the Precisely Global Geocoder City/Postal Level costs 1 geocoding credit per geocode.

- **Precisely Global Geocoder Street/Rooftop Level:**

You can use this to geocode your data to a higher precision level, Street or Rooftop level. There is also a fallback option of geocoding to geographic or postal level if a higher precision match is not found (depending on the data packs and levels supported for the country). Geocoding your data by using the Precisely Global Geocoder Street/Rooftop Level costs 5 geocoding credits per geocode.

Signing up and Activating your Precisely Global Geocoding Account

If you are new to the Precisely Global Geocoder, you need to sign up first to use the service.

1. To sign up, go to the **Pro** tab, click **Geocoding**, and click **Sign Up Now** in the **My Geocoding Account** page.
2. Enter the information asked in the **Geocoding Account Sign Up** dialog box, and click **Sign Up**.

On successful sign up, **Geocoding License** dialog box displays. Check your email for a message from Precisely that contains your account activation credentials.

Note: Make sure to keep your Precisely Global Geocoding account activation credentials safe for future.

3. Enter your credentials in the **Geocoding License** dialog box, and click **Ok**.

On successful activation, the **My Geocoding Account** page displays the following information:

- User name, email id, and the customer key with which you are currently logged on to the Precisely Global Geocoding account.

- Total geocoding credits you have received and the number of credits you are left with in your account.
- Date on which you shall receive your next quota of free monthly geocoding credits.

If you wish to login as a different user, click on **Change your Geocoding Account Credentials**. The **Geocoding License** dialog box displays where you can change the activation credentials.

Upgrading your Plan

Precisely offers you a limited number of free geocoding credits every month. If you wish to buy more credits, go to the **Pro** tab, click **Geocoding**, and click **Upgrade Plan** in the **My Geocoding Account** page. You shall be re-directed to the Precisely website from where you can buy more geocoding credits.

After successful upgrade of your plan, the **My Geocoding Account** displays the updated geocoding credits for your account.

Note: Your Precisely Global Geocoding account activation credentials remains the same after upgrading your plan.

Understanding the Geocoding Result Codes

The geocoding service returns a result code for each address it attempts to match. The code indicates whether a match was made, the type of match it was, and conveys information about the quality of the match. The result code is an alphanumeric code of 1-10 characters. There are the following Result Code categories:

- **Street level match (S category)**
- **Postcode level match (Z category)**
- **Geographic level match (G category)**
- **Multiple matches during automatic geocoding (M category)**
- **Non-matches (N category)**

Note: The **M** and **N** category of Result Codes are valid only for Envinsa and MapMarker geocoding services.

S Category: Street Level Match

Street level geocoded candidates return a result code beginning with the letter **S**. The second character in the code indicates the positional accuracy of the resulting point for the geocoded record.

Result Code Description

S8	Single match with the point located at either the single point associated with an address point candidate or at an address point candidate that shares the same house number. No interpolation is required.
S7	Single match with the point located at an interpolated point along a street segment. Both a point dictionary and a street segment dictionary must be available. Because known point data is available, the S7 interpolation is more accurate than an S5 result.
S6	Single match with the point located at Postal Code centroid.
S5	Single match with the point located at a street address position. Because only street segment data is available, the interpolation is not as accurate as an S7 return. The S5 code is followed by letters and dashes indicating match precision.
S4	Single match with the point located at a street centroid.
S3	Single match with the point located at a Secondary Postal Code centroid. This is the same quality match as a Z3 result.
S2	Single match with the point located at a Primary Postal Code centroid. This is the same quality match as a Z2 result.
S1	Single match with the point located at a Postal Code centroid. This is the same quality match as a Z1 result.
S0	Single match, however, no coordinates are available.
SX	Single match with the point located at street intersection.
SC	<p>Single match where the original point has been moved a specified distance (usually along a perpendicular line) toward or away from the associated street segment.</p> <p>In general, this result code can be returned only when both a point dictionary and a street segment dictionary are available and when the centerline offset feature is used.</p> <p>For United States, this result code can be returned only when both a point Geocode dataset and a street segment Geocode dataset are available and when the centerline offset feature is used.</p>

The **S** category result codes vary for Australia and Canada. For the respective result codes, see the sections:

- [Australia - S Category Result Codes](#)
- [Canada - S Category Result Codes](#)

For **S** category of result codes, eight additional characters describe how closely the address matches an address in the database. The characters appear in the order listed in the following table. Any non-matched components are represented by a dash.

For example, the result code S5--N-SCZA represents a single match that matched the street name, street suffix direction, town and postcode. The dashes indicate that there was no match on house number, street prefix direction, or thoroughfare type. The match came from the Street Range Address database. This record would be geocoded at the street address position of the match candidate.

Result Code	Description
H	House number match.
P	Street prefix (pre-directional). P is present if any of these conditions are satisfied: <ul style="list-style-type: none"> • The candidate pre-directional matches the input pre-directional. • The candidate post-directional matches the input pre-directional after pre- and post-directionals are swapped. • The input does not have a pre-directional.
N	Street name match.
T	Street/thoroughfare type match.
S	Street suffix (post-directional). S is present if any of these conditions are satisfied: <ul style="list-style-type: none"> • The candidate post-directional matches the input post-directional. • The candidate pre-directional matches the input post-directional after pre- and post-directionals are swapped. • The input does not have a post-directional.
C	City or Town match (this is usually the city or town).
Z	Postal code match.
A or U	Match to Address Dictionary or User Dictionary.

Australia - S Category Result Codes

The following table provides **S** result code descriptions for Australia.

Result Code	Description
-------------	-------------

S8	Single match, point located at either the single point associated with an address point candidate or at an address point candidate that shares the same house number. No interpolation is required.
S8.....G	Single match, with GNAF Reliability levels of 1 or 2 (the highest level of GNAF Reliability).
S7	Single match, located at an interpolated point along the candidate's street segment. When the potential candidate is not an address point candidate and there are no exact house number matches among other address point candidates, the S7 result is returned using address point interpolation.
S7.....G	Single match, with GNAF Reliability level of 3.
S5	Single match, point located at a street address position
S4	Single match, point located at the center of a shape point path (shape points define the shape of the street polyline).
S4.....G	Single match, with a GNAF Reliability level of 4 (associated with a unique road feature.)
S0	Single match, however, no coordinates are available.
SX	Single match with the point located at street intersection.
SC	Single match where the original point has been moved a specified distance (usually along a perpendicular line) toward or away from the associated street segment. This result code can be returned only when both a point Geocode dataset and a street segment Geocode dataset are available and when the centerline offset feature is used.
SG	Single match with point at the center of a locality or Locality level geocode derived from topographic feature. An SG result code is associated with GNAF Reliability Level 5 (locality or neighborhood) or with Level 6 (unique region.)

Canada - S Category Result Codes

The following table provides **S** result code descriptions for Canada.

Result Code	Description
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S8	Single match, point located at either the single point associated with an address point candidate or at an address point candidate that shares the same house number. No interpolation is required.
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Result Code	Description
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S7	Single match, located at an interpolated point along the candidate's street segment. When the potential candidate is not an address point candidate and there are no exact house number matches among other address point candidates, the S7 result is returned using address point interpolation.
S5	Single match, point located at a street address position.
S4	Single match, point located at the center of a shape point path (shape points define the shape of the street polyline).
S3	Single match, point located at postal centroid of FSALDU.
S1	Single match, point located at postal centroid of FSA.
S0	Single match, however, no coordinates are available.
SC	Single match where the original point has been moved a specified distance (usually along a perpendicular line) toward or away from the associated street segment. This result code can be returned only when both a point Geocode dataset and a street segment Geocode dataset are available and when the centerline offset feature is used.

Z Category: Postcode Level Match

Matches in the **Z** category indicate that a match was made at the postcode level. The second character in the code indicates the positional accuracy of the resulting point for the geocoded record.

Result Code	Description
-------------	-------------

Z6	Matched to a Postal Code centroid. The Z6 code indicates that these special postal codes are actual point locations, not an area. Postal Codes include unique single sites, buildings, or organizations.
Z3	Matched with the point located at a Secondary Postal Code centroid.
Z2	Matched with the point located at a Primary Postal Code centroid.
Z1	Matched with the point located at a Postal Code centroid.

G Category: Geographic Level Match

Geographic level geocoded candidates return a result code beginning with the letter **G**. The second character in the code indicates the positional accuracy of the resulting point for the geocoded record.

Result Code	Description
G1	State/Province match with the point located at the state centroid.
G2	County/Region match with the point located at the county centroid.
G3	City/Town match with the point located at the city centroid.
G4	Suburb/village match with the point located at the suburb/village centroid.

M Category: Multiple Automatic Matches

Matches in the **M** category indicate that there is more than one match candidate for the record and the geocoding service has chosen the best one of those candidates. This category displays when you select the automatic option and the geocoding service finds more than one strong match candidate.

Result Code	Description
M1	Multiple matches, point located at Postal Code centroid
M2	Multiple matches, point located at Primary Postal Code centroid
M3	Multiple matches, point located at Secondary Postal Code centroid
M4	Multiple matches, point located at the center of a shape point path (shape points define the shape of the street polyline)
M5	Multiple matches, point located at a street address position (highest accuracy available)
M6	Multiple matches, point located at point Postal Code location
MX	Multiple matches, point located at street intersection

Result Code	Description
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M0	Multiple matches, no coordinates available
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N Category: Non-matches

Result Code	Description
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N	No close match
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Difference Between S3 and Z3 Result Codes

One of the most often asked questions about the geocoding results is what is the difference between S3 and Z3 result codes. An S3 match is defined as a single close match with the point located at the Secondary Postal Code centroid. The Z3 match is also spotted at the Secondary Postal Code centroid. The difference is in how the geocoding service arrives at the results.

An S3 result code indicates that the geocoding service found a street address that matches, but the match record did not contain any street geometry (line points). geocoding service is, therefore, unable to interpolate where along the segment to place the record. The best it can do is to place it at the Secondary Postal Code centroid.

A Z3 match, on the other hand, is a direct match to the Secondary Postal Code centroid. In this case, the geocoding service could not find a street address match for one of several reasons:

1. The request is a Postal Code Centroid
2. There was no close match and your fallback criteria to Postal Code Centroid
3. The address is a P.O. Box or rural route

On a map, the S3 and Z3 records display at the same location, assuming the input Postal Codes were the same for both records. However, the matching process for an S3 record has an extra step that could place the point at a different, and more accurate, Secondary Postal Code centroid. During a street address match, geocoding service corrects the input Postal Code if the match record includes different information. Z3 matches do not get corrected. Because of this correction step, the S3 match is considered the more precise match.

Note: Envinsa and MapMarker parse the results of a postal code differently from each other. Envinsa places the entire postal code in one field, and MapMarker places the results into a primary postal code field and a secondary postal code field.

Figure: Envinsa Postal Code Parsing Example

Out_TownName	Out_Country_2_Su	Out_State_Provinc	Out_Postal_Code	Out_Sec_Post_Code
TROY		NY	12180 8399	

Figure: MapMarker Postal Code Parsing Example

Out_TownName	Out_Country_2_Su	Out_State_Provinc	Out_Postal_Code	Out_Sec_Post_Code
TROY		NY	12180	8399

Routing Using the Envinsa Server

Introduction

The Drivetime web service uses the latest road networks and fast search algorithms to show the buffer boundaries in time (isochrone) or distance (isodistance) from a specified location. These buffers are different from other MapInfo Pro object or table buffers because they are based on road networks and not straight line distances. Driving region time and distance buffers are calculated based on the speed limits of the individual roads and highways in the road network and the distance or time values you request. Isochrones and isodistances are collectively called isograms.

You can only access this Drivetime data and calculation functionality on an Envinsa 4.0 routing server. The Driving Regions web service helps you create isochrone and isodistance buffers using points in your own data.

An *isochrone* or a *time buffer* is a region that shows the area that a driver can reach from a starting point in a specific amount of time based on the speeds specified in the routing network. For example, if you wanted to put together an event and invite the customers who live within an hour's drive of the event site, you could create a time buffer for known customers within an hour's drive. The service would then use the average driving speeds defined in the road network to calculate the time buffer from your event. You can then display your data within those buffer regions using a Select or SQL Select statement.

An *isodistance* or a *distance buffer* is a region that shows the area that a driver can reach from the starting point in the same distance. For example, if you want to contact all of the customers who live within 50 miles of the event instead of one hour, you could calculate the distance using the Drivetime web service, using similar logic.

Effectively, you are creating buffers from a point or table of points based on the server's road network for specified times or distances. Using the Driving Region service options, you can control the way this information displays and the number of time and distance buffers you create at a time.

For more information, see [Creating Time or Distance Buffers for a Table](#) and [Rules when Adding a Driving Value](#).

Before You Begin

Setting up a Routing Server

Before you can access an Envinsa Drivetime service, you need to show MapInfo Pro where to find the Routing server it is housed on. This process gives MapInfo Pro all the information it needs to access the server. You need to enter this information only once per server. To set the routing server preferences, see [Setting the Routing Server Preferences](#).

To add a Routing server:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **Routing** tab, click **Servers** to open the **Routing Servers List** dialog box.
3. Click **Add** to open the **Routing Server Information** dialog box.
4. Type the server URL, the server description, the default user name and password in the fields provided.

Select the **Remember Password** check box to remember the password when you enter the correct user name.

5. Review the default timeout values for the server you are adding. To change these entries, select the **Override Default Values** check box and enter new timeout values.
6. Click **Test URL** to ensure that the connection is available. The **Routing Server Details** dialog box opens.

If the URL is valid, the **Countries** list displays the server's available country data. Click **Close** to return to the **Routing Server Information** dialog box.

Note: If you select **Test URL** and no server connection is found, an error message displays.

7. Click **OK** to return to the **Routing Servers List** dialog box

Set the server that you will use the most as your default, by highlighting it in the list and clicking **Set Default**. A check mark displays beside the server to indicate it will open by default.

8. Click **OK** to close the dialog and save your settings.

MapInfo Pro supports server-side and proxy server authentication. If you use a proxy server for Internet access and your routing server also requires user/password authentication, you authenticate with the proxy server first. As a result, the **Connection** dialog box displays twice—once for the proxy server and once for the routing server.

Setting the Routing Server Preferences

This section describes how to set the Routing Server preferences, which sets the driving region server maintenance options.

For instructions on how to set up MapInfo Pro to work with a routing server, see [Setting up a Routing Server](#)

To set the routing server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **System Settings Preferences** dialog box.
2. On the **Routing** tab, click **Servers** to open the **Routing Servers List** dialog box.
3. Add, edit, and remove Envinsa Drivetime servers.

Set the server that you will use the most as your default, by highlighting it in the list and clicking **Set Default**. A check mark displays beside the server to indicate it will open by default.

4. Click **OK** to close the dialogs and save your settings.

How are Time and Distance Buffers Calculated?

The following image shows a raster map of a portion of a major city, but it could just as easily be your community.



In it, you can see limited access highways, major roads with buildings on them, and local streets with homes. The speed limits on these streets vary depending upon their size and use. The routing server manages the speeds for each road type and uses those speeds to calculate the distance a

driver could travel in a specific amount of time. For example a driver could get further in an hour on a highway, than on a local road, due to the average speed limits on those roads.

If you think of these speed limits and distances in spatial terms, starting from a particular point, the region the web service could create along a highway would be longer and narrower than the region you would create using a more local road based on the same amount of time or distance request.

That is the concept behind the Driving Region functionality.

Using Driving Region Buffers to Display Data

You can create a driving region buffer (time or distance) to find out how far away your customers are from a particular event or location. We recommend that you add a server as described in the [Setting the Routing Server Preferences](#) instructions before attempting to create time or distance buffers.

Here are some definitions that may be useful for you as you use this feature.

Holes	Areas within the larger boundary that cannot be reached within the specified time or distance, based on the road network.
Island	Small areas outside the main boundary that can be reached within the specified time or distance.
Off-road Travel	Off-road travel refers to streets that are not part of the server's road network, such as driveways, private roads, or access roads.

Creating Time or Distance Buffers for Objects

You can use a routing server's driving regions network to create time or distance buffers around map objects to see your data in a new way. Keep in mind that these buffers are not like standard straight line circle buffers, but are rather based on the speed that a driver can travel on a particular road network.

Before you begin this process, we recommend that you set up your own default routing server using the instructions in [Setting the Routing Server Preferences](#).

To create time or distance buffers for an object or objects:

1. Open a table that you want to add the time or distance buffer to and make sure the layer is editable.
2. Select the point object or objects you want to create the buffer or buffers for in the **Map** window.
3. On the **SPATIAL** tab, in the **Create** group, on the **Regions** list, click **Convert to Regions**, and **Drive Regions (Objects)**.

If a user name and password is required, the **Server Password** dialog box displays. Enter the user ID and the password for the routing server. Click **OK**. One of these things occurs:

- If you have a default routing server, the **Create Driving Regions** dialog box displays.

Note: You may notice that the **Add** button in the **Create Driving Regions** dialog box or the **Geocode using Server** dialog box is disabled if you have reached the limit on the number of request values (number of address batches, times, or distances) you have sent to the server. Newer versions of Envinsa allow the server to set limits on the server side, and MapInfo Pro uses these limits. You may see some changes in behavior when you switch servers and the new server has different limits.

Another difference you may see is that a particular quantity of address batches, times or distances may work for one server but not for another.

4. Select the server, request type and request value options for this request.

Routing Server

Select the server for the request from the drop-down list.

5. Select the type of buffer request you want to create from this box. Do one of the following:

- Click **Time** and select the time units to create a time buffer
- Click **Distance** and select the distance units to create a distance buffer

Request Values lets you select the buffer values for the driving region request. For example, to create time buffers for 5, 10, and 15 minutes, you can add or edit the existing request values to read 5, 10, and 15.

Note: The items in the list are always sorted in ascending order of the value.

You can add or remove values using the **Add** and **Remove** buttons. See the [Rules when Adding a Driving Value](#) for more information.

To edit a request value in this box, double-click it and type over the entry or press **F2**.

To change a region style, double-click the image to display the **Region Style** dialog box and make your changes or press **<Ctrl+F2>**.

6. Select the road network details you want the server to use to calculate the buffers you specified.

- **Use major roads only in calculation** – Select this check box to use only the server network's major roads in the buffer calculation. The network can include major roads only or all roads. A major road is a main road or highway.

Note: When you select this option you may get the results faster, but they may be less precise.

- **When multiple drive values are defined** – Use this option only if you are requesting more than one buffer value in this calculation.
- **Create non-overlapping objects** – Select this option to create buffers that do not overlap.
- **Create overlapping objects** – Select this option to create drive value buffers that overlap.

7. Select the advanced options for this request to specify the result types for this request.

- **Exclude holes from results** – Select this button to indicate whether the resulting geometries can contain holes. These pockets of territory are often neighborhoods of local roads that are hard to cross.
- **Exclude islands from results** – Select this button to indicate whether the resulting geometries can include islands outside of the main boundary. These areas are frequently located off exit ramps of major highways. The results can include the islands or ignore them entirely.
- **Speed used for off-road travel/Propagation factor** – The label for this field changes depending upon the driving region request you selected (time or distance). For a time calculation, the Speed used for off-road travel label displays. For a distance calculation requests, the Propagation Factor label displays.

Use the **Speed** field to indicate the speed you want the server to use for roads that are not part of the server's network. The default value for this field is 15, but you can add any whole or decimal number. The Unit drop-down list only displays when you choose an off-road network speed.

Use the **Propagation Factor** field to enter a default percentage that MapInfo Pro will use to calculate the off-road distance for each buffer boundary. Off-road distance or off network distances might include driveways or access roads. The propagation factor is expressed as a percentage of the distance calculation between the starting point and the buffer boundary. The default value for this property is .16 and the range is between .01 and 1.

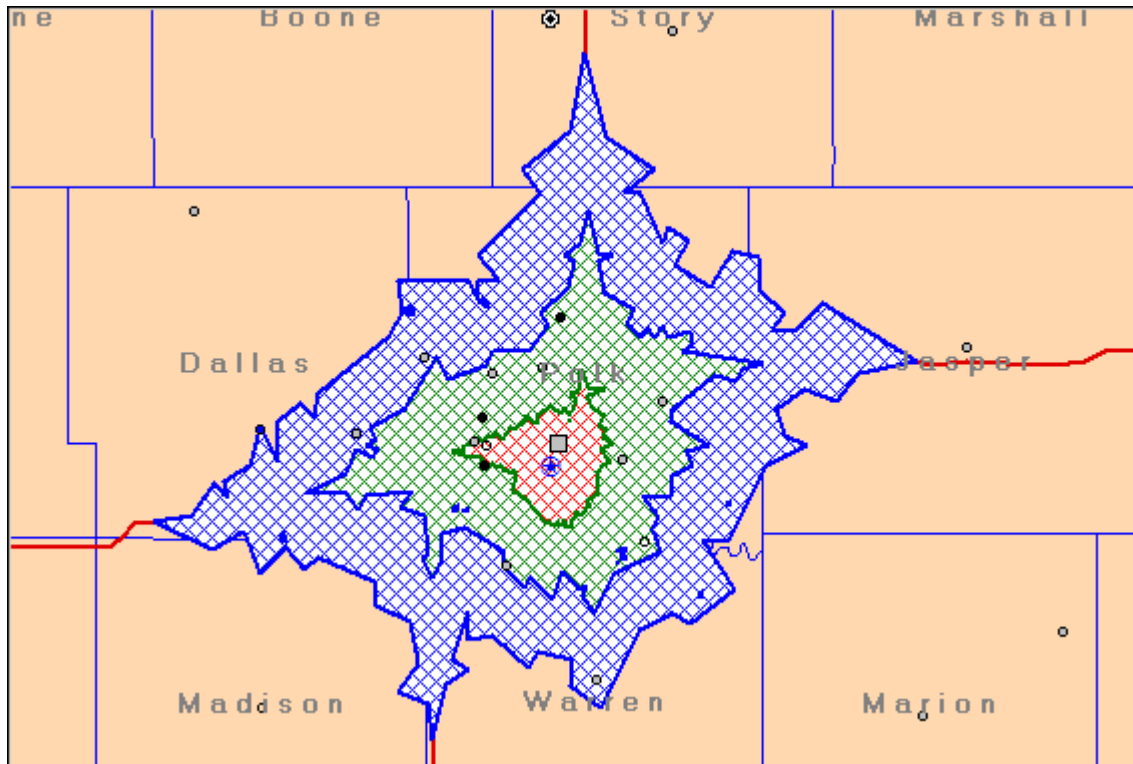
- **Limit off-road travel** – Use this check box to limit the off-road distance used in the calculation. This option can be useful in preventing buffers that extend into areas that you cannot travel in (such as a swamp or body of water). When you select this option, the you can enter a distance value and its units. The default value for this field is 15, but you can enter any integer. The corresponding field and drop-down list are enabled when you select the check box.
- **Include only point objects as input** – Use this option to skip any table objects that are not points. No errors result. This option is selected by default.
- **Reset options from connection** – Use this option to return to the previous options from the current connection.
- **Smoothing factor** – Use this slider control to indicate the smoothness of the polygon you have requested. MapInfo Pro uses this entry to calculate the number of nodes used to create and display in the resulting buffer. When this number is low, there are fewer points and the transmission time is less. You can specify a value between 1% and 100%. The corresponding static text control displays the current value. This bar is always enabled.

8. When you have completed these selections, click **Next** to display the **Data Aggregation** dialog box.

Note: When you are creating driving regions in the Cosmetic layer, click **OK** to begin the process, since no data aggregation occurs.

9. Do one of the following:

- Highlight the field you want to place the new data into and select the **Drive Value** option to put the drive value associated with the resulting geometry into the selected (numeric) column.
 - Highlight the field you want to place the new data into and select the **Drive Unit** option to put the drive unit for the resulting geometry into the selected (character) field.
10. Click **OK** to begin the driving region processing. A status bar displays. Then the driving regions you specified display.



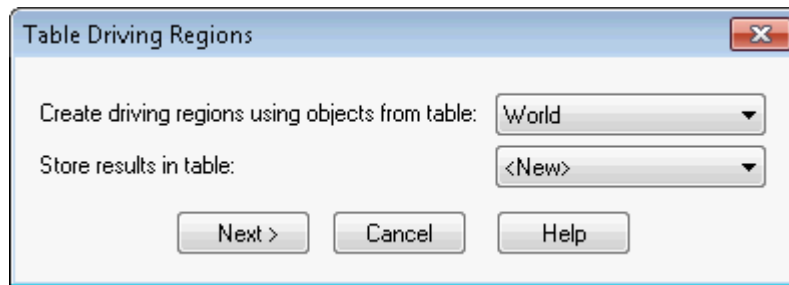
These driving regions were created with non-overlapping objects.

Creating Time or Distance Buffers for a Table

If you have an event at multiple nearby locations and you want to determine which customers are within a particular driving distance or driving time, use the Driving Regions service to display this data on a map.

To create time or distance buffers for a table:

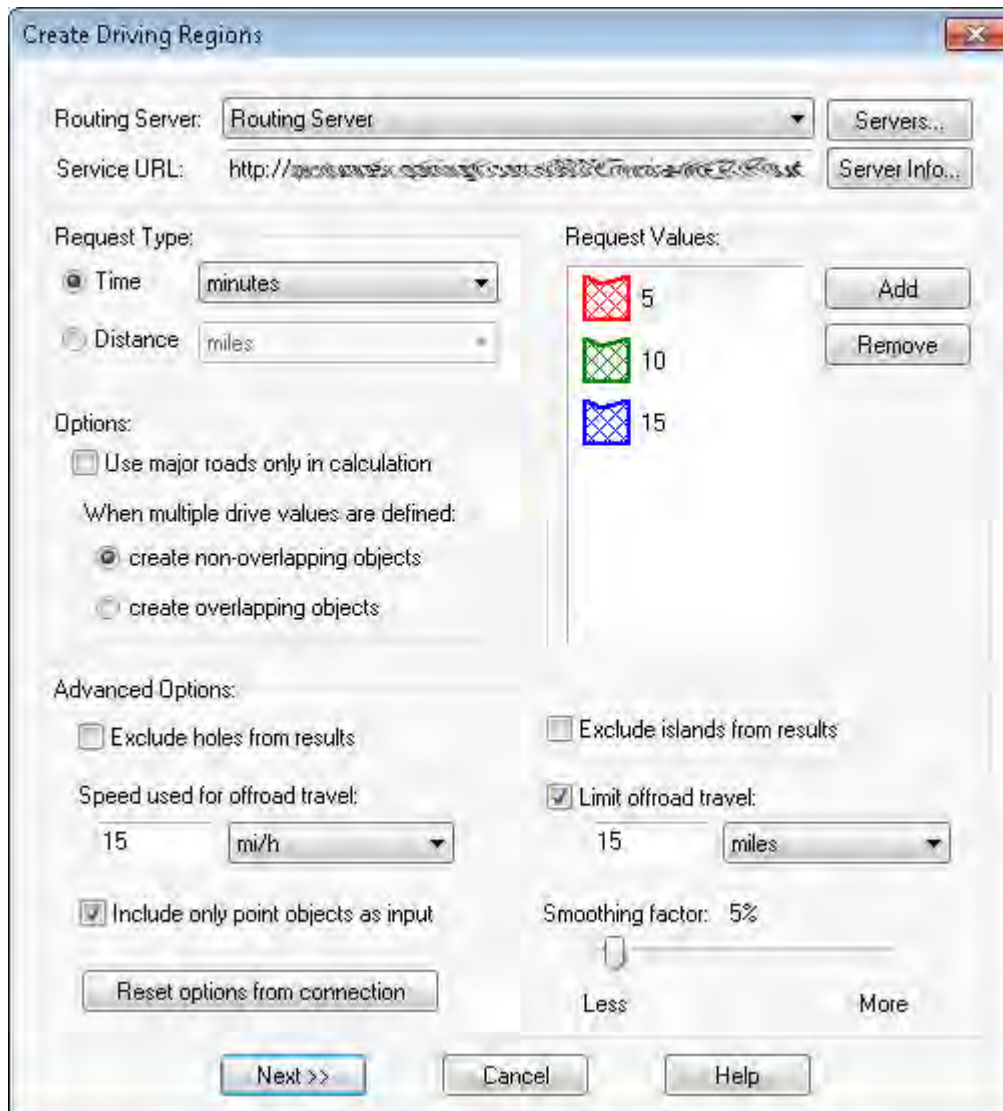
1. Open the table that contains the points for which you want to determine the driving distances or driving times. Make this layer editable.
2. On the **SPATIAL** tab, in the **Create** group, on the **Regions** list, click **Convert to Regions**, and **Drive Regions (Table)**.



3. Use the Create driving regions using objects from table drop-down list to select the table that contains the driving region points.
4. Use the Store results in table drop-down list to select the table in which you want to store the results. Click **Next** to continue.

- *If you select a table name in the Store results list, the **Create Driving Regions** dialog box displays.*
- *If you select <New> to create a new table, the **New Table Structure** dialog box displays so you can select the basic table options for the new table.*

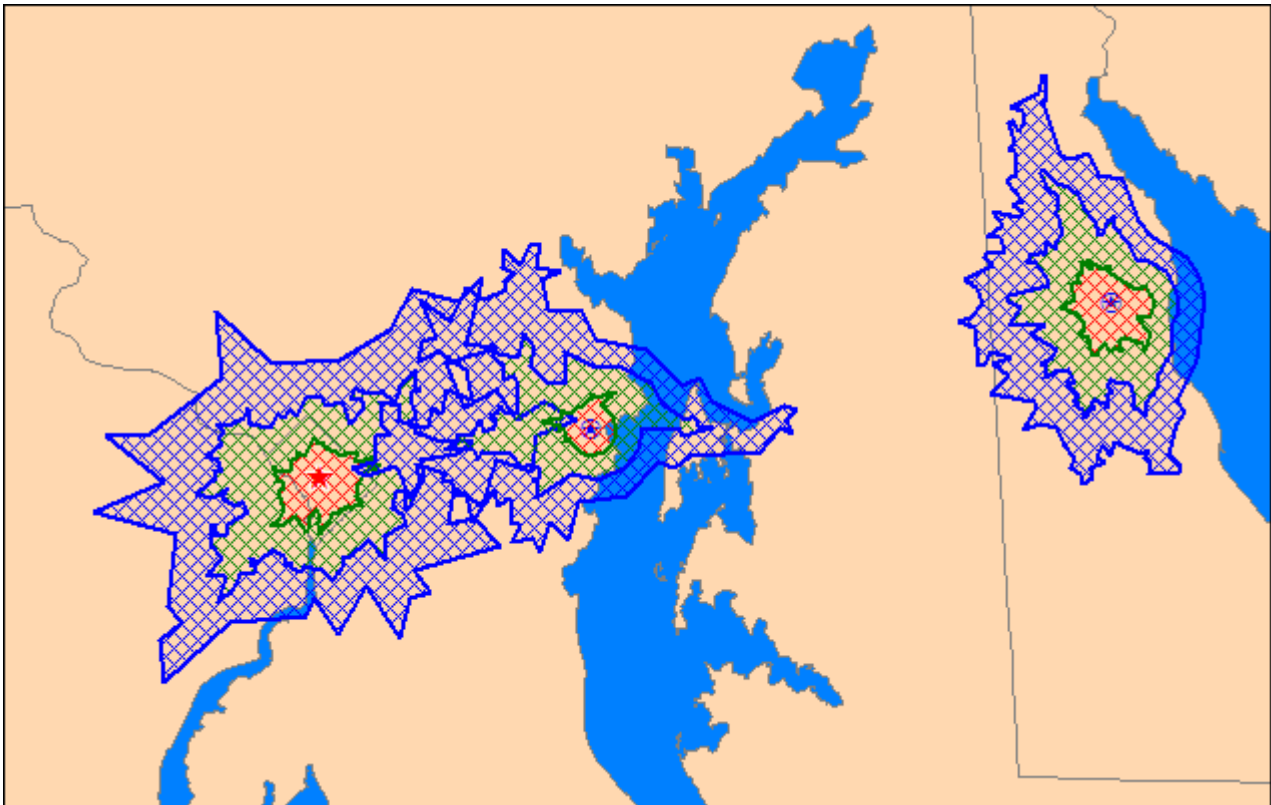
Click **Create** to display the **New Table Structure** dialog box. Add fields to the new table to hold the requested information and click **Create**. The **Create New Table** dialog box displays. Enter the name for the table you are creating and select the path in the fields provided. Then click **Save** to display the **Create Driving Regions** dialog box.



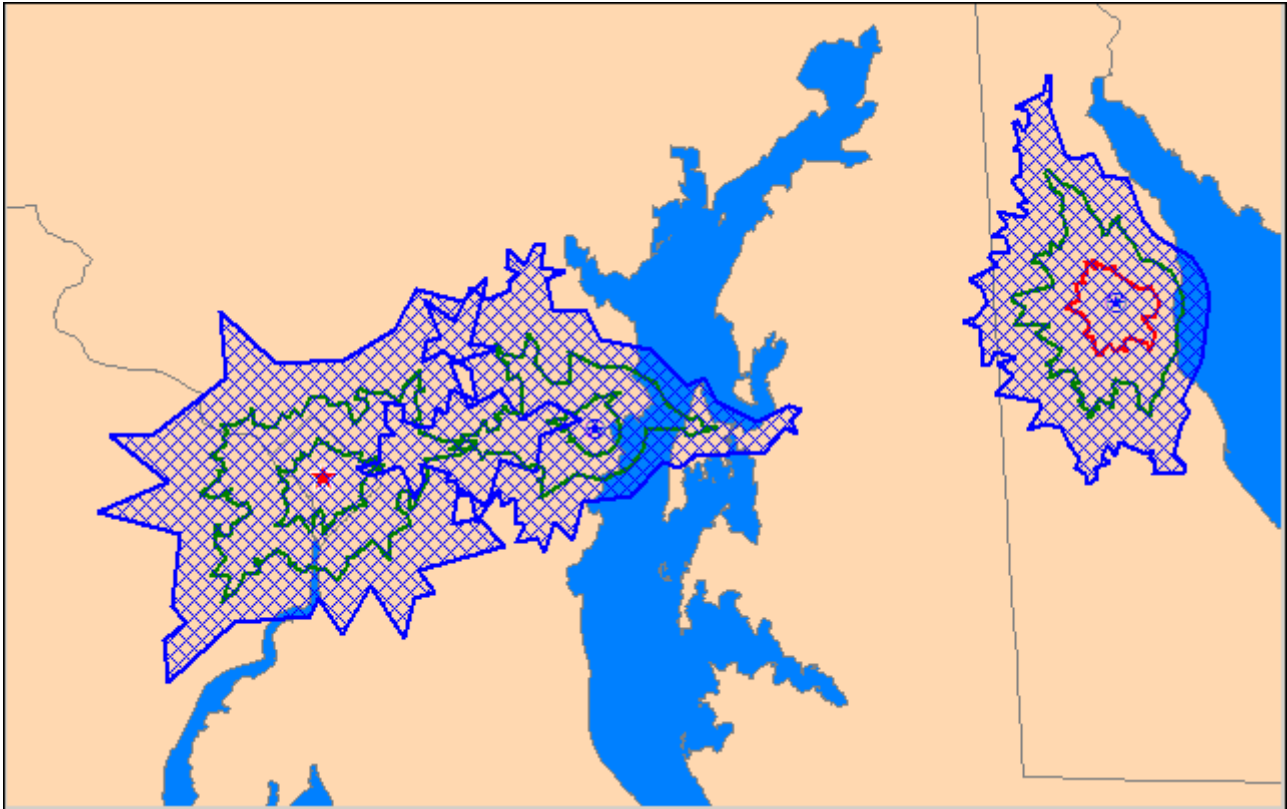
The options in this dialog box are the same as in the previous section.

5. Select the driving region options you want for this request. Click **Next** to continue. See [Using Driving Region Buffers to Display Data](#) for detailed descriptions of these fields. The **Data Aggregation** dialog box displays.
6. Do one of the following:
 - Highlight the field you want to place the new data into and select the **Drive Value** option to put the drive value associated with the resulting geometry into the selected (numeric) column.
 - Highlight the field you want to place the new data into and select the **Drive Unit** option to put the drive unit for the resulting geometry into the selected (character) field.
7. Click **OK** to begin the driving region processing.

Then the driving regions that you specified display.



Driving Region Results (Table) Non-Overlapping Regions



Driving Region Results (Table) Overlapping Regions

Rules when Adding a Driving Value

To add a new value, you must remember these rules:

- Drive values can be in whole numbers or decimals.
- If you enter text that cannot be converted to a drive value within the specified range, an error occurs.
- You cannot enter a drive value that already exists in the list.
- You can enter up to 15 characters.
- When you enter an invalid value and receive an error message, clear the message to edit your entry.

Driving Region Limits

When we were developing these new request capabilities, we wanted to set reasonable limits to prevent server overload while allowing the maximum flexibility to the system. For example, the larger the distances in the distance calculation, the less meaningful the buffer boundaries, since you will

most likely end up with a circle. The more buffers you add to the Request Values list, the more time it will take to retrieve the answer from the server. With these thoughts in mind, these are the limitations we have imposed on the driving region requests:

Value	Minimum/Maximum Limit
Number of Request Values	1 to 50
Size of Request Values	Distance: Up to 280 mi or 450 km (with Major roads only selected) Up to 35 mi or 56 km (when using entire network) Time: Up to 4 hours (with Major roads only selected) Up to 30 minutes (when using entire network)
Offroad Distance	Up to 150 mi or 241 km
Smoothing Factor	1 to less than or equal to 100%
Speed offroad	Default is 15 mph or 24 km\h
Propagation factor	.01 to 1.0
Batch size	1 to 50 records (2 is the default)

Troubleshooting Web Services

Tips for Troubleshooting Web Services

If you are having trouble connecting to a web server, check to see if the connection between your computer and the server was interrupted. The issue could be either at your end or at the server end

of the connection. If you cannot access a public server, then check your Internet status. If you can access a public server, then retry the web server at a later time.

Sometimes our software is unable to understand a response from a web server when the response is poorly formed. In this case, contact the server administrator if the server is in your organization. Your server administrator can address the issue on the server. When accessing a public server, contact the organization that administers the server to get resolution.

Sometimes our software is unable to understand a response from a web server due to a system limitation, which means that there is something in the response that our software does not support.

Mapping Tile Server (MTS) and Microsoft Bing Services

Issue: Unable to Update Bing Services

Issue: If the Bing Service Update utility finds an instance of MapInfo Pro or MapInfo Runtime that has a valid license for extending access to Bing Services and it runs successfully, then no messages display. If the utility cannot update access to Bing Services, then it displays a message for each error found.

Fix: Re-run the Bing Service Update utility from the command prompt using the following flags to save messages to a log file. Contact customer support for assistance and send them the log file. In the following example `BingUtility.log` is the name of the log file.

```
"MapInfoProBingServicesUpdate.exe" /v"/Lv* BingUtility.log
```

Message: No MapInfo Pro or Runtime found

Issue: When you start MapInfo Pro or Runtime, an error displays stating that the product cannot be found.

Fix: If you have a valid version of MapInfo Pro or Runtime installed and get this error, then re-run the Bing Service Update utility from the command prompt using the following flags to save messages to a log file. Contact customer support for assistance and send them the log file. In the following example `BingUtility.log` is the name of the log file.

```
"MapInfoProBingServicesUpdate.exe" /v"/Lv* BingUtility.log
```

Message: An error occurred loading a Tile Server table: Problem retrieving Bing Imagery Metadata

Issue: If you do not have a valid Bing license key, you would be unable to use Bing Tile Services. In this case, accessing Bing Roads, Hybrid, and Aerial display a message.

Fix: Contact your MapInfo Pro Sales Representative to purchase or correct your Bing license key.

Message: Cannot determine the version of MapInfo Pro or Runtime

Issue: You do not have the necessary administrative permissions to write to the machine.

Fix: Ensure that you have Administrator write permission to the machine.

If you have the necessary rights and still see this message, re-run the Bing Service Update utility from the command prompt using the following flags to save messages to a log file. Contact customer support for assistance and send them the log file. In the following example `BingUtility.log` is the name of the log file.

```
"MapInfoProBingServicesUpdate.exe" /v"/Lv* BingUtility.log
```

Message: Cannot find the executable file

Issue: The Bing Service Update utility is unable to locate `MapInfoW.exe`, `MapInfoR.exe`, `MapInfoPro.exe`, and/or `MapInfoRuntime.exe`.

Fix: Re-run the Bing Service Update utility from the command prompt using the following flags to save messages to a log file. Contact customer support for assistance and send them the log file. In the following example `BingUtility.log` is the name of the log file.

```
"MapInfoProBingServicesUpdate.exe" /v"/Lv* BingUtility.log
```

Message: Product in Use

Issue: A messages displays for every instance of MapInfo Pro or Runtime that is currently open when the Bing Service Update utility is run.

Fix: Close the program, and re-run the Bing Service Update utility from the command prompt using the following flags to save messages to a log file. In the following example `BingUtility.log` is the name of the log file.

```
"MapInfoProBingServicesUpdate.exe" /v"/Lv* BingUtility.log
```

Message: Serial Number does not meet update requirements

Issue: A message displays when the product serial number does not match what the Bing Service Update utility expects for the update.

Fix: Contact customer support for assistance.

Message: Incorrect command for silent installation

Issue: There was a typo or a misuse of the silent installation command.

Fix: Follow the instructions in the section *Running in Silent Mode* (in the *Bing Licensing Update Utility*). If the installation still fails, contact customer support for assistance.

Message: Unable to open table BingAriel

Issue: If you have a saved workspace containing a Bing Tile Server layer or a map with objects and vector layers on it, and your Bing key is invalid; you will be unable to open the workspace properly. The workspace would open, but without the tile server layer.

Fix: To resolve these errors, re-enter a valid Bing license key to the Bing Tile Services:

1. On the **PRO** tab, click **Licensing**, and **Bing License Key** (you may need to scroll down your screen to see this option) to display the Bing Key Credential dialog box.
2. Type a valid value in the **Enter valid key** field and click **OK**.

The Bing Roads tile server also may require that you have a valid license for them. If you see a message that your service has expired, then contact your Precisely representative to learn about renewal options. The Add Bing Roads to Map feature is only available to MapInfo Pro Premium Option holders (this service requires an additional fee and do not come standard with the product). The evaluation version of MapInfo Pro includes a preview of this feature, but after activating your MapInfo Pro license, you require the Premium Option to access it.

Web Feature Service (WFS)

Data returned to the WFS client depends on the availability and status of the WFS server and the characteristics and status of the maps on the WFS server. These conditions are beyond the control of MapInfo Pro, which returns any error messages from the WFS server.

Some messages have two parts separated by a colon. The information up to the colon is generated by the MapInfo WFS client. The information following the colon comes directly from the WFS server. For clarification on WFS server messages, contact the service provider of the server.

Message: The WFS Server issued the following exception

Issue: The information following the colon in the message is information from the WFS server and may help you analyze the problem.

Fix: For clarification, contact the service provider of the WFS server.

Message: The following error was issued while attempting to access the WFS server: ...

Issue: The information following the colon in the message is information from the WFS server and may help you analyze the problem.

Fix: There could be a problem with the URL, the server may not be available, or it may have timed out.

Message: The WFS Server returned no data in response to the request

Issue: MapInfo Pro issued a service request, but nothing was received from the server.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Unable to retrieve capabilities from the WFS Server

Issue: The server did not return a list of `FeatureTypes` in response to the `GetCapabilities` request. This message usually displays with another message in the same window.

Fix: Refer to the additional message in the same window and then see [Tips for Troubleshooting Web Services](#).

Message: The WFS Server returned HTML data rather than the requested format. The specified address may not be a WFS Server or the server could not process the request: ...

Issue: The information following the colon in the message is information from the WFS server and may help you analyze the problem. You may see this message after accessing a WFS server and seeing a list of WFS layers.

Fix: The server you are accessing may not be a WFS server. This can occur because the Capabilities document provided by the server may contain additional URLs that redirect you to another server (not the one you explicitly selected). That redirected server may be unavailable or have a problem.

Message: The WFS Server returned data which was neither in the requested format nor a recognized WFS service exception

Issue: The information following the colon in the message is information from the WFS server and may help you analyze the problem.

Fix: The exception message from the server could not be understood. For example, the exception message may not have been in XML format.

Message: Error accessing temporary file

Issue: The temporary file that MapInfo Pro was running is unavailable.

Fix: Check if your disk is full or if the temporary file was deleted while MapInfo Pro was running.

Message: In response to a DescribeFeatureType request, the WFS Server returned an invalid feature type: ...

Issue: MapInfo Pro could not interpret the schema returned by the server.

Fix: The information following the colon in the message is information from the WFS server and identifies the WFS version in the Capabilities document as reported by the server. This may help you analyze the problem.

Message: Unable to read WFS Table Description XML file

Issue: MapInfo Pro is unable to read the XML file containing the WFS table description.

Fix: The most likely cause of this error, is that someone edited the XML file that was created by MapInfo Pro.

Message: Unable to retrieve WFS Server GetFeature: ...

Issue: Unable to retrieve WFS Server `GetFeature`.

Fix: The information following the colon in the message is information from the WFS server and identifies the WFS version in the Capabilities document as reported by the server. This may help you analyze the problem.

Message: An error occurred while processing GML returned from the WFS server

Issue: The server provided GML that MapInfo Pro could not interpret.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: The WFS Server returned capabilities in an unsupported version: ...

Issue: The WFS Server returned capabilities in an unsupported version.

Fix: The information following the colon in the message is information from the WFS server and identifies the WFS version in the Capabilities document as reported by the server. This may help you analyze the problem.

Message: The layer is not supported because it has more than one FeatureType

Issue: The MapInfo WFS client expects one `FeatureType` in the schema, but the server returned a schema containing more than one `FeatureType`.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: You need to select a WFS layer

Issue: After selecting a server in the WFS Server Map Properties dialog box, you must also select a WFS layer. If you click **OK** before selecting a WFS layer, you will get this message.

Fix: Try again and select a WFS layer before clicking **OK**.

Message: Unable to communicate with the WFS server while trying to determine the table structure

Issue: A message displays after clicking **OK** on the **WFS Sever Map Properties** dialog, because the `DescribeFeatureType` failed.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Please select a supported projection

Issue: A message displays when the selected WFS layer has an unsupported projection and a project was not set.

Fix: Try again and click the **Projection** button to set a projection.

Message: Unable to create XML file for WFS table

Issue: A message displays after clicking **OK** on the **WFS Sever Map Properties** dialog, because there is a problem creating the XML file used to open a WFS table.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: The WFS server does not return data in the required GML format

Issue: The selected WFS server does not support GML as an output format.

Fix: Select an alternate WFS server.

Message: XML Parsing Error: message from XML parser

Issue: There is badly formed XML coming from the server. The information following the colon in the message is from the MSXML parser.

Fix: see [Tips for Troubleshooting Web Services](#)

Web Map Service (WMS)

In some cases, the WMS server may return an error when you click on the map. Error messages are displayed in the info tool window itself. Examples of errors include:

- The WMS Server does not support `GetFeatureInfo` requests.
- The WMS Server does not return `GetFeatureInfo` data in a format supported by MapInfo Pro.
- There are no layers that you can query in the WMS table for the `GetFeatureInfo` request
- The WMS Server returned data in `<requested-format>` format rather than the requested format of `<requested-format>`
- Unable to retrieve feature information from the WMS Server.

Data returned to the WMS client depends on the availability and status of the WMS server and on the characteristics and status of the maps on the WFS server. These conditions are beyond the control of Precisely

Some messages have two parts separated by a colon. The information up to the colon is generated by the MapInfo WMS client. The information following the colon comes directly from the WMS server. For clarification on WMS server messages, contact the service provider of the server.

Message: The WMS Server issued the following exception

Issue: The WMS Server issued an exception.

Fix: The information following the colon in the message is information from the WMS server and may help you analyze the problem.

Message: The WMS server generated an error

Issue: The information following the colon in the message is information from the WMS server and may help you analyze the problem.

Fix: Contact the service provider for the WMS server.

Message: The following error was issued while attempting to access the WMS server: message from server

Issue: The information following the colon in the message is information from the WMS server and may help you analyze the problem.

Fix: There could be a problem with the URL, the server may not be available, or it may have timed out.

Message: The WMS Server returned no data in response to the request

Issue: MapInfo Pro issued a service request, but nothing was received from the server.

Fix: see [Tips for Troubleshooting Web Services](#) and [Web Map Service \(WMS\)](#).

Message: Unable to retrieve capabilities from the WMS Server

Issue: The GetCapabilities request from the server failed. This message usually displays with another message in the same window.

Fix: Review the additional message in the window and then see [Tips for Troubleshooting Web Services](#).

Message: The WMS Server returned HTML data rather than the requested format. The specified address may not be a WMS Server or the server could not process the request

Issue: The information following the colon in the message is information from the WMS server and may help you analyze the problem. You may see this message after accessing a WMS server while seeing a list of WMS layers.

Fix: The server you are accessing may not be a WMS server. This can occur because the Capabilities document provided by the server may contain additional URLs that redirect you to another server (not the one you explicitly selected). That redirected server may be unavailable or have a problem.

Message: The WMS Server returned data which was neither in the requested format nor a recognized WMS service exception

Issue: The information following the colon in the message is information from the WMS server and may help you analyze the problem.

Fix: The exception message from the server could not be understood. For example, the exception message may not have been in XML format.

Message: Error accessing temporary file

Issue: The temporary file that MapInfo Pro was running is unavailable.

Fix: Check if your disk is full or if the temporary file was deleted while MapInfo Pro was running.

Message: The WMS Server does not return GetFeatureInfo data in a format supported by MapInfo Pro

Issue: The server may not support `GetFeatureInfo`.

Fix: see [Web Map Service \(WMS\)](#).

Message: The WMS Server does not support GetFeatureInfo requests

Issue: The server may not provide `GetFeatureInfo` in a format understood by MapInfo Pro.

Fix: see [Web Map Service \(WMS\)](#).

Message: There are no layers that you can query in the WMS table for GetFeatureInfo request

Issue: The server may not have layer that you can query. It is possible that a layer changed between creating the WMS table and reopened the table.

Fix: see [Web Map Service \(WMS\)](#).

Message: The WMS Server returned data in formatA rather than the requested format of formatB

Issue: MapInfo Pro requested data in the format that the server claims it supports, however the server is returning a different format.

Fix: For clarification, contact the service provider of the WMS server. See also [Web Map Service \(WMS\)](#).

Message: Unable to retrieve feature information from the WMS server

Issue: The `GetFeatureInfo` request from the server failed. This message usually displays with another message in the same window.

Fix: see [Web Map Service \(WMS\)](#).

Web Map Tile Service (WMTS)

Data returned to the MapInfo Pro WMTS client depends on the availability and status of the WMTS server. These conditions are beyond the control of Precisely

Some messages consist of two parts, separated by a colon. The information up to the colon is generated by the MapInfo WMTS client. The raw data following the colon comes directly from the WMTS server. For clarification on those messages, please contact the service provider of the WMTS server.

*Message: The server issued the following exception: **message from server***

Issue: The information following the colon in the message is information from the WMTS server and may help you analyze the problem.

Fix: There could be a problem with the URL, the server may not be available, or it may have timed out. For further clarification, contact the service provider of the WMTS server.

Message: The following error was issued while attempting to access the server

Issue: There could be a problem with the URL, the server may not be available, or it may have timed out.

Fix: Check the URL and check that the server is available.

Message: Unable to retrieve capabilities from the WMTS Server: ...

Issue: The server did not return a list of Feature Types in response to the GetCapabilities request.

Fix: The information following the colon in the message is information from the WFS server and identifies the WFS version in the Capabilities document as reported by the server. This may help you analyze the problem.

Message: The Server returned data which was neither in the requested format nor a recognized service exception

Issue: The information following the colon in the message is information from the WMTS server and may help you analyze the problem.

Fix: The exception message from the server could not be understood. For example, the exception message may not have been in XML format.

Message: Error creating cache directory for WMTS web requests

Issue: It is possible that the disk is full, or there is a permission issue that prevents creating a cache directory for WMTS requests.

Fix: Check the disk space, and then check that there is adequate permission to create a cache directory.

Message: Error parsing the WMTS server capabilities document

Issue: The server did not returned a capabilities document in the response, or the document is not in a format understood by MapInfo Pro.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Error parsing a Layer information from the WMTS server capabilities document

Issue: The server may not provide Layer information in the XML response document in a format understood by MapInfo Pro.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Error parsing a Bounds Extent information from the WMTS server capabilities document

Issue: The server may not provide Bounding Box information in the XML response document in a format understood by MapInfo Pro.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Error parsing a Resource URL information from the WMTS server capabilities document

Issue: The server may not provide Resource URLs in the XML response document in a format understood by MapInfo Pro.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Error parsing a Tile Matrix information from the WMTS server capabilities document

Issue: The server may not provide Tile Matrix information in the XML response document in a format understood by MapInfo Pro.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Error parsing a Tile Matrix Set information from the WMTS server capabilities document

Issue: The server may not provide Tile Matrix information in the XML response document in a format understood by MapInfo Pro.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Error parsing Version information from the WMTS server capabilities document

Issue: The server may not provide Version information in the XML response document in a format understood by MapInfo Pro.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Unrecognized Coordinate Reference System

Issue: Failed to identify the EPSG code from the XML response document.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: Error locating Tiles at this Zoom Level

Issue: The server failed to return requested tiles at a particular zoom level.

Fix: see [Tips for Troubleshooting Web Services](#)

Message: URL for fetching Tiles from the server could not be created. Please recheck the parameters passed.

Issue: The server URL for fetching the tiles in XML is invalid or has been modified accidentally.

Fix: Check the URL to ensure it is valid.

Message: An error occurred while fetching tiles from the server

Issue: The server failed to return requested tiles due to time out issues or other network issues.

Fix: Check for and correct any network issues.

6 - Working with Coordinate Systems

This section describes the coordinate systems and projections that are standard in MapInfo Pro and explains how to create custom projections.

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Working with Coordinate Systems and Projections

Understanding Coordinate Systems

Maps at their base are a visual representation in two dimensions of a section of the three-dimensional Earth. Being able to use maps in an electronic format in many ways frees us from the constrictions of the two-dimensional map because we can use mathematical formulas to compensate for the curvature of the Earth. In this chapter, we cover the coordinate systems and projections that are standard in MapInfo Pro and provide the commands with which you can create a custom projections to meet your organization's needs. Whether you are a local government trying to establish new tax rolls or a large company trying to define your sales territory more precisely, creating a custom projection may be a solution you want to explore.

The terms "projection" and "coordinate system" are often used interchangeably, however they do not mean the same thing.

Projection - An equation or set of equations that contain mathematical parameters for a map. The exact number and nature of the parameters depends upon the type of projection. You can think of a projection as a method of reducing a map's distortion caused by the curvature of the Earth, or more precisely, a projection compensates for the shortcomings of depicting maps in two dimensions when the coordinates exist in three dimensions.

Coordinate System - When parameters of a projection are assigned specific values, they become a coordinate system. A coordinate system is a collection of parameters that describe coordinates, one of which is a projection.

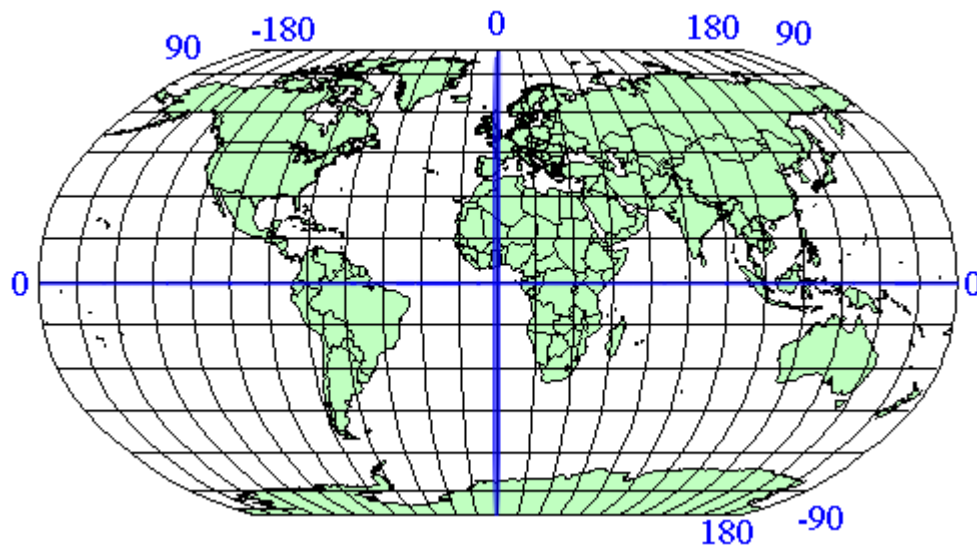
Note: All coordinates are stored with respect to the northeast quadrant. The coordinates for points in the United States have a negative X, while coordinates for points in Europe (east of Greenwich) have a positive X. Coordinates for points in the Northern hemisphere have a positive Y, while coordinates for points in the Southern hemisphere have a negative Y.

You can make a map out of any globe without distorting the points on the surface by placing the globe into an imaginary cylinder.



Globe with Longitude/Latitude Projection

If you transfer the touch points from the globe surface onto the cylinder and roll out the cylinder onto graph paper, the result is a map as in the figure below. In the map that would be created from this cylinder, the Equator is 0 degrees all the way around the globe and the points on that line are completely accurate.



Longitude/Latitude Projection Map

When you add longitude and latitude lines at 15 degree increments to each side of the Equator and the Prime Meridian you create a reference grid. The lines furthest from the Prime Meridian are +180 degrees toward the right and -180 degrees to the left. This map projection is commonly called the Longitude/Latitude projection.

This is often considered the default projection. It is the most effective map for areas nearest the Equator but measurements further away tend to increase in distortion.

Because many people do not live near the Equator, other projections came into use to create more accurate local maps. Accuracy depends upon how you project the globe onto the cylinder. If you turn the cylinder so that it touches the Prime Meridian instead (or any line of longitude, 90 degrees

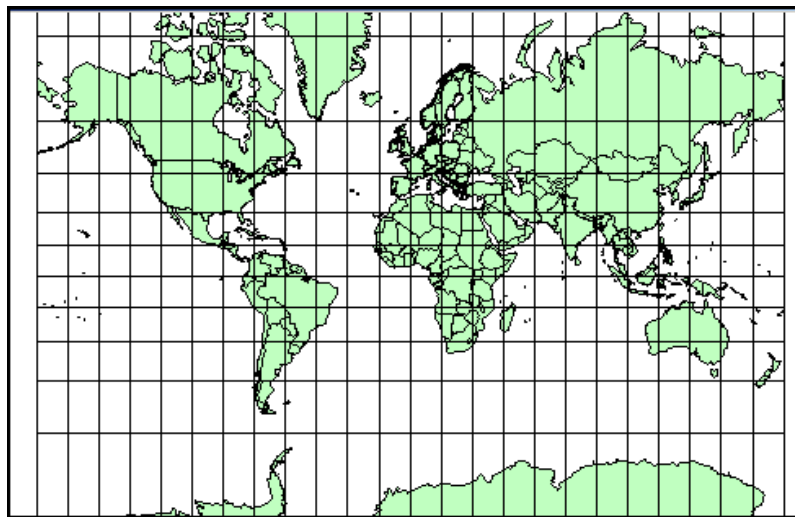
away from the Equator) you have a Transverse Projection. The closer you are to the place the cylinder touches the globe, the more accurate the measurements are.



Globe Demonstrating the Transverse Projection

Transverse projections allow us to make maps that are more North-South line accurate, as long as you compensate for the distance from the new "Equator" which in this case is the Prime Meridian.

Figure: Transverse Mercator Projection Map

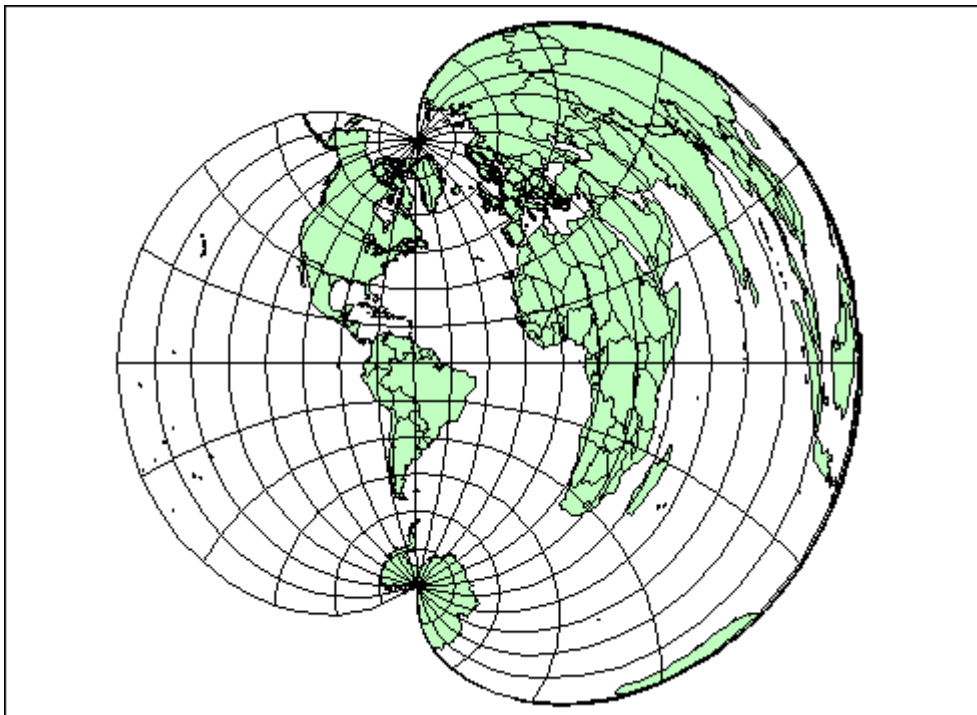


A third type of projection attempts to resolve the distortion problem in another way. Conic projections use a cone shape instead of a cylinder to create the "touch points" .



Globe with Conic Projection

This type of projection is much more accurate for large regions or countries that are wider in the East-West direction than in the North-South direction. There is much less distortion regionally because the touch points of a cone are closer to the map surface than those of a cylinder.



Brazilian Polyconic Projection Map

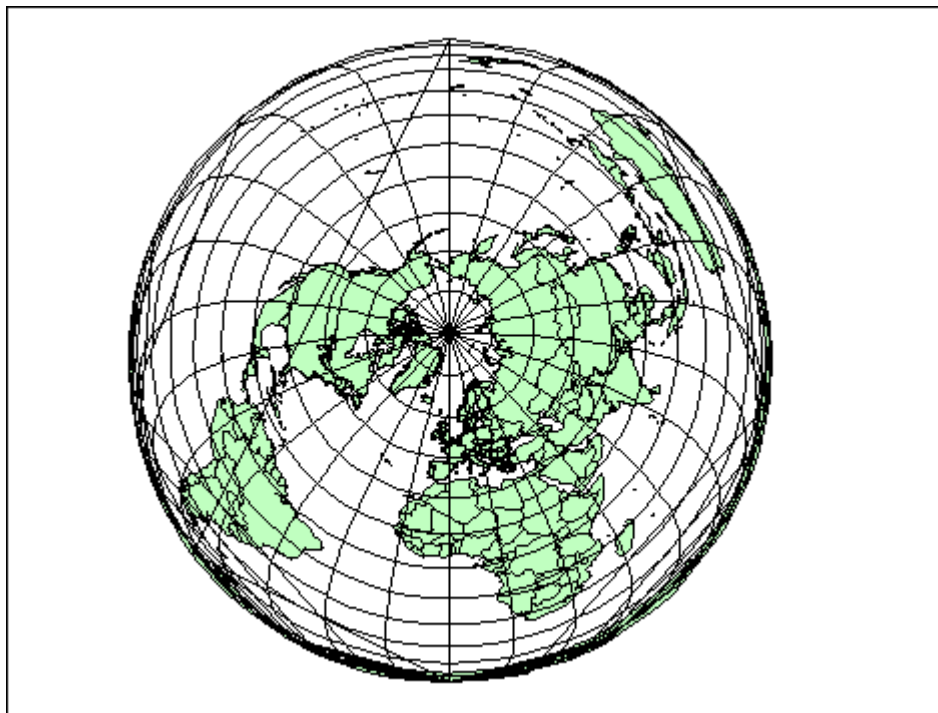
As you can see from the previous figure, the conic maps are best for small regional areas. The smaller-scale map has too much distortion to be useful.

A fourth type of projection, the Azimuthal projection, does not use cones or cylinders but a simple circle that goes all the way around the globe over a particular point. This projection provides a "view from space" over a particular point.



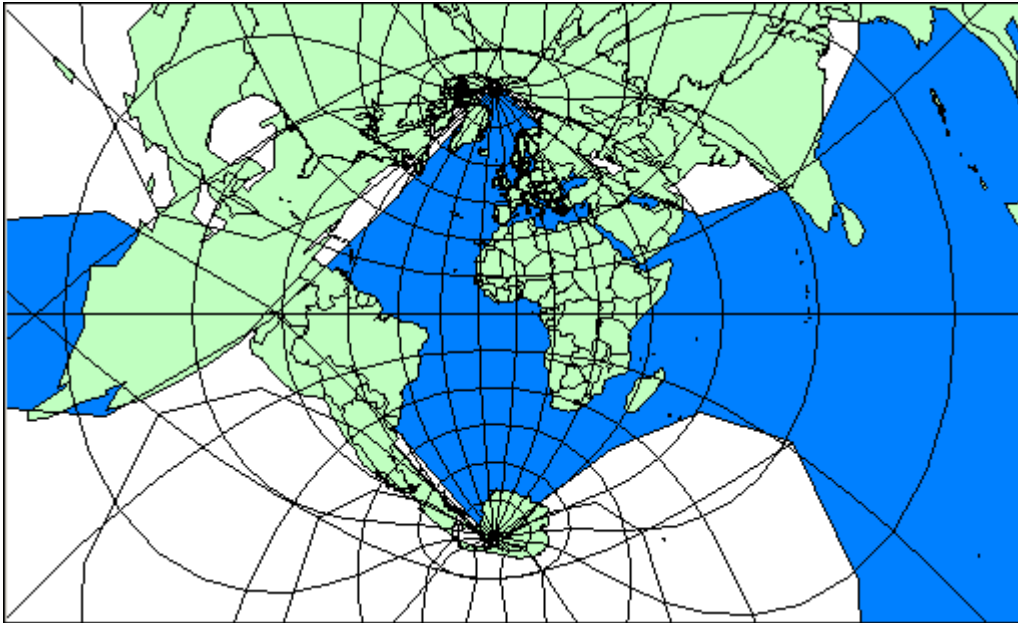
Globe with Azimuthal Projection

This type of projection is most useful when you need to work with a particular hemisphere. A hemisphere need not be North-South or East-West based. The next figure uses the North Pole as the center point for the Azimuthal Projection.



Lambert Azimuthal Projection Map

You can use more than one projection that rotates a cylinder slightly along the Equator. This style is used in the Universal Transverse Mercator (UTM) projection. UTM maps the Earth with a transverse cylinder projection to create standard "UTM Zones". By rotating the cylinder around the globe in six degree increments, the UTM assures that all spots on the Earth are within 3 degrees of the center line. (The Gauss-Kruger system is a European system akin to UTM that also uses a transverse cylinder rotated in six degree steps).



Universal Transverse Mercator Projection Map (UTM Zone 29)

Almost all projections you will use are one of these types. They are either cylindrical (regular or transverse), conic, or azimuthal projections and are customized by slightly different projection parameters. Projection parameters are options that describe how the projection is arranged.

You can further customize projections by specifying different parameters for the projection you want to use. For example, you can specify the longitude and latitude of any point on the Earth to create your own Azimuthal projection of that point. You can customize conic projections by specifying the parallel of latitude at which the cone should be tangent.

Displaying Coordinates

There are two places where coordinates display:

- In the **Status Bar** by cursor location (set in the **Map Options** dialog box or by clicking on the **Status Bar**).
- In dialog boxes that display area measurements, such as a **Point Object**, **Region Object** etc.

Note: Coordinates can only be entered in the **Object Info** dialog boxes when a layer is editable.

You can display coordinates in one of the following formats:

- Decimal degrees (for example -97.90052°, 42.85732°)
- Degrees, minutes, seconds (for example -97° 54' 1.908", 42° 51' 26.28")
- Military Grid Reference (WGS 1984 datum) (for example 14TNN8982545555)
- US National Grid Reference (NAD 83/WGS 84) (for example 14TNN8982545555)
- US National Grid Reference (NAD 27) (for example 14TNN8985745342 (NAD 27))

The default is Decimal degrees.

See Also:

[Changing the Default or Preference Setting for Calculations](#)

Building Blocks of a Coordinate System

In this section, we provide the tables required to create your own coordinate systems using map projections, datums, units, Origins, Standard Parallels, Azimuths, Scale Factors, False Eastings, False Northings, and Ranges. You might want to create your own coordinate system if accuracy is crucial to understanding your data or if your data is specified in relation to a non-standard point, and you would prefer to keep your data in that custom coordinate system.

A coordinate system in MapInfo Pro is made up of many elements which need to be specified in advance. Once these elements are in place, you can be sure that your maps are as accurate as possible. These are the projection elements you need to set in the `MAPINFOW.PRJ` file:

- [Projection Types](#)
- [Datums](#)
- [Units](#)
- [Coordinate System Origin](#)
- [Standard Parallels \(Conic Projections\)](#)
- [Oblique Azimuth \(Hotine Oblique Mercator\)](#)
- [Scale Factor \(Transverse Mercator\)](#)
- [False Easting and False Northing](#)
- [Range \(Azimuthal Projections\)](#)

Note: For datum and unit tables, see [Projection Datums](#) and [Units](#).

See Also:

[Adding Projections to the MAPINFOW.PRJ File](#)

Coordinate Systems, Projections, and their Parameters

By specifying a projection type and various required parameters, you create a mathematical algorithm for producing equivalent coordinates in degrees for the projected coordinate system. Each projection has specific parameters you can customize to make your maps more geographically accurate. The following table details each major coordinate system type and the parameters you can use to customize that system. The parameters are listed in the order they appear in the relevant projection entries in the `MAPINFOW.PRJ` file. To create your own coordinate system using a particular projection, you must add an entry into the `MAPINFOW.PRJ` file.

The parameters of a coordinate system are (in this order):

- Coordinate System Name
- Projection Type
- Datum
- Units
- Original Longitude
- Original Latitude
- Standard Parallel 1
- Standard Parallel 2
- Azimuth
- Scale Factor
- False Easting
- False Northing
- Range

Note: Each of these headings is described in detail in the next few pages.

For a complete list of common coordinate systems and their necessary parameters, see [Projections and Their Parameters](#)

Projections and Their Parameters

The next tables indicate the parameters applicable to each projection, which are listed in the order they appear in the relevant coordinate system lines in the `MAPINFO.WPJ` file (the first table lists the first six parameters and the second table lists the next six parameters). The projection type is the equation or equations used by a coordinate system. The following list names the projections MapInfo uses and gives the number used to identify the projection in the `MAPINFO.WPJ` file:

Projection Name	Projection Type	Datum	Units	Origin, Longitude	Origin, Latitude	Standard Parallel 1
Albers Equal-Area Conic	9	X	X	X	X	X
Azimuthal Equidistant	28	X	X	X	X *	
Azimuthal Equidistant (polar aspect only)	5	X	X	X	X	

Projection Name	Projection Type	Datum	Units	Origin, Longitude	Origin, Latitude	Standard Parallel 1
Cassini-Soldner	30	X	X	X	X	
Cylindrical Equal Area	2	X	X	X		X
Double Stereographic	31	X	X	X	X	
Eckert IV	14	X	X	X		
Eckert VI	15	X	X	X		
Equidistant Conic	6	X	X	X	X	X
Equidistant Cylindrical	33	X	X	X		X
Extended Transverse Mercator	34	X	X	X	X	
Gall	17	X	X	X		
Hotine Oblique Mercator	7	X	X	X	X	
Krovak Oblique Conformal Conic (JTSKc)	32	X	X	X	X	X

Projection Name	Projection Type	Datum	Units	Origin, Longitude	Origin, Latitude	Standard Parallel 1
Lambert Azimuthal Equal-Area	29	X	X	X	X †	
Lambert Azimuthal Equal-Area (polar aspect only)	4	X	X	X	X †	
Lambert Conformal Conic	3	X	X	X	X	X
Lambert Conformal Conic (Modified for Belgium 1972)	19	X	X	X	X	X
Longitude-Latitude	1	X				
Mercator	10	X	X	X		
Miller	11	X	X	X		
Mollweide	13	X	X	X		
New Zealand Map Grid	18	X	X	X	X	
Peninsular RSO GDM2000	35	X	X	X	X	
Polyconic	27	X	X	X	X	
Regional Mercator	26	X	X	X		X

Projection Name	Projection Type	Datum	Units	Origin, Longitude	Origin, Latitude	Standard Parallel 1
Robinson	12	X	X	X		
Sinusoidal	16	X	X	X		
Stereographic	20	X	X	X	X	
Swiss Oblique Mercator	25	X	X	X	X	
Transverse Mercator	8	X	X	X	X	
Tranverse Mercator, (Modified for Danish System 34 Jylland-Fyn)	21	X	X	X	X	
Tranverse Mercator, (Modified for Danish System 34 Sjaelland)	22	X	X	X	X	
Tranverse Mercator, (Modified for Danish System 34 /45 Bornholm)	23	X	X	X	X	
Tranverse Mercator, (Modified for Finnish KKJ)	24	X	X	X	X	

The following table is a continuation of the previous list.

Projection Name	Standard Parallel 2	Azimuth	Rectified Skew to Grid	Scale Factor	False Easting	False Northing	Range
Albers Equal-Area Conic	X				X	X	
Azimuthal Equidistant							X
Azimuthal Equidistant (polar aspect only)							X
Cassini-Soldner					X	X	
Cylindrical Equal Area							
Double Stereographic				X	X	X	
Eckert IV							
Eckert VI							
Equidistant Conic	X				X	X	
Equidistant Cylindrical					X	X	
Extended Transverse Mercator				X	X	X	

Projection Name	Standard Parallel 2	Azimuth	Rectified Skew to Grid	Scale Factor	False Easting	False Northing	Range
Gall							
Hotine Oblique Mercator		X		X	X	X	
Krovak Oblique Conformal Conic (JTSKc)		X			X	X	
Lambert Azimuthal Equal-Area							X
Lambert Azimuthal Equal-Area (polar aspect only)							X
Lambert Conformal Conic	X				X	X	
Lambert Conformal Conic (Modified for Belgium 1972)	X				X	X	
Longitude-Latitude							
Mercator							
Miller							

Projection Name	Standard Parallel 2	Azimuth	Rectified Skew to Grid	Scale Factor	False Easting	False Northing	Range
Mollweide							
New Zealand Map Grid					X	X	
Peninsular RSO GDM2000		X	X	X	X	X	
Polyconic					X	X	
Regional Mercator							
Robinson							
Sinusoidal							
Stereographic				X	X	X	
Swiss Oblique Mercator					X	X	
Transverse Mercator				X	X	X	
Tranverse Mercator, (Modified for Danish System 34 Jylland-Fyn)				X	X	X	

Projection Name	Standard Parallel 2	Azimuth	Rectified Skew to Grid	Scale Factor	False Easting	False Northing	Range
Tranverse Mercator, (Modified for Danish System 34 Sjaelland)				X	X	X	
Tranverse Mercator, (Modified for Danish System 34 /45 Bornholm)				X	X	X	
Tranverse Mercator, (Modified for Finnish KKJ)				X	X	X	

The Origin Latitude for the Azimuthal Equidistant projections must be either 90 or -90. An Oblique Azimuthal Equidistant projection supports all Origin Latitudes, including the poles. A Lambert Azimuthal Equal-Area projection has been added that also supports all Origin Latitudes, including the poles.

Projection Types

The projection type is the equation or equations used by a coordinate system. For a list of projections MapInfo Pro uses, see [Projection Types List](#).

Specifying the Bounds for Coordinate Systems

You can specify the bounds for coordinate systems in the MapInfo Pro .PRJ file. To do so, add 2000 to the projection number and list the bounds after the projection parameters. The general form is:

```
name, projectionnum + 2000, projection parameters, x1, y1, x2, y2
```

For example, to define a UTM Zone 10 coordinate system with bounds of (100000, 400000) to (200000, 450000), use this line:

```
"UTM Zone 10", 2008, 74, 7, -123, 0, 0.9996, 500000, 0, 100000, 400000, 200000, 450000
```

To define a Longitude / Latitude coordinate system with bounds of (-50, 30) to (-48, 35), use this line:

```
"Longitude / Latitude", 2000, 0, -50, 30, -48, 35
```

You can also define a coordinate system with bounds and an affine transformation. In that case, add 3000 to the projection number, and list the bounds after the affine transformation constants. The general form is:

```
name, projectionnum + 3000, projection parameters, unitnum, A, B, C, D,  
E, F, x1, y1, x2, y2
```

Accounting for Affine Transformations and Explicit Bounds in Projection Types

You can modify projection type entries in the `MAPINFOW.PRJ` to add a constant value to account for affine transformations and explicit bounds. Valid constant values are listed in the next table:

Constant	Coordinate System has:	Parameters
1000	Affine transformations	Affine units specifier and coefficients appear after the regular parameters for the system.
2000	Explicit bounds	Bounds appear after the regular parameters for the system.
3000	Both affine transformations and bounds	Affine parameters follow system's parameters; bounds follow affine parameters.

Example:

In this example we use the Transverse Mercator coordinate system with the NAD 1983 datum. You might have this line in your `MAPINFOW.PRJ` file:

```
"UTM Zone 1 (NAD 83)", 8, 74, 7, -177, 0, 0.9996, 500000, 0
```

If you want to account for an affine transformation for this system, you would add the constant to the projection type and append the parameters of the affine transformation as listed below:

Units=meters; A=0.5; B=-0.866; C=0; D=0.866; E=0.5; and F=0

Therefore, the new entry to append the parameters of the affine transformation would be:

```
"UTM Zone 1 (NAD 83) - rotated 60 degrees", 1008, 74, 7, -177, 0,
0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0
```

where:

Entry	Description
1008	Achieved by adding the constant (1000) to the projection type (8)
7	Units for the affine transformation (7 = meters)
0.5, -0.866, 0, 0.866, 0.5, 0	Affine parameters. See Understanding Affine Transformations .

To supply explicit bounds to the coordinate system (x1, y1, x2, y2)=(-500000, 0, 500000, 1000000), the required line entries would be:

```
"UTM Zone 1 (NAD 83) - bounded", 2008, 74, 7, -177, 0, 0.9996, 500000,
0, -500000, 0, 500000, 1000000
```

where:

Entry	Description
2008	Produced by adding the constant (2000) to the projection type (8)
-500000, 0, 500000, 1000000	Explicit bounds parameters

To customize the coordinate system using both the affine transformation and explicit bounds, the entry in the MAPINFOW.PRJ would be:

```
"UTM Zone 1 (NAD 83) - rotated and bounded", 3008, 74, 7, -177, 0,
0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0, -500000, 0,
500000, 1000000
```

where:

Entry	Description
3008	Produced by adding the constant (3000) to the projection type (8)
7	Units for the affine transformation (7 = meters)
0.5, -0.866, 0, 0.866, 0.5, 0	Affine parameters
-500000, 0, 500000, 1000000	Explicit bounds parameters (See Accounting for Affine Transformations and Explicit Bounds in Projection Types.)

Note: For more about affine transformations, see [Understanding Affine Transformations](#).

Projection Types List

The projection type is the equation or equations used by a coordinate system. The following list names the projections MapInfo Pro uses and gives the number used to identify the projection in the MAPINFO .PRJ file:

Number	Projection Type
9	Albers Equal-Area Conic
28	Azimuthal Equidistant (all origin latitudes)
5	Azimuthal Equidistant (polar aspect only)
30	Cassini-Soldner
2	Cylindrical Equal-Area
31	Double Stereographic

Number	Projection Type
14	Eckert IV
15	Eckert VI
6	Equidistant Conic, also known as Simple Conic
33	Equidistant Cylindrical
34	Extended Transverse Mercator
17	Gall
7	Hotine Oblique Mercator
32	Krovak Oblique Conformal Conic (JTSKc)
4	Lambert Azimuthal Equal-Area (polar aspect only)
29	Lambert Azimuthal Equal-Area
3	Lambert Conformal Conic
19	Lambert Conformal Conic (modified for Belgium 1972)
1	Longitude/Latitude
10	Mercator
11	Miller Cylindrical

Number	Projection Type
13	Mollweide
18	New Zealand Map Grid
27	Polyconic
26	Regional Mercator
12	Robinson
16	Sinusoidal
20	Stereographic
25	Swiss Oblique Mercator
8	Transverse Mercator, (also known as Gauss-Kruger)
21	Transverse Mercator, (modified for Danish System 34 Jylland-Fyn)
22	Transverse Mercator, (modified for Danish System 34 Sjaelland)
23	Transverse Mercator, (modified for Danish System 34/45 Bornholm)
24	Transverse Mercator, (modified for Finnish KKJ)

Projection numbers in the `MAPINFOW.PRJ` may be modified by the addition of a constant value to the base number listed in the Projection table, above. Valid values and their meanings are in the next table:

Constant	Meaning	Parameters
1000	System has affine transformations	Affine units specifier and coefficients appear after the regular parameters for the system.
2000	System has explicit bounds	Bounds appear after the regular parameters for the system.
3000	System with both affine and bounds	Affine parameters follow system's parameters; bounds follow affine parameters.

Example:

Assume you want to work with a simple system based on the Transverse Mercator projection and using the NAD 1983 datum. You might have a line such as the following in your `MAPINFOW.PRJ` file:

```
"UTM Zone 1 (NAD 83)", 8, 74, 7, -177, 0, 0.9996, 500000, 0
```

Now let us say that you want a system based on this, but with an affine transformation specified by the following parameters (see [Understanding Affine Transformations](#)): Units=meters; A=0.5; B=-0.866; C=0; D=0.866; E=0.5; and F=0. The required line in the `MAPINFOW.PRJ` file is:

```
"UTM Zone 1 (NAD 83) - rotated 60 degrees", 1008, 74, 7, -177, 0, 0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0
```

Alternatively, if you want to bound the system to (x1, y1, x2, y2)=(-500000, 0, 500000, 1000000), the required line is:

```
"UTM Zone 1 (NAD 83) - bounded", 2008, 74, 7, -177, 0, 0.9996, 500000, 0, -500000, 0, 500000, 1000000
```

To customize the system using both of these modifications, the line is:

```
"UTM Zone 1 (NAD 83) - rotated and bounded", 3008, 74, 7, -177, 0, 0.9996, 500000, 0, 7, 0.5, -0.866, 0, 0.866, 0.5, 0, -500000, 0, 500000, 1000000
```

Datums

A datum is established by tying a reference ellipsoid to a particular point on the earth. The following Datums table lists the details for each datum:

- The number used to identify the datum in the `MAPINFOW.PRJ` file.
- The datum's name
- The maps for which the datum is typically used
- The datum's reference ellipsoid

For a comprehensive list of supported projection datums, see [Projection Datums](#).

To create a custom datum, see [Defining Custom Datums](#).

For a list of datum changes by version, see [Coordinate System Enhancements by Version](#).

Converting Coordinates from One Datum to Another

When converting coordinates from one datum to another, MapInfo Pro has used the Molodensky (3-parameter) and Bursa-Wolfe (7-parameter) methods. These are general-purpose methods that can convert coordinates from any datum to any other datum.

After the NAD 83 datum was introduced, NOAA developed a program called NADCON, which stands for North American Datum CONversion. This is a very specialized program that converts coordinates only from NAD 27 to NAD 83 and vice versa. For this specialized task, it is much more accurate than the Molodensky general-purpose method; NADCON is accurate to about 0.1 meter, and Molodensky is accurate to only 10-30 meters. Most U.S. government agencies, including the Census Bureau, have standardized on NADCON for converting between NAD 27 and NAD 83.

The NADCON algorithm is used to convert coordinates between NAD 27 and NAD 83 if those coordinates lie within the areas covered by NADCON (United States, Puerto Rico, and the Virgin Islands). If the coordinates lie outside those areas, or if they use datums other than NAD 27 or NAD 83, MapInfo Pro uses the Molodensky or Bursa-Wolfe conversion methods.

Due to the file access required, the NADCON conversion method can be slightly slower than the Molodensky method. If you want to turn off the NADCON conversion, add a "NADCON" entry to the registry. The registry entry should have this path:

```
HKEY_LOCAL_MACHINE\Software\MapInfo\MapInfo\Common\NADCON
```

If this entry is set to zero, then the Molodensky conversion method will be used instead of NADCON.

```
NADCON=0
```

Projection Datums

The datum is established by tying a reference ellipsoid to a particular point on the earth. The following table lists these details for each datum.

- Number - The number used to identify the datum in the `MAPINFOW.PRJ` file.
- Datum Name - The datum's name
- Area of Coverage - The maps for which the datum is typically used
- Ellipsoid - The datum's reference ellipsoid

Number	Datum Name	Area of Coverage	Ellipsoid
1	Adindan	Ethiopia, Mali, Senegal, Sudan	Clarke 1880
2	Afgooye	Somalia	Krassovsky
1007	AGD 66, 7 parameter	Australia, A.C.T.	Australian National
1008	AGD 66, 7 parameter	Australia, Tasmania	Australian National
1009	AGD 66, 7 parameter	Australia, Victoria/NSW	Australian National
1006	AGD 84, 7 parameter	Australia	Australian National
3	Ain el Abd 1970	Bahrain Island	International
118	American Samoa	American Samoa Islands	Clarke 1866
4	Anna 1 Astro 1965	Cocos Islands	Australian National
119	Antigua Island Astro 1943	Antigua, Leeward Islands	Clarke 1880
5	Arc 1950	Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe	Clarke 1880
6	Arc 1960	Kenya, Tanzania	Clarke 1880
7	Ascension Island 1958	Ascension Island	International
9	Astro B4 Sorol Atoll	Tern Island	International

Number	Datum Name	Area of Coverage	Ellipsoid
8	Astro Beacon "E"	Iwo Jima Island	International
10	Astro DOS 71/4	St. Helena Island	International
11	Astronomic Station 1952	Marcus Island	International
12	Australian Geodetic 1966 (AGD 66)	Australia and Tasmania Island	Australian National
13	Australian Geodetic 1984 (AGD 84)	Australia and Tasmania Island	Australian National
120	Ayabelle Lighthouse	Djibouti	Clarke 1880
154	Beijing 1954	China	Krassovsky (#3)
1019	Belgian 1972 (7 parameters)	Belgium	International 1924
110	Belgium	Belgium	International
14	Bellevue (IGN)	Efate and Erromango Islands	International
15	Bermuda 1957	Bermuda Islands	Clarke 1866
16	Bogota Observatory	Colombia	International
121	Bukit Rimpah	Bangka and Belitung Islands (Indonesia)	Bessel 1841
17	Campo Inchauspe	Argentina	International

Number	Datum Name	Area of Coverage	Ellipsoid
18	Canton Astro 1966	Phoenix Islands	International
19	Cape	South Africa	Clarke 1880
20	Cape Canaveral	Florida and Bahama Islands	Clarke 1866
1005	Cape, 7 parameter	South Africa	WGS 84
21	Carthage	Tunisia	Clarke 1880
158	CH1903+ datum for Switzerland	Switzerland	Bessel
22	Chatham 1971	Chatham Island (New Zealand)	International
23	Chua Astro	Paraguay	International
122	Coordinate System 1937 of Estonia	Estonia	Bessel 1841
24	Corrego Alegre	Brazil	International
123	Dabola	Guinea	Clarke 1880
156	Dealul Piscului 1970	Romania	Krassovsky
124	Deception Island	Deception Island, Antarctica	Clarke 1880
1000	Deutsches Hauptdreicksnetz (DHDN) Potsdam/Rauenberg	Germany	Bessel

Number	Datum Name	Area of Coverage	Ellipsoid
25	Djakarta (Batavia)	Sumatra Island (Indonesia)	Bessel 1841
26	DOS 1968	Gizo Island (New Georgia Islands)	International
27	Easter Island 1967	Easter Island	International
115	EUREF 89	Europe	GRS 80
28	European 1950 (ED 50)	Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland	International
29	European 1979 (ED 79)	Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland	International
108	European 1987 (ED 87)	Europe	International
125	Fort Thomas 1955	Nevis, St. Kitts, Leeward Islands	Clarke 1880
30	Gandajika Base	Republic of Maldives	International
116	GDA 94	Australia	GRS 80
32	Geodetic Reference System 1967 (GRS 67)	Worldwide	GRS 67
33	Geodetic Reference System 1980 (GRS 80)	Worldwide	GRS 80

Number	Datum Name	Area of Coverage	Ellipsoid
126	Graciosa Base SW 1948	Faial, Graciosa, Pico, Sao Jorge, and Terceira Islands (Azores)	International 1924
34	Guam 1963	Guam Island	Clarke 1866
35	GUX 1 Astro	Guadalcanal Island	International
150	Hartbeesthoek 94	South Africa	WGS 84
127	Herat North	Afghanistan	International 1924
128	Hermannskogel	Yugoslavia (Prior to 1990), Slovenia, Croatia, Bosnia and Herzegovina, Serbia	Bessel 1841
153	HGRS87		GRS80 (#0)
36	Hito XVIII 1963	South Chile (near 53°S)	International
37	Hjorsey 1955	Iceland	International
38	Hong Kong 1963	Hong Kong	International
1004	Hungarian Datum of 1972 (HD 72)	Hungary	GRS 80
39	Hu-Tzu-Shan	Taiwan	International
40	Indian	Thailand and Vietnam	Everest (India 1830)
41	Indian	Bangladesh, India, Nepal	Everest (India 1830)

Number	Datum Name	Area of Coverage	Ellipsoid
129	Indian	Pakistan	Everest (Pakistan)
130	Indian 1954	Thailand	Everest (India 1830)
131	Indian 1960	Vietnam	Everest (India 1830)
132	Indian 1975	Thailand	Everest (India 1830)
133	Indonesian 1974	Indonesia	Indonesian 1974
42	Ireland 1965	Ireland	Modified Airy
134	ISTS 061 Astro 1968	South Georgia Island	International 1924
43	ISTS 073 Astro 1969	Diego Garcia	International
152	JGD2000	Japan	Bessel 1841
44	Johnston Island 1961	Johnston Island	International
45	Kandawala	Sri Lanka	Everest (India 1830)
46	Kerguelen Island	Kerguelen Island	International
47	Kertau 1948	West Malaysia and Singapore	Everest (W. Malaysia and Singapore 1948)
1016	KKJ	Finland	International

Number	Datum Name	Area of Coverage	Ellipsoid
135	Kusaie Astro 1951	Caroline Islands, Federated States of Micronesia	International 1924
48	L.C. 5 Astro	Cayman Brac Island	Clarke 1866
136	Leigon	Ghana	Clarke 1880
49	Liberia 1964	Liberia	Clarke 1880
155	Libya (LGD 2006)	Libya	International
113	Lisboa (DLx)	Portugal	International
1018	Lithuanian Pulkovo 1942	Latvia, Lithuania	Krassovsky (#3)
50	Luzon	Philippines (excluding Mindanao Island)	Clarke 1866
51	Luzon	Mindanao Island	Clarke 1866
138	M'Poraloko	Gabon	Clarke 1880
52	Mahe 1971	Mahe Island	Clarke 1880
53	Marco Astro	Salvage Islands	International
54	Massawa	Eritrea (Ethiopia)	Bessel 1841
114	Melrica 1973 (D73)	Portugal	International

Number	Datum Name	Area of Coverage	Ellipsoid
55	Merchich	Morocco	Clarke 1880
56	Midway Astro 1961	Midway Island	International
57	Minna	Nigeria	Clarke 1880
137	Montserrat Island Astro 1958	Montserrat, Leeward Islands	Clarke 1880
58	Nahrwan	Masirah Island (Oman)	Clarke 1880
59	Nahrwan	United Arab Emirates	Clarke 1880
60	Nahrwan	Saudi Arabia	Clarke 1880
61	Naparima, BWI	Trinidad and Tobago	International
109	Netherlands	Netherlands	Bessel
1010	New Zealand Geodetic Datum 194, 7 parameter	New Zealand	International
31	New Zealand Geodetic Datum 1949 (NZGD 49)	New Zealand	International
62	North American 1927 (NAD 27)	Continental U.S.	Clarke 1866
63	North American 1927 (NAD 27)	Alaska	Clarke 1866
64	North American 1927 (NAD 27)	Bahamas (excluding San Salvador Island)	Clarke 1866

Number	Datum Name	Area of Coverage	Ellipsoid
65	North American 1927 (NAD 27)	San Salvador Island	Clarke 1866
66	North American 1927 (NAD 27)	Canada (including Newfoundland Island)	Clarke 1866
67	North American 1927 (NAD 27)	Canal Zone	Clarke 1866
68	North American 1927 (NAD 27)	Caribbean (Turks and Caicos Islands)	Clarke 1866
69	North American 1927 (NAD 27)	Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua)	Clarke 1866
70	North American 1927 (NAD 27)	Cuba	Clarke 1866
71	North American 1927 (NAD 27)	Greenland (Hayes Peninsula)	Clarke 1866
72	North American 1927 (NAD 27)	Mexico	Clarke 1866
73	North American 1927 (NAD 27)	Michigan (used only for State Plane Coordinate System 1927)	Modified Clarke 1866
74	North American 1983 (NAD 83)	Alaska, Canada, Central America, Continental U.S., Mexico	GRS 80
139	North Sahara 1959	Algeria	Clarke 1880
1022	North Sahara 7-parameter	Algeria	Clarke 1880

Number	Datum Name	Area of Coverage	Ellipsoid
107	Nouvelle Triangulation Francaise (NTF) Greenwich Prime Meridian	France	Modified Clarke 1880
1002	Nouvelle Triangulation Francaise (NTF) Paris Prime Meridian	France	Modified Clarke 1880
111	NWGL 10	Worldwide	WGS 72
117	NZGD 2000	New Zealand	GRS 80
75	Observatorio 1966	Corvo and Flores Islands (Azores)	International
140	Observatorio Meteorologico 1939	Corvo and Flores Islands (Azores)	International 1924
76	Old Egyptian	Egypt	Helmert 1906
77	Old Hawaiian	Hawaii	Clarke 1866
78	Oman	Oman	Clarke 1880
79	Ordnance Survey of Great Britain 1936	England, Isle of Man, Scotland, Shetland Islands, Wales	Airy
80	Pico de las Nieves	Canary Islands	International
81	Pitcairn Astro 1967	Pitcairn Island	International
141	Point 58	Burkina Faso and Niger	Clarke 1880

Number	Datum Name	Area of Coverage	Ellipsoid
142	Pointe Noire 1948	Congo	Clarke 1880
157	Popular Visualization CRS / Mercator	Worldwide	WGS 84 Sphere
143	Porto Santo 1936	Porto Santo and Madeiras Islands	International 1924
1000	Potsdam	Germany	Bessel
82	Provisional South American 1956	Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela	International
36	Provisional South Chilean 1963	South Chile (near 53°S)	International
83	Puerto Rico	Puerto Rico and Virgin Islands	Clarke 1866
1001	Pulkovo 1942	Germany	Krassovsky
84	Qatar National	Qatar	International
85	Qornoq	South Greenland	International
1000	Rauenberg	Germany	Bessel
86	Reunion	Mascarene Island	International
112	Rikets Triangulering 1990 (RT 90)	Sweden	Bessel

Number	Datum Name	Area of Coverage	Ellipsoid
1011	Rikets Triangulering 1990 (RT 90), 7 parameter	Sweden	Bessel
87	Rome 1940	Sardinia Island	International
1012	Russia PZ90	Russia	PZ90
1012	Russia PZ90	Russia	PZ90
1013	Russia SK42	Russia	SK95
1014	Russia SK95	Russia	PZ90
88	Santo (DOS)	Espirito Santo Island	International
89	São Braz	São Miguel, Santa Maria Islands (Azores)	International
90	Sapper Hill 1943	East Falkland Island	International
91	Schwarzeck	Namibia	Modified Bessel 1841
159	Schwarzeck (updated) datum for Namibia	Namibia	Modified Bessel
144	Selvagem Grande 1938	Salvage Islands	International 1924
1021	Serbia datum MGI 1901	Republic of Serbia	Bessel
145	Sierra Leone 1960	Sierra Leone	Clarke 1880

Number	Datum Name	Area of Coverage	Ellipsoid
146	S-JTSK	Czech Republic	Bessel 1841
1020	S-JTSK (Ferro prime meridian)	Czech Republic	Bessel #11
92	South American 1969	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trinidad and Tobago	South American 1969
93	South Asia	Singapore	Modified Fischer 1960
94	Southeast Base	Porto Santo and Madeira Islands	International
95	Southwest Base	Faial, Graciosa, Pico, Sao Jorge, Terceira Islands (Azores)	International
1003	Switzerland (CH 1903)	Switzerland	Bessel
147	Tananarive Observatory 1925	Madagascar	International 1924
96	Timbalai 1948	Brunei and East Malaysia (Sarawak and Sabah)	Everest (India 1830)
97	Tokyo	Japan, Korea, Okinawa	Bessel 1841
1015	Tokyo97	Japan	Bessel 1841
98	Tristan Astro 1968	Tristan da Cunha	International
99	Viti Levu 1916	Viti Levu Island (Fiji Islands)	Clarke 1880

Number	Datum Name	Area of Coverage	Ellipsoid
148	Voirol 1874	Tunisia/Algeria	Clarke 1880
149	Voirol 1960	Algeria	Clarke 1880
100	Wake-Eniwetok 1960	Marshall Islands	Hough
101	World Geodetic System 1960 (WGS 60)	Worldwide	WGS 60
102	World Geodetic System 1966 (WGS 66)	Worldwide	WGS 66
103	World Geodetic System 1972 (WGS 72)	Worldwide	WGS 72
104	World Geodetic System 1984 (WGS 84)	Worldwide	WGS 84
1017	Xian	China	1980
105	Yacare	Uruguay	International
106	Zanderij	Surinam	International
166	Aratu	Brazil	4
167	Barbados	Barbados	6
168	Beduaram	Niger	30
169	Conakry_1905	Guinea	30

Number	Datum Name	Area of Coverage	Ellipsoid
170	Dealul Piscului 1930	Romania	4
171	Douala	Cameroon	4
172	Final_Datum_1958	Iran	6
173	Makassar	Indonesia	10
174	Manoca	Cameroon	30
1026	NGO_1948	Norway	1026
1927	Palestine_1923	Asia / Middle East	1027

Units

The units indicate the measurement that the projection uses to keep track of space.

The following table lists the available coordinate units and the number used to identify the unit in the MAPINFOW . PRJ file:

Number	Units
6	Centimeters
31	Chains
3	Feet (also called International Feet) ¹
2	Inches
1	Kilometers
30	Links

Number Units

7	Meters
0	Miles
5	Millimeters
9	Nautical Miles ²
32	Rods
8	US Survey Feet (used for 1927 State Plane) ³
4	Yards

¹One International Foot equals exactly 30.48 cm.

²One Nautical Mile equals exactly 1852 meters.

³One US Survey Foot equals exactly 12/39.37 meters, or approximately 30.48006 cm.

Coordinate System Origin

The coordinate system origin is the point on the Earth (specified as longitude and latitude degrees) from which all coordinate distances are to be measured. $X = 0$ and $Y = 0$ at the origin point, unless a false easting and/or false northing is used. It is chosen to optimize the accuracy of a particular coordinate system. As we move north from the origin, Y increases; X increases as we move east. These coordinate values are generally called northings and eastings.

For the Transverse Mercator projection the origin's longitude defines the central meridian. In constructing the Transverse Mercator projection a cylinder is positioned tangent to the earth. The central meridian is the line of tangency. The scale of the projected map is true along the central meridian.

In creating a Hotine Oblique Mercator projection it is necessary to specify a great circle that is not the equator nor a meridian. MapInfo Pro does this by specifying one point on the ellipsoid and an azimuth from that point. That point is the origin of the coordinate system.

Standard Parallels (Conic Projections)

In conic projections a cone is passed through the earth intersecting it along two parallels of latitude. These are the standard parallels. One is to the north and one is to the south of the projection zone. To use a single standard parallel specify that latitude twice. Both are expressed in degrees of latitude.

Oblique Azimuth (Hotine Oblique Mercator)

When specifying a great circle (Hotine Oblique Mercator) using a point and an azimuth (arc), the azimuth is called the Oblique Azimuth and is expressed in degrees.

Note: MapInfo Pro assumes that the Azimuth and a Rectified Skew values are identical for a Hotine Oblique Mercator. This is because the MapInfo Pro map file allows for only eight Coordsys parameters not including the Projection value. MapInfo Pro supports Alaska State Plane Zone 1, which has identical Azimuth and a Rectified Skew values.

Scale Factor (Transverse Mercator)

A scale factor is applied to cylindrical coordinates to average scale error over the central area of the map while reducing the error along the east and west boundaries. The scale factor has the effect of recessing the cylinder into the earth so that it has two lines of intersection. Scale is true along these lines of intersection.

You may see the scale factor expressed as a ratio, such as 1:25000. In this case it is generally called the scale reduction. The relationship between scale factor and scale reduction is:

scale factor = 1-scale reduction

In this case the scale factor would be 1-(1/25000) or 0.99996.

False Easting and False Northing

As you can see in [Understanding Coordinate Systems](#), X and Y coordinate parameters are commonly designated in relationship to a single point. Points to the left of that center point are negative and points to the right are positive. Points above that center point are positive and points below that point are negative.

Calculating coordinates is easier if negative numbers are not involved. To eliminate this problem in calculating State Plane and Universal Transverse Mercator coordinates, it is common to add measurement offsets to the northings and eastings. These offsets are called False Northings and False Eastings. They are expressed in coordinate units, not degrees. (The coordinate units are specified by the Units parameter.)

Range (Azimuthal Projections)

The range specifies, in degrees, how much of the Earth is visible. The range can be between 1 and 180. When you specify 90, you see a hemisphere. When you specify 180 you see the whole earth, though much of it is very distorted.

Polyconic Projection

The following description is copied from "Map Projections - A Working Manual", USGS Professional Paper 1395, by John P. Snyder.

The Polyconic projection, usually called the American Polyconic in Europe, achieved its name because the curvature of the circular arc for each parallel on the map is the same as it would be following the unrolling of a cone which had been wrapped around the globe tangent to the particular parallel of latitude, with the parallel traced onto the cone. Thus, there are many ("poly-") cones involved, rather than the single cone of each regular conic projection.

The Polyconic projection is neither equal-area nor conformal. Along the central meridian, however, it is both distortion free and true to scale. Each parallel is true to scale, but the meridians are lengthened by various amounts to cross each parallel at the correct position along the parallel, so that no parallel is standard in the sense of having conformality (or correct angles), except at the central meridian. Near the central meridian, distortion is extremely small.

This projection is not intended for mapping large areas. The conversion algorithms used break down when mapping wide longitude ranges. For example, `WORLD.TAB`, from the sample data shipped with MapInfo Pro, may exhibit anomalies if reprojected using Polyconic.

Equidistant Cylindrical Projection

The Equidistant Cylindrical projection (also called the Equirectangular projection, geographic projection, Plate Carrée, or Carte Parallélogrammatique projection or CPP), is a very simple map projection attributed to Marinus of Tyre, who Ptolemy claims invented the projection about 100 AD.

The projection maps meridians to equally spaced vertical straight lines, and circles of latitude to evenly spread horizontal straight lines. The projection is neither equal area nor conformal. Because of the distortions introduced by this projection, it has little use in navigation or cadastral mapping, and finds its main use in thematic mapping. In particular, the Plate Carrée is used often in computer applications that process global maps, because of the particularly simple relationship between the position of an image pixel on the map and its corresponding geographic location on Earth. The Plate Carrée (French, for "flat square"), is the special case where standard parallel is zero.

The following examples are of PRJ entries for Plate Carrée and Equidistant Cylindrical projection centered at 46.5 degree Standard Parallel (used in France):

```
"Plate Carree WGS84", 33, 104, 7, 0, 0, 0, 0
"Equidistant Cylindrical 46.5 Degree WGS84", 33, 104, 7, 0, 46.5, 0, 0
```

Examples of Projection Entries in the MAPINFOW.PRJ File

The MAPINFOW.PRJ file lists the parameters for each coordinate system on a separate line, as in the following examples:

"Mollweide (Equal Area)", 13, 62, 7, 0

"Albers Equal-Area Conic (Alaska)", 9, 63, 7, -154, 50, 55, 65, 0, 0

"UTM Zone 9 (NAD 27 for Canada)", 8, 66, 7, -129, 0, 0.9996, 500000, 0

This is a basic list of the elements of a coordinate system, for review. There are some projections that do not require all of the elements in the list. Following this list, you can see some entries from the .PRJ file.

1. The first element in each list is the name of the projection in quotes.
2. The second element in each list is the number that identifies the projection number as indicated in [Projection Types List](#).
3. The third element in each list is the datum ID that identifies the appropriate datum for the projection. See [Datums](#) for a complete list of supported datums.
4. The fourth element in each list is the units, which indicate the units of the projection. See [Units](#) for a current list of the supported units.
5. The next element in some lists is the coordinate system origin. See [Coordinate System Origin](#) for a complete description of this entry.
6. The remaining elements are specific to particular types of projections. You can see their descriptions in [Standard Parallels \(Conic Projections\)](#), [Oblique Azimuth \(Hotine Oblique Mercator\)](#), [Scale Factor \(Transverse Mercator\)](#), [False Easting and False Northing](#) and [Range \(Azimuthal Projections\)](#).

Note: Each element in a projection entry is separated by a comma.

Let us look at some specific coordinate systems to prepare you to create your own projection. It is important to remember that the elements of a projection are different for each projection. Here are some examples we have already seen:

Example: "Mollweide (Equal Area)", 13, 62, 7, 0

where:

Where	Refers to:	For More Information, See:
"Mollweide (Equal Area)",	Name of Coordinate System	Projections and Their Parameters
13,	Projection type used	Projection Types List

Where	Refers to:	For More Information, See:
62,	Datum used	Datums
7,	Units used	Units
0	Origin Longitude used	Coordinate System Origin

Example: "Albers Equal-Area Conic (Alaska)", 9, 63, 7, -154, 50, 55, 65, 0, 0

where:

Where	Refers to:	For More Information, See:
"Albers Equal-Area Conic (Alaska)",	Name of Coordinate System	Projections and Their Parameters
9,	Projection type used	Projection Types List
63,	Datum used	Datums
7,	Units used	Units
-154, 50	Origin Longitude and Origin Latitude used	Coordinate System Origin
55, 65,	Standard Parallels used	Standard Parallels (Conic Projections)
0, 0	False Easting, False Northing	False Easting and False Northing

Example:

"UTM Zone 9 (NAD 27 for Canada)", 8, 66, 7, -129, 0, 0.9996, 500000, 0

where:*

Where	Refers to:	For More Information, See:
"UTM Zone 9 (NAD 27 for Canada)",	Name of Coordinate System	Projections and Their Parameters
8,	Projection type used	Projection Types List
66,	Datum used	Datums
7,	Units used	Units
-129, 0	Origin Longitude and Origin Latitude used	Coordinate System Origin
0.9996, 500000	Scale Factor, False Northing	Scale Factor and False Northing
0	Scale Factor used	Scale Factor (Transverse Mercator)

Adding Projections to the MAPINFOW.PRJ File

Once you understand the structure of the entries in the `MAPINFOW.PRJ` file, you are ready to create a new projection entry for your coordinate system. You may want to make a copy of the `MAPINFOW.PRJ` file in case you want to revert back to it later.

To create a new projection entry for the coordinate system in the `MAPINFOW.PRJ` file:

1. Open `MAPINFOW.PRJ` in a text editor or word processor. In this file, you are going to add the new projection entries.

```

"--- Longitude / Latitude ---", 0, 0, 0, 0., 0., 0., 0., 0., 0., 0.,
0.
"Longitude / Latitude", 1, 0
"Longitude / Latitude (Adindan)\p4201", 1, 1
"Longitude / Latitude (Afgooye)\p4205", 1, 2
"Longitude / Latitude (AGD 66)\p4202", 1, 12
"Longitude / Latitude (AGD 84)\p4203", 1, 13
"Longitude / Latitude (Ain el Abd 1970)\p4204", 1, 3
"Longitude / Latitude (Anna 1 Astro 1965)", 1, 4
"Longitude / Latitude (Arc 1950)\p4209", 1, 5
"Longitude / Latitude (Arc 1960)\p4210", 1, 6
"Longitude / Latitude (Ascension Island 1958)", 1, 7
"Longitude / Latitude (Astro Beacon E)", 1, 8

```

MAPINFOW.PRJ in Notepad

2. Scroll down in this list to find the type of projection you want to base your map on. See [Understanding Coordinate Systems](#) for descriptions of the different projection types.
3. Add a new line at the end of the projection list you are modifying.

For example, to add a new Universal Transverse Mercator projection (Australian Map Grid using AGD66 datum), scroll down to that entry and type the new projection at the end of the list.

```

"--- Longitude / Latitude (v 6.0 and later projections) ---"
"Longitude / Latitude (Hungarian HD 72)", 1, 1004
"Longitude / Latitude (Hartbeesthoek 94)", 1, 150
"Longitude / Latitude (Australia GDA94)\p4283", 1, 116
"Longitude / Latitude (Australia-National-AGD84 7-param)", 1, 1006
"Longitude / Latitude (Australia (A.C.T. AGD66 7-param)", 1, 1007
"Longitude / Latitude (Australia (Tasmania AGD66 7-param)", 1, 1008
"Longitude / Latitude (Australia (Victoria/NSW AGD66 7-param)", 1, 1009
|
"Longitude / Latitude (New Zealand (NZGD49 7-parameter)", 1, 1010
"Longitude / Latitude (EUREF89)", 1, 115
"Longitude / Latitude (New Zealand NZGD2000)", 1, 117
"Longitude / Latitude (American Samoa)", 1, 118

```

Adding a Line in the MAPINFOW.PRJ File

4. On a new line, type the new parameter entries based on the required parameters described for that projection type in the table [Projections and Their Parameters](#).
 - If the name of your projection does not appear in the Common Map Projections list, consider the kind of projection you are creating (Latitude/Longitude, Conic, Transverse, etc.) and follow the table entries for the type of projection you want.
 - Remember to include constant values ([Accounting for Affine Transformations and Explicit Bounds in Projection Types](#)) to indicate an affine transformation, specific bounds, or both if appropriate or necessary.

Note: The order of parameters is vitally important. Remember to separate each parameter with a comma.

5. Save your edited MAPINFOW.PRJ file in the directory in your user directory.

Note: In the past the `MAPINFOW.PRJ` file was saved in your installation directory but this did not allow different users to have different PRJ files. This new file placement permits this.

Things to keep in mind when editing the `MAPINFOW.PRJ` file:

- You must record the X and Y coordinates of the origin point in decimal degrees.
- Remember to include a negative sign for west longitudes and south latitudes.
- You must list the origin longitude first in the `MAPINFOW.PRJ` file entry.
- Carry out decimals to at least five (5) places for greater accuracy.
- Do not use commas to represent thousands or millions in large numbers. Only use commas to separate parameters from one another.
- When specifying projection, datum and units, use the *number* that represents the parameter. These numbers are listed in the table for each parameter earlier in this section. In our example, 6 represents Equidistant Conic projection; 74 represents NAD 83 datum, and 7 represents meters.

Using the New Projection in a Coordinate System

Once you have created this new projection, you can use it in a **Map** window to replace the coordinate system you are using.

1. Open the map for which you want to change projections.
2. In the **Layers** or **Explorer** window, right-click the map name and click **Map Options** to open the **Map Options** dialog box.
3. Click **Projection** to open the **Choose Projection** dialog box.

Note: To change the projection of a tab file and all of the map objects in it, use the **Save Copy As** command and select the new projection (on the **HOME** tab, in the **File** group, click **Save Copy As**).

4. From the **Category** drop-down list, choose the projection group.
5. From the **Category Members** list, choose a projection or unit.
6. Click **OK** to close the dialog boxes.

MapInfo Pro implements the new projection in the **Map** window

Entering a New Coordinate System (Example)

To illustrate this process in another way, create the following coordinate system using these parameters by adding a new entry to the `MAPINFOW.PRJ` file:

Parameter Type	Entry	Description
Name	"Equidistant Conic Plus"	Name of the new coordinate system

Parameter Type	Entry	Description
Projection Type	6,	Equidistant Conic
Datum	74,	(NAD 83)
Units	7,	meters
Origin Longitude	-90.5,	90×30°W
Origin Latitude	30,	30×N,
Standard Parallel 1	10.33333,	10×20°N
Standard Parallel 2	50,	50×N
False Easting	10000000,	10,000,000 m
False Northing	500000	500,000 m

1. Open `MAPINFOW.PRJ` in a text editor or word processor.
2. Go to the Equidistant Conic section and add a new line.
3. Type the name of your new coordinate system in quotes, followed by a comma.
4. Enter the following information to represent your coordinate system:
6, 74, 7, -90.5, 30, 10.33333, 50, 10000000, 500000
5. Save your edited `MAPINFOW.PRJ` file.

You can use your custom coordinate system just as you would use any of the coordinate systems that come with MapInfo Pro.

There are other ways you can edit this file. To shorten the list, remove coordinate systems from the file. You can also change the names, change group headings and reorder the file to suit your needs.

Note: Group headings are distinguished by the hyphen at the beginning of the name. Names of coordinate systems cannot begin with a hyphen or a space.

Understanding Precision in MapInfo Pro

MapInfo Pro is a very good application for working at a high precision level. But the onus is on the user to discover the practical limits of the program in various circumstances and how to set the work environment in order to obtain the desired precision level. Millimeter level precision can be easily attained and maintained with projected maps in the metric system.

The most basic component of any GIS is the spatial data that defines the map features. This spatial data could not exist without the coordinate systems that are used to specify the location information. Coordinate precision is a measure of storing spatial data as accurately as possible. Of course, this can be no more precise than the original data provided. Precision is a measurement of how accurately you can store and retrieve the spatial data and has nothing to do with the quality of the data. The number of reliable digits in your coordinate is termed significant digits. Precision is measured in terms of these significant digits.

The Quest For Superior Map Precision

One question that is raised again and again is "How can I obtain a higher level of precision from MapInfo Pro?". This question is usually followed by, "Why not use 64-bit data precision like some other systems?". To answer these questions, it is first necessary to understand how MapInfo software stores spatial data.

You would think it was just a case of writing out numbers such as 153.34125 and -26.21435 to a file. This method would work but it would be very inefficient and slow. What MapInfo Pro does is store all data written to file in single-precision 32 bit integers. A 32-bit integer is able to hold a whole number from 0 to well over 2 billion. When a table is read back in, MapInfo Pro converts this integer data back into its real world coordinates and stores it in memory as 64 bit floating point numbers. This may sound like a lot of work but it is in fact how most systems that deal with large numbers work.

The precision is affected by what coordinate system the data is read in to. For example, when using Latitude/Longitude coordinates, you have to be able to store numbers in the range of -180 to +180 and from -90 to +90. This means the largest number we need is 360. Actually, for mathematical reasons (for example faster calculations), MapInfo Pro uses the range -1000 to +1000 which makes 2000 the largest number. If you then divide this range by the 2 billion possible from the 32bit integer, you get 0.000001 of a degree (about 4 inches).

The point to remember here is that this is the default world coordinate system. As will be explained below, MapInfo Pro has a method by which you can improve this level of precision. Very few applications of GIS ever need the entire World down to sub millimeter accuracy. Typically, GIS users work within a much smaller area such as a state, local government area or even a single town. We refer to this as "bounded coordinates".

All MapInfo spatial data layers are bounded. As we saw above, the default World projection is bounded by +/- 1000. MapInfo Pro calls this "implicit bounding" as there is no mention of the coordinate range. In fact, when you use any of the projections MapInfo Pro supports, these all use "implicit bounding".

Take the UTM projection which is commonly used in Australia. It is a 6 degree wide band that wraps around the world. When you select the projection from a dialog, you select a particular zone (for example, a 6 degree band) for either the northern or southern hemisphere. The bounds here are 10,000,000m to the north (the Equator) and 0m at the 80 degrees south latitude. The projection is also 1,000,000 metres wide with a centre at 500,000m.

Using the same method as above, this projection has a numerical range of 10,000,000. When divided by 2 billion the precision is 0.005 of a metre (half a centimeter).

Eureka - There Is A Way!

To obtain higher precision, MapInfo Pro also supports "explicit bounding" where the user can manually specify the coordinate bounds. You get a glimpse of this when you create a Non-Earth table where you are prompted to specify the minimum and maximum coordinate extents. You can also use "explicit bounding" to modify any of the standard MapInfo projections. When you do this you specify a smaller range for your coordinates. The smaller the range, the higher the precision. For example, Brisbane is bounded by the coordinates 7,000,000 (North), 6,930,000 (South), 470,000 (West) and 530,000 (East). The maximum range here is 70,000m. Divide this by 2 billion and you get 0.000035 of a metre accuracy. This is 0.034 of a millimeter accuracy. Applying bounds in a similar manner to cover all of Australia equates to approximately 10 centimeter accuracy.

You can use explicit bounding whenever you want to store spatial data to a higher level of accuracy. However, you cannot add bounds to an existing layer and expect the data to become more accurate. The same coordinate will be there after you add the Bounds. Only when you add new data or edit existing data will you be able to use the higher precision.

Show Me The Way

So, how do you create a table with explicit bounding? The first thing you need to do is determine the coordinate range that meets your requirements. Remember that once bounds are set for a layer, that layer cannot store spatial data outside the bounds. If for example you were a local government authority, you might set the layer bounds to be 10km outside your authority boundary.

Even if you set the layer bounds to be 100km larger, you would still obtain a much higher level of coordinate precision. If you were a state government department, you may use a Lat/Long projection with bounds set to just outside the state boundary.

Next you create your tables as normal setting the desired projection. To apply the bounds to the table, run the MapBasic application CoordSys Bounds Manager. This application shows a list of the currently opened layers. The selected layer's bounds are displayed as shown below.

CoordSys Bounds Manager (Version 1.5)

Tables

- Graticule
- World
- Capitals
- OCEAN
- Major_Cities
- Cities

Table CoordSys Bounds

Min X: -34012036.739299998

Min Y: -8625248.5147200003

Max X: 34012036.739299998

Max Y: 8625248.5147200003

Actual Data Bounds

Min X: -17005875.042927179

Min Y: -8625248.5147200003

Max X: 17006146.629040543

Max Y: 8625248.5147200003

Table CoordSys

Name: Robinson NAD27

Clause: CoordSys Earth Projection 12, 62, "m", 0 Bounds (-34012036.7393, -8625248.51472) (34012036.7393, 8625248.51472)

Buffer % for Bounds Optimization: 20

ReRead CoordSys Bounds Save Table As... with CoordSys Bounds Draw outline of bounds

Optimize CoordSys Bounds Save Table As... without CoordSys Bounds Copy Cancel

Note: Run the CoordSys Bounds Manager from the **Tools** menu. If it is not available, then see [Working with MapInfo Pro Tools](#).

You can manually key in bounds or use the Optimize CoordSys Bound button to read it from the data already in the layer. Finally, you save a new copy of the table. A good approach is to create a new empty table with explicit bounds set. Then for any new tables you create, make them from a copy of this empty file.

Tip: Use the Create New Table command.

Sometimes you may receive data from other systems in MIF/MID format. Depending on the source, this data may have more precision than can be handled by the standard implicit projection. For example, the MIF/MID exported from Microstation in GDA projection may have 3 decimal places. If you just import it into MapInfo Pro you will end up with data to 2 decimal places. An alternative, enabling full precision to be retained, is to open the MIF file in any text editor and add the appropriate projection settings (including Bounds) to the header section. Then, when the data is imported, you will have 3 decimal place precision as in the original data.

Precisely has chosen to use the 32bit integer for external storage instead of 64-bit integer because it offers a good balance between efficiency and precision. As discussed above, if you want higher precision, then MapInfo Pro can provide it through the use of explicit bounding, this will however have a performance impact when working with the spatial data so implement this judiciously. Experience shows that for the vast majority of users, the default implicit bound projections provide ample precision. The use of 32bit integers for storage also means that MapInfo spatial data is stored

in half the space as the equivalent 64-bit data. Not only is this more efficient, it also means that data loads and displays much quicker.

Storing data with a higher level of precision is only appropriate when the source data is supplied with a comparable level of precision. In any case, MapInfo Pro can handle higher precision data if the user desires, the user needs to be fully aware of the options available and how to implement them in order to make full use of it.

Some Constants

- x and y coordinates should be given with the same number of decimal digits (unless ending in zeros)
- The number of decimals varies within a certain range with the level of internal precision.

Types of Maps and Bounds

When a table is created in MapInfo format, through an import of a MIF table, or by creation of a new table, it is defined according to one of two main types:

- Earth with two sub-types: Long\Lat, or Projected (Robinson, UTM, Lambert, etc.)
- Non-Earth

A map is always "bounded" by a pair of (Min X / Min Y) (Max X / Max Y) values that define a rectangle (Lower left/Upper right corners).

The bounding rectangle can be one of two types:

- Implicit (automatically set by MI to default values depending on projection)
- Explicit (the bounds are spelled out and form an integral and visible part of the table specifications).

Implicit (default option) and explicit bounds are possible with Long\Lat and projected maps. Explicit bounding is required for Non-Earth tables.

The bounds are stringent limits: it is impossible to add objects to a map that would lie outside the bounds (its coordinates would be clipped to the bounds of the table).

Bounds values can be altered by editing the MIF export file.

Internal Storage of Coordinates

The original coordinates that define the objects making up a map are stored in long integer format, in their genuine units coded in integer "internal" units, after some linear transformations according to the situation:

Long\Lat "unbounded" is a unique case: the coordinates are registered in millionths of a degree and the range of internal units are set to correspond to +-90 millions for Latitude, and to +-360 millions for Longitude

In all the other situations, (Long\Lat bounded, projected bounded/unbounded, and Non-Earth explicitly bounded), the minimum x bound is set to -1 billion in internal units and the maximum to +1 billion of

these units; and the same for minimum Y and maximum Y. The genuine coordinates are converted by linear transformation using these parameters into internal units. The x and Y transformations are independent, being based on the X and Y ranges that can be different.

Note: General transformation that applies to Longitude (x-) and Latitude (y-)

```
ex (external coordinate)
```

```
exmax, exmin (Max, Min of external coordinate, the bounds)
```

```
ix (internal coordinate) = int [( ex - exmin) / (exmax - exmin) * 2  
billion] - 1 billion
```

The parameters of the linear transformations (exmax, exmin) are kept in double precision (15 significant digits) as are the projection parameters; the internal coordinate as a long integer.

Finding the Bounds of a Map

There are different ways to find out the bounds on a MapInfo map. One is to examine the header of the MIF file that was used to create the map, if it exists, or just export it to open and view it in any text editor. However, if implicit bounds have been used, they will not be visible.

Use the Check & Set CoordSys Bounds tool to see entire set of bounds for the map.

In MapBasic, the TableInfo() function can also give this information (CoordSys, bounds).

It can be obtained in the MapBasic Window by typing and running (press **Enter** after typing):

```
Print TableInfo( table_id, attribute )
```

where

table_id is the name of the open table for which the information is requested.

attribute is one of the following numbers:

30	Projection Name (quoted name)
29	CoordSys clause (numeric parameters)
25	Min X
26	Min Y
27	Max X

28

Max Y

Results from 25 to 28 are included in the result from 29, with the difference that they might not be in the same coordinate system.

If using attribute 29, one gets the coordinate system of the original table.

If using 25-28, it is the MapBasic Coordinate system which is by default Long\Lat (no datum).

To obtain the Table's CoordSys system, the following command can be run beforehand to set the MapBasic CoordSys to the same as that of the Table's:

```
Set CoordSys Table "table_id"
```

Internal Precision and Virtual Grid

The transformation of genuine coordinates into integer values creates a virtual grid into which actual data is inserted. One could easily imagine that the distance between two successive internal values expressed in original map units gives the size of the grid (by default, vertical and horizontal grid sizes may not be equal, except for unbounded Long\Lat). This grid definition is used to define the internal precision of a given map.

Internal precision is of interest because it indicates the ability of the software to differentiate between points with different coordinates during input by assigning them different internal values, and during processing by keeping them separate and by showing their distinct coordinates. Original measures are rounded up to the closest integer value during transformation; "restituted" decimal coordinates look like the original only if the rounding of the decimal equivalent of the internal integer values reduces significantly the number of decimal digits. It is very possible that two points showing the same coordinates (for example, in an ObjectInfo window) are in fact distinct in the map internal representation.

How to Measure Internal Precision

There are two measures applied to the vertical and to the horizontal directions. Calculations are identical, and if the results are different, one should take the largest value that is the least favorable one for defining precision. The measures are expressed in the units of the original map, be they degrees or meters.

The general expression is: $(\text{bound Max} - \text{bound Min}) / 2 \text{ billion}$

Example 1: an UTM map bounded in the X direction to 0 and 2,000,000 meters will have an internal X precision of 2 million / 2 billion meters, for example, 1 millimeter. If its Y bounds were 3,000,000 to 5,000,000 meters, the Y precision will also be 1 millimeter.

Example 2: a Long\Lat "unbounded" as a definition of 1 millionth of a degree; that gives 11.11 cm in the Y direction and $11.11 \cdot \cos(\text{lat})$ in the X.

Example 3: a Long\Lat bounded to 20 and 40 degrees North and -90 and -70 in Longitude has a precision of 1/100 million of a degree, 100 times superior to the unbounded one.

Setting Bounds

There are several ways to set bounds to existing and new tables.

The first one would be when creating a new table, as explained below:

Display the MapBasic window in MapInfo Pro and create a mappable table called FOO. You should see this line appear in the MapBasic window:

```
Create Map for FOO Coordsys Earth Projection 1,0
```

To set the bounds for this table to 2*2 degrees, ranging from 110-112 degrees Longitude and 41-43 degrees Latitude, position the cursor at the end of the above line and change it to this:

```
Create Map for FOO CoordSys Earth Projection 1,0 Bounds (110,41)
(112,43)
```

Do this before adding any objects to FOO because it will delete all existing Map objects, the attribute data remains intact.

The second method is much easier and uses the Utility described in this testplan.

Another technique is to introduce the proper bounds specifications in the header of a MIF file. As many format translators generate MIF files, adding the bounds (either through requests of the translator itself or with a text editor later) is very feasible. For an existing table, exporting it as a MIF file, changing (or adding) the bounds and reimporting it is also possible. In this case, the existing coordinates do not gain in precision; they stay at the level they were before and may even be slightly altered because of the various roundings, but manipulations and creations will benefit from the new precision.

Practical Uses of Precision Level Setting

The most important advantage of setting the precision level is to be able to answer the demands of some professionals that are not satisfied with the only indication relative to precision of the 1/1,000,000 of a degree. It is indeed possible to attain precision levels well beyond the generally acceptable one millimeter.

The increased precision is generally obtained by a limitation of the scope of any map (see Example 1 above). A limitation to 2,000kms in the north-south and east-west directions will insure the 1 millimeter precision. Note that the east-west limitation is not really a constraint in "segmented" projections (UTM width is 6 degrees) because the metric coordinates are never negative and do not exceed 1,000 km.

Another advantage of controlled bound setting is the guarantee to work with a unique "basic grid"; If several projected maps from different origins and/or with different projections are piled/tiled in the same mapper, their basic grids can be in perfect alignment if similar and compatible bounds are

chosen for each map. Several topological problems are avoided; for example, tracing in one layer using another as reference will give the new nodes exactly the same "internal" coordinates. - copying from one to the other will avoid any distortions, - moving nodes to have them coincide in different layers become possible whereas they may be prevented from taking the required position by non-coincidental grids.

The rules to follow are simple: for a given project, choose a precision level, translate it in a given value that leads preferably to "round" measures of precision (1 mm, 0.5 cm) and should be used for width and height, then apply the appropriate bounds to all the maps.

Precautions with MIF files

If one wants to export/reimport in MIF format, one must make sure of the precision with which the coordinates are written down. The number of decimals must be such that they correspond to the level of precision of the map before exporting. In an unbounded UTM projection, the precision is 1 cm less a micron in Latitude (just over 10,000 km for 1 billion positions) and about double in the X direction. Because of possible roundings, if one wants the full guarantee of not losing information by giving the same coordinates to 2 distinct points, one would require coordinates posted in millimeters.

MapInfo Pro is responsive to precision settings. An example of this would be an MTM (Modified Transverse Mercator) table without specific bounds, its object location (with the ObjectInfo window) and its exported coordinates in cms (2 decimals with a metric standard). If using a bounded map definition, they are in millimeters. However, there is no difference when the bounds width varies; at 2000000 meters (internal precision 1 mm) or at 200 000, there are only 3 decimal digits.

Truncation of Results as a Limit to Precision

One should be aware that the precision level has limits. As an example, in a MTM or UTM projection, Latitude cannot be given with more than the millimeter level (the US-Canada border is roughly 4,500,000 meters North, leaving three digits for millimeters). But for safety reasons, one should also consider the roundings that are possibly done on the last digit and put their trust more on a lower level of precision, the cm in this case. But in Non-Earth tables, this constraint can be pushed back further. This is another example that precision considerations are specific to each work environment and that the user must understand the various parameters that determine the results.

Working at the Limits of the Precision Level

When zooming a mapper window to a small multiple of the internal precision, say 10 times, one can observe some interesting and some strange behaviors.

If a layer is editable, adding symbols will reveal the basic grid (add two symbols in the same place, then drag one progressively further horizontally or vertically from the origin until it does not snap back on the first when released, then use that distance as a guide for adding more).

Some results of editing operations may not be seen: a window redraw is practically required after each operation (addition or move) to see the results on the screen.

The **Ruler** command gives weird readings, bouncing by increments that have nothing to do with the precision level nor with pixel definition; it seems that it could be due to the truncation mentioned above.

On a UTM table bounded to 2 million meters in both directions, with a zoom of 1 meter on a default size mapper, the **Ruler** command gave the following readings (in cms) 9.49 13.43 16.44 18.99 21.23 23.25 25.12 with asymptotically decreasing jumps.

The **Ruler** command traces on the screen a measured path that is offset from the cursor position and the nodes of this path are not constrained by the basic grid. However, this may be due to the graphic card more than to MI as many PC's with differing video cards produce different results

The snap action is useless in the sense that the snapping distance within the window becomes inferior to the basic grid size; there is a zoom at which the basic grid overtakes the "set" snapping distance.

Estimate of snapping distance expressed in real world measurement:

```
p is pixel size (ex.: .28 mm), S the scale factor for the mapper (ex.: 1/10),
```

```
n number of pixels for snapping as set in preferences
```

```
snapping distance = n * p / S (all expressed in the same unit)
```

It is necessary to change the "distance units" used to post some mapping information (zoom or **Ruler** command) to be able to read with the same accuracy than the one available in the window; truncation has also its impact here. But the change has not effect on cursor location nor on object info window, the number of decimals there being determined by the existence of bounds. Editing techniques are also limited to direct positioning and shaping of objects because the ObjectInfo tool does not necessarily accept coordinates with the adequate number of digits.

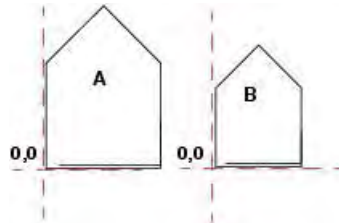
Understanding Affine Transformations

An affine transformation allows you to match the points on two vector maps that use different coordinate systems so they can be used together. The base map stays the same while the derived map is transformed mathematically to match up coordinates to the base map.

MapInfo Pro provides the definitions for scale, translation, rotation, reflection, and shearing necessary to support an optional affine transformation for any coordinate system definition. You can also define a coordinate system with bounds and/or with an affine transformation. This is described in detail in [Accounting for Affine Transformations and Explicit Bounds in Projection Types](#).

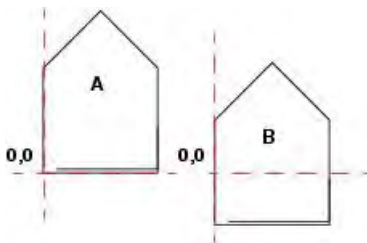
There are several basic types of transformation that can be applied to the base map using an affine transformation. These include scaling, translation, rotation, shearing, and reflection.

The *scale* factor of a transformation indicates the distance between the fixed points of one map versus the fixed points of the second map. If the only difference between two maps is the scale, the affine transformation of the derived map is only the same map zoomed in or out around a fixed point. The orientations of the lines connecting the points, and the angles between these lines, remain the same. The scaling in the case of the figure below is around the 0,0 point.



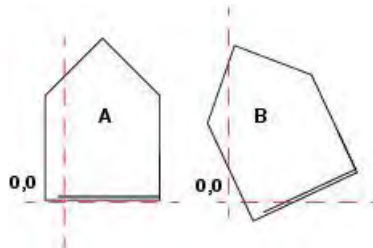
The difference between these images is the scale. To create an affine transformation that maps the base image (A) to the derived image (B), change only the scale.

The *translation* factor of a transformation is when every point on an image follows a parallel path and no rotation takes place.



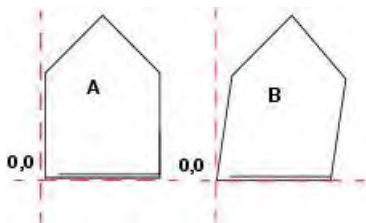
The difference between these two images is the translation.

The *rotation* factor of a transformation indicates that the image turns on a particular point. The next figure shows a 25-degree rotation of the map around the 0,0 point.



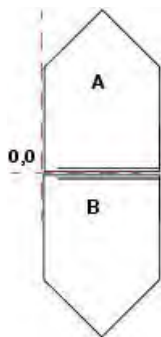
The difference between these two images is not the scale, because the size of each image is the same. The difference is the rotation of the derived image (B).

The *shearing* factor of a transformation indicates that one of the coordinates of one image should change proportionally to the other. You can apply a shear transformation either on the x-axis as shown in the next figure or on the y-axis. As you can see the vertical scale of the image has not changed, and the corner of the figure at 0,0 has not moved-but points higher up on the figure are shifted progressively further to the right.



The difference is the shearing of the derived image (B).

The *reflection* factor of a transformation indicates that the derived image is the mirror image of the base image, that is, all the points in the base image should be reflected across some straight line, such as the x-axis or y-axis. In the figure below, the derived image (B) is the reflection of the base image (A).



The difference between these two images is that the derived image (B) is a reflection of the base image (A) along the x-axis.

Mathematically, an affine transformation in MapInfo Pro has the following form:

$$x' = Ax + By + C$$

$$y' = Dx + Ey + F$$

In these equations, the **base** coordinates (x, y) are transformed to produce the **derived** coordinates (x', y'). The six constants A through F determine the effect of the transformation. We can use the post multiply method for homogenous 2D coordinate systems, which can be considered a matrix operation as follows:

A	B	C		X		X'
D	E	F	*	Y	=	Y'
0	0	1		1		1

where (X,Y) and (X',Y') are as defined above.

To do various types of affine transformations the values of A, B, C, D, E, and F need to be determined. To define the basic transformations that can be done using an affine transformation, determine the translations, rotations, reflections, scaling and shearing in the X and Y directions.

Translation: C and F are the values you want (0, 0) to go to, $A=E=1$ and $B=D=0$. To move the coordinate system so the origin is at (5, 2) the values would be: $A=1$, $B=0$, $C=5$, $D=0$, $E=1$, and $F=2$.

Rotation about the origin: $A=E=\cos(\text{angle to rotate})$, $-B=D=\sin(\text{angle to rotate})$, $C=F=0$. To rotate 60 degree counterclockwise around the origin, $A=.5$, $B=-.866$, $C=0$, $D=.866$, $E=.5$, and $F=0$.

To scale in the X direction: A is the scale you want to use. $E=1$ and the rest are 0. So to scale to 3 times the size in the X direction the values would be $A=3$, $B=0$, $C=0$, $D=0$, $E=1$, $F=0$.

To scale in the Y direction: E is the scale you want to use. $A=1$ and the rest are 0. So to scale to 5 times the size in the Y direction the values would be $A=1$, $B=0$, $C=0$, $D=0$, $E=5$, $F=0$.

To scale overall just make sure that A and E are equal.

To shear in the X direction: $A=E=1$, B is the shear factor and the rest are 0. So for a shear factor of 5 in the X direction (that is, to move a derived point 5 units in the X direction for each Y unit in the base point) use $A=1$, $B=5$, $C=0$, $D=0$, $E=1$, $F=0$.

To shear in the Y direction: $A=E=1$, D is the shear factor and the rest are 0. So for a shear factor of 4 in the Y direction, use $A=1$, $B=0$, $C=0$, $D=4$, $E=1$, $F=0$.

To reflect an image across the X axis: $A=1$, $E=-1$ and the rest are 0. More generally, to reflect across the line $y=k$, use $A=1$, $B=0$, $C=0$, $D=0$, $E=-1$, $F=2*k$.

To reflect an image across the Y axis: $A=-1$, $E=1$ and the rest are 0. More generally, to reflect across the line $x=j$, use $A=-1$, $B=0$, $C=2*j$, $D=0$, $E=1$, $F=0$.

To get a general affine transformation, do a pre-matrix multiplication of the basic pieces of the transformation. Make sure that you put the first operation on the right. So to Translate to (5,2), rotate 60 degrees and then shear 5 units in Y, set up and multiply the following matrices:

1	0	0		0.5	-.0866	0		1	0	5
5	1	0	*	.0866	0.5	0	*	0	1	2
0	0	1		0	0	1		0	0	1

Multiplying these out gives the following matrix:

0.5	-0.866	0.768
-----	--------	-------

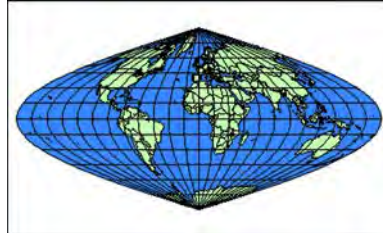
3.366	-3.83	9.17
0	0	1

Therefore, the required values are: A=.5, B=-.866, C=0.768, D=3.366, E=-3.83, F=9.17.

Note: When using affine transformation values in projection definitions or .MIF file COORDSYS settings, you may need to calculate the *inverse* of an affine transformation. This is because if a table displays in a projection that includes an affine transformation, MapInfo Pro transforms the coordinate system, not the objects in the table!

Using Earth and Non-Earth Maps

Earth maps and non-earth maps generally require different treatment. The following section on projections apply only to earth maps. An *earth map* contains objects that have a particular location on the earth's surface. All maps that MapInfo Pro sells are earth maps. Coordinates typically represent an object's location in longitude and latitude, although other coordinate systems (using various projections) may be used instead.



Sinusoidal (Equal-Area)

Use earth maps to:

- Overlay your map onto any maps that MapInfo Pro supplies.
- Use or change projections.
- Specify objects on the map in terms of longitude and latitude.

A *non-earth map* contains objects that have no specific location on the earth's surface. Floor plans are typical examples of non-earth maps. A non-earth map has a coordinate system, but since its map points are not referenced to locations on earth, the coordinate system does not contain a projection. Even though the floor plan describes a building that may be located somewhere on the Earth, the coordinates of objects in the floor plan are generally not referenced to positions on the Earth. Rather, the object's coordinates are referenced to the floor plan itself, generally representing distance from the lower left corner of the floor plan.

Specifying Coordinates for a Non-Earth Map

Saving a Map to a Non-Earth Coordinate System

To save a table into a Non-Earth Coordinate system:

1. Ensure that your non-earth map is open and that it is the active window (click on the map to activate the map window).
2. On the **HOME** tab, in the **File** group, click **Save Copy As**.
3. If the **Save As** dialog box opens, select the map to save from the **Save Table** list and then click **Save As**.
4. In the **Save Copy of Table As** dialog box, click the **Projection** button to open the **Choose Projection** dialog box.
5. From the **Category** drop-down list, choose **Non-Earth**.
6. From the **Category Members** list, choose a Non-Earth unit to specify the bounds and units for your non-earth coordinate system.
7. Click **OK** to open the **Non-Earth Coordinate Bounds** dialog box.
8. Specify the bounds and units for your non-earth coordinate system and click **OK**. You can use positive or negative numbers to specify the minimum and maximum X and Y values.

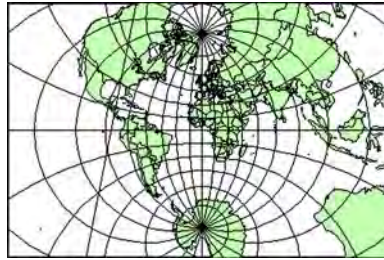
Changing the Map's Coordinate System to Non-Earth

To only change the Map's Coordinate System:

1. Ensure that your map is open and that it is the active window.
2. In the **Layers** or **Explorer** window, right-click the map name and click **Map Options** to open the **Map Options** dialog box.
3. Click **Projection** to open the **Choose Projection** dialog box.
4. From the **Category** drop-down list, choose **Non-Earth**.
5. From the **Category Members** list, choose a Non-Earth unit.
6. Click **OK** to close the dialog boxes.

Using the Ocean and Grid Tables

MapInfo Pro supplies tables that you can use with projections. For example, you can use the Ocean table as a background for World projections. You can use the grid15 table as a coordinate grid for your map (often called a graticule). The number in the table's name specifies the spacing.



Stereographic

For More Information on Projections

The first three publications listed are relatively short pamphlets. The last two are substantial books. We have also given addresses and phone numbers for the American Congress of Surveying and Mapping (the pamphlets) and the U.S. Geological Survey (the books).

American Cartographic Association. *Choosing a World Map-Attributes, Distortions, Classes, Aspects*. Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 2. 1988.

American Cartographic Association. *Matching the Map Projection the Need*. Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 3. 1991.

American Cartographic Association. *Which Map is Best? Projections for World Maps*. Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 1. 1986.

John P. Snyder. *Map Projections-A Working Manual*. Washington: U.S. Geological Survey Professional Paper 1395. 1987

John P. Snyder and Philip M. Voxland. *An Album of Map Projections*. Washington: U.S. Geological Survey Professional Paper 1453. 1989.

Contact Information

The Department of Geography at the University of Colorado at Boulder has made available "The Geographer's Craft" project, a website devoted to explanations of map projections, geodetic datums, and coordinate systems. It is particularly valuable because many of the explanations were presented using MapInfo Pro.

The materials may be used for study, research, and education. If you link to or cite the materials below, please credit the author: Peter H. Dana, The Geographer's Craft Project, Department of Geography, The University of Colorado at Boulder.

Working with Basic and Custom Datums

About Datums

A datum is a mathematical description of the earth's shape and orientation. Because the earth's shape is not uniform, there are many different local datums used in different parts of the world. These local datums provide a close approximation to the earth's surface in a particular area.

Each Earth coordinate system uses a specific datum to approximate the earth's surface. If two coordinate systems use different datums, then MapInfo Pro must perform a datum transformation when it converts coordinates from one coordinate system to the other. MapInfo Pro uses the Bursa-Wolfe datum transformation method, which is generally accurate to within 10 meters. (When MapInfo Pro converts between two coordinate systems that use the same datum, no datum transformation is performed, and the results are generally accurate to within 0.1 meter.)

Three Parameter Datums

The following is a current list of the three parameter datums supported by MapInfo Pro.

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
1	Adindan	7	-162	-12	206
2	Afgooye	4	-43	-163	45
3	Ainel Abd 1970	5	-150	-251	-2
4	Anna1 Astro 1965	3	-491	-22	435
5	Arc1950	16	-143	-90	-294

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
6	Arc1960	7	-160	-8	-300
7	Ascension Island 1958	5	-207	107	52
8	Astro Beacon "E"	5	145	75	-272
9	Astro B4 Sorol Atoll	5	114	-116	-333
10	AstroDOS71/4	5	-320	550	-494
11	Astronomic Station 1952	5	124	-234	-25
12	Australian Geodetic 1966	3	-133	-48	148
13	Australian Geodetic 1984	3	-134	-48	149
14	Bellevue(IGN)	5	-127	-769	472
15	Bermuda1957	8	-73	213	296
16	Bogota Observatory	5	307	304	-318
17	Campo Inchauspe	5	-148	136	90
18	Canton Astro1966	5	298	-304	-372

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
19	Cape	7	-136	-108	-232
20	Cape Canaveral	8	-2	150	181
21	Carthage	7	-263	6	431
22	Chatham 1971	5	175	-38	113
23	Chua Astro	5	-134	229	-29
24	Corrego Alegre	5	-206	172	-6
25	Djakarta (Batavia)	10	-377	681	-50
26	DOS 1968	5	230	-199	-752
27	Easter Island 1967	5	211	147	111
28	European 1950	5	-87	-98	-121
29	European 1979	5	-86	-98	-119
30	Gandajika Base	5	-133	-321	50
31	Geodetic Datum 1949	5	84	-22	209
32	GRS67	21	0	0	0

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
33	GRS80	0	0	0	0
34	Guam1963	8	-100	-248	259
35	GUX1 Astro	5	252	-209	-751
36	Hito XVIII1963	5	16	196	93
37	Hjorsey 1955	5	-73	46	-86
38	Hong Kong 1963	5	-156	-271	-189
39	Hu-Tzu-Shan	5	-634	-549	-201
40	Indian (Thailand/Vietnam)	11	214	836	303
41	Indian (Bangladesh)	11	289	734	257
42	Ireland 1965	13	506	-122	611
43	ISTS073 Astro 1969	5	208	-435	-229
44	Johnston Island 1961	5	191	-77	-204
45	Kandawala	11	-97	787	86
46	Kerguelen Island	5	145	-187	103

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
47	Kertau 1948	40	-11	851	5
48	L.C.5Astro	8	42	124	147
49	Liberia 1964	7	-90	40	88
50	Luzon (Philippines)	8	-133	-77	-51
51	Luzon (MindanaoIsland)	8	-133	-79	-72
52	Mahe 1971	7	41	-220	-134
53	Marco Astro	5	-289	-124	60
54	Massawa	10	639	405	60
55	Merchich	30	31	146	47
56	Midway Astro1961	5	912	-58	1,227
57	Minna	7	-92	-93	122
58	Nahrwan (MasirahIsland)	7	-247	-148	369
59	Nahrwan (Un.Arab Emirates)	7	-249	-156	381
60	Nahrwan (Saudi Arabia)	7	-231	-196	482

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
61	Naparima	5	-2	374	172
62	NAD27 (Continental US)	8	-8	160	176
63	NAD27 (Alaska)	8	-5	135	172
64	NAD27 (Bahamas)	8	-4	154	178
65	NAD27 (San Salvador)	8	1	140	165
66	NAD27 (Canada)	8	-10	158	187
67	NAD27 (CanalZone)	8	0	125	201
68	NAD27 (Caribbean)	8	-7	152	178
69	NAD27 (Central America)	8	0	125	194
70	NAD27 (Cuba)	8	-9	152	178
71	NAD27 (Greenland)	8	11	114	195
72	NAD27 (Mexico)	8	-12	130	190
73	NAD27(Michigan)	8	-8	160	176

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
74	NAD 83	0	0	0	0
75	Observatorio 1966	5	-425	-169	81
76	Old Egyptian	22	-130	110	-13
77	Old Hawaiian	8	61	-285	-181
78	Oman	7	-346	-1	224
79	Ordnance Survey Great Brit.	9	375	-111	431
80	Picodelas Nieves	5	-307	-92	127
81	Pitcairn Astro 1967	5	185	165	42
82	Provisional South American	8	-288	175	-376
83	Puerto Rico	8	11	72	-101
84	Qatar National	5	-128	-283	22
85	Qornoq	5	164	138	-189
86	Reunion	5	94	-948	-1,262
87	Rome 1940	5	-225	-65	9

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
88	Santo(DOS)	5	170	42	84
89	Sao Braz	5	-203	141	53
90	Sapper Hill 1943	5	-355	16	74
91	Schwarzeck	35	616	97	-251
92	South American 1969	24	-57	1	-41
93	South Asia	19	7	-10	-26
94	Southeast Base	5	-499	-249	314
95	Southwest Base	5	-104	167	-38
96	Timbalai 1948	11	-689	691	-46
97	Tokyo	10	-128	481	664
98	Tristan Astro 1968	5	-632	438	-609
99	Viti Levu 1916	7	51	391	-36
100	Wake-Eniwetok 1960	23	101	52	-39
101	WGS 60	26	0	0	0

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
102	WGS 66	27	0	0	0
103	WGS 72	1	0	8	10
104	WGS 84	28	0	0	0
105	Yacare	5	-155	171	37
106	Zanderij	2	-265	120	-358
107	NTF (Greenwich meridian)	30	-168	-60	320
108	European1987	5	-83	-96	-113
109	Netherlands Bessel	10	593	26	478
110	BelgiumHayford	5	81	120	129
111	NWGL10	1	-1	15	1
112	RT90 (Sweden)	10	498	-36	568
113	Lisboa(DLx)	5	-303	-62	105
114	Melrica1973(D73)	5	-223	110	37
115	EUREF89	0	0	0	0

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
116	GDA94	0	0	0	0
117	NZGD2000	0	0	0	0
118	American Samoa	8	-115	118	426
119	Antigua Island Astro 1943	7	-270	13	62
120	Ayabelle Lighthouse	7	-79	-129	145
121	Bukit Rimpah	10	-384	664	-48
122	Estonia 1937	10	374	150	588
123	Dabola	7	-83	37	124
124	Deception Island	7	260	12	-147
125	Fort Thomas 1955	7	-7	215	225
126	Graciosa Base SW 1948	5	-104	167	-38
127	Herat North	5	-333	-222	114
128	Hermannskogel	10	682	-203	480
129	Indian (Pakistan)	50	283	682	231

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
130	Indian 1954	11	217	823	299
131	Indian 1960	11	198	881	317
132	Indian 1975	11	210	814	289
133	Indonesian 1974	41	-24	-15	5
134	ISTS061 Astro1968	5	-794	119	-298
135	Kusaie Astro1951	5	647	1,777	-1,124
136	Leigon	7	-130	29	364
137	Montserrat Isl. Astro 1958	7	174	359	365
138	M'Poraloko	7	-74	-130	42
139	North Sahara1959	7	-186	-93	310
140	Observatorio Meteor. 1939	5	-425	-169	81
141	Point 58	7	-106	-129	165
142	Pointe Noire 1948	7	-148	51	-291
143	Porto Santo 1936	5	-499	-249	314

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
144	Selvagem Grande 1938	5	-289	-124	60
145	Sierra Leone 1960	7	-88	4	101
146	S-JTSK	10	589	76	480
147	Tananarive Observatory 1925	5	-189	-242	-91
148	Voirol 1874	7	-73	-247	227
149	Voirol 1960	7	-123	-206	219
150	Hartbeesthoek 94	28	0	0	0
151	ATS 77	51	0	0	0
152	JGD 2000	0	0	0	0
153	HGRS 87	0	-199.87	74.79	246.62
154	Beijing 1954	4	-31.4	144.3	81.2
155	Libya (LGD 2006)	4	208.4058	109.8777	2.5764
156	Dealul Piscului 1970	3	28	-121	-77

#	Datum Name	Ellipsoid #	ShiftX	ShiftY	ShiftZ
157	Popular Visualization CRS / Mercator	54	0	0	0
161	NOAA GCS_Sphere	55	0	0	0

Seven or Eight Parameter Datums

The following is a current list of datums that have either seven or eight parameters and are supported by MapInfo Pro.

E stands for **Ellipsoid**, **Ro** stands for **Rotation**, and **s_p** stands for **scale_ppm**. All of the final column Prime Meridian values are 0, except for NTF (Paris) which is 2.337229166667 and the S-JTSK which is -17.666666666667.

#	Name	E #	ΔX	ΔY	ΔZ	RoX	RoY	RoZ	s_p	Prime Meridian
162	JGD2011	0	0	0	0	0	0	0	0	0
163	Timbalai 1948, Everest 1968	16	-679	669	-48	0	0	0	0	0
164	GDM2000	0	0	0	0	0	0	0	0	0
165	MAGNA-SIRGAS	0	0	0	0	0	0	0	0	0

#	Name	E #	ΔX	ΔY	ΔZ	RoX	RoY	RoZ	s_p	Prime Meridian
1000	DHDN (Potsdam/ Rauen- berg)	10	582	105	414	-1.04	-0.35	3.08	8.3	0
1001	Pulkovo 1942	4	24	-123	-94	-0.02	0.25	0.13	1.1	0
1002	NTF (Paris Meridian)	30	-168	-60	320	0	0	0	0	2.3372291 66667
1003	CH 1903 (Switzer- land)	10	660.077	13.551	369.344	0.804816	0.577692	0.952236	5.66	0
1004	HD72 (Hungar- ian Datum of 1972)	21	-56	75.77	15.31	-0.37	-0.2	-0.21	-1.01	0
1005	Cape (South Africa)	28	-134.73	-110.92	-292.66	0	0	0	1	0
1006	Australia National (AGD84)	2	-117.763	-51.51	139.061	-0.292	-0.443	-0.277	-0.191	0
1007	Australia A.C.T. (AGD66)	2	-129.193	-41.212	130.73	-0.246	-0.374	-0.329	-2.955	0
1008	Australia Tasmania (AGD66)	2	-120.271	-64.543	161.632	-0.2175	0.0672	0.1291	2.4985	0

#	Name	E #	ΔX	ΔY	ΔZ	RoX	RoY	RoZ	s_p	Prime Meridian
1009	Australia Victoria/ NSW (AGD66)	2	-119.353	-48.301	139.484	-0.415	-0.26	-0.437	-0.613	0
1010	New Zealand Geodetic Datum 1949	4	59.47	-5.04	187.44	-0.47	0.1	-1.024	-4.5993	0
1011	Sweden (RT 90)	10	419.3836	99.3335	591.3451	-0.850389	-1.817277	7.862238	-0.99496	0
1012	Russia PZ90	52	-1.08	-0.27	-0.9	0	0	-0.16	-0.12	0
1013	Russia SK42	52	23.92	-141.27	-80.9	0	-0.35	-0.82	-0.12	0
1014	Russia SK95	52	24.82	-131.21	-82.66	0	0	-0.16	-0.12	0
1015	Tokyo97	10	-146.414	507.337	680.507	0	0	0	0	0
1016	KKJ	4	-96.062	-82.428	-121.754	-4.801	-0.345	1.376	1.496	0
1017	Xian 1980	53	24	-123	-94	-0.02	-0.25	0.13	1.1	0
1018	Lithuanian Pulkovo 1942	4	-40.59527	-18.54979	-69.33956	-2.508	-1.8319	2.6114	-4.2991	0

#	Name	E #	ΔX	ΔY	ΔZ	RoX	RoY	RoZ	s_p	Prime Meridian
1019	Belgian 1972 7 Parameter	4	-99.059	53.322	-112.486	-0.419	0.83	-1.885	.999999	0
1020	Longitude / Latitude (S-JTSK with Ferro prime meridian)	10	589	76	480	0	0	0	0	-17666666 66667
1021	Serbia MGI 1901	10	574.027	170.175	401.545	4.88786	-0.66524	-13.24673	6.88933	0
1022	North Sahara	10	-38.7086	-128.8054	118.8837	0.83822	7.38459	-1.57989	3.9904	0
1023	HD72 (Hungarian Datum of 1972) - UPDATED	21	52.684	-71.194	-13.975	0.312	0.1063	0.3729	1.0191	0
1024	HD72 (Hungarian Datum of 1972) - UPDATED	10	570.6934	856936000 00000004	462839299 99999998	-49982499 99999996	-1.58663	-526114000 00000001	354301550 00000001	0
1025	JTSK03 (Slovak Republic)	10	485.014 055	169.473 618	483.842 943	-7.78625 453	-4.39770 887	-4.10248 899	0	0

#	Name	E #	ΔX	ΔY	ΔZ	RoX	RoY	RoZ	s_p	Prime Meridian
9999	Bosnia-Herzegovina (Zone 5)	10	472.8677	187.8769	544.7084	-5.76198422	-5.3222842	12.80666941	1.54517287	0
9999	Bosnia-Herzegovina (Zone 6)	10	472.8677	187.8769	544.7084	-5.76198422	-5.3222842	12.80666941	1.54517287	0
9999	Bosnia-Herzegovina (Zone 7)	10	472.8677	187.8769	544.7084	-5.76198422	-5.3222842	12.80666941	1.54517287	0
9999	"Luxembourg 1930 / Gauss\p 2169	8	4	-192.986	13.673	-39.309,	0.409900	2.933200	2.688100	0

Defining Custom Datums

Most coordinate systems use one of MapInfo Pro's predefined datums, listed in this section. If you need to use a datum that is not in the list, and you know what the datum's mathematical parameters are, then you can define the coordinate system using a custom datum. MapInfo Pro uses the following information to define a datum:

- An ellipsoid, also called a spheroid. This is an ellipse rotated around its minor axis to form a three-dimensional surface. The ellipsoid is described by two mathematical parameters: the length, in meters, of its semi-major axis (denoted by the letter a) and its degree of flattening (denoted by the letter f). MapInfo Pro supports over 40 predefined ellipsoids, which are listed in the next table.
- Three shift parameters specifying the distance, in meters, to shift the ellipsoid along each of its axes. These parameters are usually denoted by dX , dY , and dZ . You may also see them denoted by DX , DY , and DZ , or by u , v , and w .
- Three rotation parameters specifying the angle, in arc-seconds, to rotate the ellipsoid around each of its axes. These parameters are usually denoted by E_X , E_Y , and E_Z . You may also see them denoted by e_X , e_Y , and e_Z , or by e , y , and w .

- A scale correction factor specifying the amount, in parts per million, to adjust the size of the ellipsoid. This parameter is denoted by the letter *m*, or sometimes *k*.
- The longitude of the prime meridian, in degrees east of Greenwich. The prime meridian specifies which location on earth is assigned longitude 0°. Most datums use Greenwich as the prime meridian, so this parameter is usually zero. However, some datums use a different location as the prime meridian. For example, the NTF datum uses Paris as its prime meridian, which is 2.33722917 degrees east of Greenwich. If you use the NTF datum in a coordinate system, all longitudes in that coordinate system are relative to Paris instead of Greenwich.

You can define a custom datum in any coordinate system definition. To define a custom datum in a coordinate system, you use datum number 9999 followed by the datum parameters, in this order:

9999, EllipsoidNumber, dX, dY, dZ, E_x , E_y , E_z , *m*, PrimeMeridian

Some datums specify only an ellipsoid and shift parameters (dX, dY, dZ), with no rotation parameters, scale correction, or prime meridian. In those cases, you can use datum number 999 instead of 9999, to simplify the definition:

999, EllipsoidNumber, dX, dY, dZ

The ellipsoid number must be chosen from the following list. Currently, there is no way to define a custom ellipsoid. If you need to use an ellipsoid that does not appear on this list, please notify Technical Support so that we can add your ellipsoid to a future MapInfo Pro version.

Two ellipsoids have been added. These are: Everest Pakistan #50, and ATS 77 (Average Terrestrial System) #51.

The ellipsoid names for Everest ellipsoids have been standardized according to NIMA specs to conform to the most current standards used in the GIS and mapping communities. The name changes are summarized in this table:

Ellipsoid #	Old Name	New Name/NIMA Designation
11	Everest (1830)	Everest (India 1830)
17	Everest (Kertau)	Everest (W. Malaysia and Singapore 1948)
39	Everest (Timbalai)	Everest (Brunei and East Malaysia (Sabah and Sarawak))
48	Everest (West Malaysia)	Everest (West Malaysia 1969)
40	Everest (Kalianpur)	Everest (India 1956)

The additions and the new names are reflected in this table.

Number Ellipsoid		a	1/f
9	Airy 1930	6377563.396	299.3249646
13	Airy 1930 (modified for Ireland 1965)	6377340.189	299.3249646
51	ATS7 77	6378135.0	298.257
2	Australian	6378160.0	298.25
10	Bessel 1841	6377397.155	299.1528128
35	Bessel 1841 (modified for NGO 1948)	6377492.0176	299.15281
14	Bessel 1841 (modified for Schwarzeck)	6377483.865	299.1528128
36	Clarke 1858	6378293.639	294.26068
7	Clarke 1866	6378206.4	294.9786982
8	Clarke 1866 (modified for Michigan)	6378450.047484481	294.9786982
6	Clarke 1880	6378249.145	293.465
15	Clarke 1880 (modified for Arc 1950)	6378249.145326	293.4663076

Number Ellipsoid		a	1/f
30	Clarke 1880 (modified for IGN)	6378249.2	293.4660213
37	Clarke 1880 (modified for Jamaica)	6378249.136	293.46631
16	Clarke 1880 (modified for Merchich)	6378249.2	293.46598
38	Clarke 1880 (modified for Palestine)	6378300.79	293.46623
39	Everest (Brunei and East Malaysia (Sabah and Sarawak))	6377298.556	300.8017
11	Everest (India 1830)	6377276.345	300.8017
40	Everest (India 1956)	6377301.243	300.80174
50	Everest (Pakistan)	6377309.613	300.8017
17	Everest (W. Malaysia and Singapore 1948)	6377304.063	300.8017
48	Everest (West Malaysia 1969)	6377295.664	300.8017
18	Fischer 1960	6378166.0	298.3
19	Fischer 1960 (modified for South Asia)	6378155.0	298.3

Number	Ellipsoid	a	1/f
20	Fischer 1968	6378150.0	298.3
55	GCS Sphere	6371200.0	0.0
21	GRS 67	6378160.0	298.247167427
0	GRS 80	6378137.0	298.257222101
56	GSK-2011	6378136.5	298.2564151
5	Hayford	6378388.0	297.0
22	Helmert 1906	6378200.0	298.3
23	Hough	6378270.0	297.0
31	IAG 75	6378140.0	298.257222
41	Indonesian	6378160.0	298.247
4	International 1924	6378388.0	297.0
49	Irish (WOFO)	6377542.178	299.325
3	Krassovsky	6378245.0	298.3
32	MERIT 83	6378137.0	298.257
33	New International 1967	6378157.5	298.25

Number	Ellipsoid	a	1/f
43	NWL 10D	6378135.0	298.26
42	NWL 9D	6378145.0	298.25
44	OSU86F	6378136.2	298.25722
45	OSU91A	6378136.3	298.25722
46	Plessis 1817	6376523.0	308.64
52	PZ90	6378136.0	298.257839303
57	PZ-90.11	6378136.0	298.25784
24	South American	6378160.0	298.25
12	Sphere	6370997.0	0.0
	Struve 1860	6378297.0	294.73
34	Walbeck	6376896.0	302.78
25	War Office	6378300.583	296.0
26	WGS 60	6378165.0	298.3
27	WGS 66	6378145.0	298.25
1	WGS 72	6378135.0	298.26

Number	Ellipsoid	a	1/f
28	WGS 84	6378137.0	298.257223563
55	WGS 84 Sphere	6378137.0	0.0
53	Xian 1980	6378140.0	298.257

The shift and rotation parameters describe the ellipsoid's orientation in space, as compared to the WGS 84 datum. It is important to make sure that these parameters have the correct signs (positive or negative). Usually, a document describing a local datum will list the parameters required to convert coordinates from the local datum to WGS 84. (This is the same as saying that the parameters were derived by subtracting the local datum from WGS 84.) In that case, you can use the parameters exactly as they appear in the document. However, if you have a document that lists parameters for converting coordinates in the opposite direction - from WGS 84 to the local datum - then you must reverse the signs of the shift, rotation, and scale correction parameters.

It is also very important to list the parameters in the correct order. Some documents list the rotation parameters with E_Z first, like this: E_Z , E_Y , E_X . In those cases, you must reverse the order of the rotation parameters when defining the custom datum. This is especially easy to overlook when your document uses Greek letters to denote the parameters. If the document lists the parameters in order as w , y , e , then you must reverse their order in the custom datum definition.

Here is an example of a local datum description (we will call it LD-1) as it might appear in a technical article:

Table 3: LD-1 ellipsoid: International

a	6378388.0 m
f	1 / 297.0

Table 4: Converting from WGS 84 to LD-1

DX	93.5 m
----	--------

DY	103.5 m
DZ	123.3 m
e_x	-0.25
e_y	0.11
e_z	0.07
m	-2.1 ppm

This datum uses the International ellipsoid, which is number 4 in the ellipsoid table above. The other parameters describe a conversion from WGS 84 to the local datum, so we must reverse their signs. No prime meridian is listed, so we can assume that Greenwich is used. The custom datum definition in MapInfo Pro would look like this:

```
9999, 4, -93.5, -103.5, -123.3, 0.25, -0.11, -0.07, 2.1, 0
```

You can insert this string of numbers in place of the datum number in any line in the `MAPINFOW.PRJ` file. For example, you could define the following coordinate systems using this custom datum:

Note: Strings must be entered on a single line.

```
"Longitude / Latitude (LD-1)", 1, 9999, 4, -93.5, -103.5, -123.3, 0.25,
-
0.11, -0.07, 2.1, 0
```

```
"UTM Zone 30 (LD-1)", 8, 9999, 4, -93.5, -103.5, -123.3, 0.25, -0.11, -
0.07, 2.1, 0, 7, -3, 0, 0.9996, 500000, 0
```

Here is another sample local datum description, called LD-2 this time:

Table 5: LD-2 ellipsoid: Krassovsky

a	6378245.0 m
---	-------------

f	1 / 298.3
---	-----------

Table 6: Converting from LD-2 to WGS 84

u	+24 m
v	-123 m
w	-94 m
w	+0.13
y	+0.25
e	-0.02
m	$+1.1 \times 10^{-6}$

This datum uses the Krassovsky ellipsoid, which is number 3 in the ellipsoid table above. We do not need to reverse the signs of the parameters, since they describe a conversion from the local datum to WGS 84. However, the rotation parameters are listed with w first, so we must reverse their order in the custom datum definition:

```
9999, 3, 24, -123, -94, -0.02, 0.25, 0.13, 1.1, 0
```

Here is a final example, LD-3, that provides only the ellipsoid and shift parameters:

Table 7: LD-3 ellipsoid: Clarke 1880

a	6378249.145 m
f	1 / 293.465

Table 8: WGS 84 minus local datum LD-3

dX	-7 m
dY	36 m
dZ	225 m

This datum uses the Clarke 1880 ellipsoid, which is number 6 in the ellipsoid table above. We do not need to reverse the signs of the parameters or worry about the order of the rotation parameters (since they are not present). In this case, you can use datum number 999 instead of 9999 in the custom datum definition. These two definitions are equivalent, and you can use either one:

```
999, 6, -7, 36, 225
```

```
9999, 6, -7, 36, 225, 0, 0, 0, 0, 0
```

As with the other custom datum definitions, you would insert one of these definitions in place of the datum number in a `MAPINFOW.PRJ` line, as follows:

```
"Longitude / Latitude (LD-3)", 1, 999, 6, -7, 36, 225
```

```
"UTM Zone 30 (LD-3)", 8, 999, 6, -7, 36, 225, 7, -3, 0, 0.9996, 500000, 0
```

Datum Conversion

When converting coordinates from one datum to another, MapInfo Pro has used the Molodensky (3-parameter) and Bursa-Wolf (7-parameter) methods. These are general-purpose methods that can convert coordinates from any datum to any other datum.

After the NAD 83 datum was introduced, NOAA developed a program called NADCON, which stands for North American Datum CONversion. This is a very specialized program that converts coordinates only from NAD 27 to NAD 83 and vice versa. For this specialized task, it is much more accurate than the Molodensky general-purpose method; NADCON is accurate to about 0.1 meter, and Molodensky is accurate to only 10-30 meters. Most U.S. government agencies, including the Census Bureau, have standardized on NADCON for converting between NAD 27 and NAD 83.

Beginning with MapInfo Pro 4.1.2, the NADCON algorithm is used to convert coordinates between NAD 27 and NAD 83 if those coordinates lie within the areas covered by NADCON (United States,

Puerto Rico, and the Virgin Islands). If the coordinates lie outside those areas, or if they use datums other than NAD 27 or NAD 83, MapInfo Pro uses the Molodensky or Bursa-Wolfe conversion methods.

Due to the file access required, the NADCON conversion method can be slightly slower than the Molodensky method. If you want to turn off the NADCON conversion, add a "NADCON" entry to the registry. The registry entry should have this path:

```
HKEY_LOCAL_MACHINE\Software\MapInfo\MapInfo\Common\NADCON
```

If this entry is set to zero, then the Molodensky conversion method will be used instead of NADCON.

Productivity Tools

Coordinate Extractor Tool

This tool extracts x, y coordinates for each record in your table using a projection in the `MAPINFO.WORKSPACE` file and places them in designated columns.

The `COORDINATEEXTRACTOR.MBX` tool allows you to add two columns to an open table and updates each column with x and y coordinates in the table's native projection. For objects other than points, the x and y coordinates will represent CentroidX and CentroidY locations. You can extract coordinates in any projection listed in the .prj file. The Coordinate Extractor also displays current table projections and gives the option to change to a different projection.

The Coordinate Extractor tool can be used on mappable tables that contain at least one geographic object. This tool cannot be used on the following types of tables:

- Query
- Read-Only
- Seamless
- Remote
- Raster

It is recommended that you use float type columns for the coordinates. Other column types may not be able to fit all the coordinate information in the column. If you select character columns, the coordinate values will include six digits after the decimal place.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids* Guide.

Displaying your Coordinate Data in a Browser

To use the Coordinate Extractor:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and double-click **Coordinate Extractor** on the **Running** tab.

The **Coordinate Extractor** dialog box opens.

2. Select the table that you want to extract the points from.
3. Indicate the columns you want to use for the X and Y coordinates, or click the **Create new columns to hold coordinates** button to have the tool add the columns. When you click this button, a dialog box displays asking you to name the columns.
4. Select the **Browse Results** check box to have the results displayed in a Browser window after the operation is completed.
5. Click **OK**.

To take out the coordinate information after you have used Coordinate Extractor, revert the table.

CoordSys Bounds Manager Dialog Box

The CoordSys Bounds Manager checks and sets the coordinate system bounds for mappable MapInfo Pro base tables. This is useful for controlling the resolution of object coordinates. The CoordSys Bounds Manager works only with open, mappable, base tables.

This tool is available on the Tools Manager, on the **HOME** tab, in the **Tools** group, click **Tool Extensions**.

For instructions on how to load and run tools, see [Working with MapInfo Pro Tools](#).

For instructions on how to load and run tools, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids* Guide.

Note: The coordinate system bounds are usually much larger than the actual data bounds, which may make finding your displayed data difficult. You are usually zoomed out too far to be able to locate your data easily.

Tables

Lists all currently open native TAB files. Select the table to check or set the coordinate system bounds for.

Table CoordSys Bounds

Displays the X and Y coordinates that match the bounds of the table. Provide X and Y coordinate values in the same number of decimal digits (unless ending in zeros). The number of decimals varies within a certain range with the level of internal precision.

Min X

Minimum X value.

Min Y

Minimum Y value.

Max X

Maximum X value.

Max Y

Maximum Y value.

Actual Data Bounds

Displays the X and Y coordinates that match the actual data bounds.

Min X

Minimum X value.

Min Y

Minimum Y value.

Max X

Maximum X value.

Max Y

Maximum Y value.

Table CoordSys**Name**

Displays the coordinate system projection name that the table is in.

Clause

Displays the MapBasic CoordSys clause for the table, which shows the CoordSys Earth Projection *type* value and *datum* value.

Buffer % for Bounds Optimization

This controls how close the new bounds rectangle is to the actual limits of the data in the table. Enter a positive value. A value of zero (0) sets the bounds to the limits of the data in the table.

ReRead CoordSys Bounds

Click to refresh the dialog with the coordinate system bounds information set for the table.

Optimize CoordSys Bounds

Click to match the table coordinate system bounds to the actual data bounds. The match applies the **Buffer % for Bounds Optimization** value to calculate the table coordinate system bounds.

Save Table As with CoordSys Bounds

Click to save a copy of the table with your settings.

Save Table As without CoordSys Bounds

Click to save a copy of the table without coordinate system bounds information.

Draw outline of bounds

Click to show the coordinate system bounds on the map.

Copy

Click to select and copy the text in the **Clause** field to paste it into your MapBasic application or MapBasic window. (If you can edit the text in the Clause field while in copy mode, the CoordSys Bounds Manager ignores the edits.)

Cancel

Click to close the dialog box.

Degree Converter Tool

This tool converts a column of data containing DMS coordinates to Decimal Decimals and Decimal Degrees to degrees/minutes/seconds. The Degree Converter tool is part of the toolset that ships with MapInfo Pro. It converts coordinate information to decimal degrees from a degrees, minutes, seconds (d/m/s) format. It can also convert the columns back to degrees, minutes, seconds from decimal degrees.

Note: You can also use the Degree Converter to convert decimal degrees back to degrees, minutes, seconds format. Use this feature if you must return the data to its original format.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids* Guide.

Converting Degree/Minute/Second Coordinates into Decimal Degrees

The Degree Converter tool is part of the toolset that ships with MapInfo Pro. It converts coordinate information to decimal degrees from a degrees, minutes, seconds (d/m/s) format. It can also convert the columns back to degrees, minutes, seconds from decimal degrees.

Before using this program, make sure that there are two new columns available to hold the converted data. You can also use the Degree Converter to convert a single Latitude/Longitude coordinate to either decimal degrees or D/M/S. You can also run this program with the **Run Program** command, as well as any of the other tools in the Tools Manager.

If you are entering map coordinates in degrees, you must enter decimal degrees as opposed to degrees/minutes/seconds. For example, to specify the coordinates 40 degrees, 30 minutes, enter 40.5 degrees.

MapInfo Pro includes a MapBasic application, `DMSCNVRT.MBX`, which converts d/m/s coordinates into decimal degrees.

To convert degrees, minutes, seconds coordinates to decimal degree coordinates:

1. Run the **Degree Converter** tool to display the **Decimal / Degree Converter (Version 1.3)** window. See [Running a Tool](#) for details.
2. Select the table containing the columns for conversion.
3. Choose one of the columns containing the coordinate information. You have to run the program once for the longitude (X) column and once for the latitude (Y) column.
4. Enter the **DMS Separator**. You should be able to look at your table and identify the character separating the degrees, minutes, and seconds entries.
5. Choose the column for the converted results and click **OK**.
6. Browse your table to see the new column of coordinate information in decimal degrees. Repeat this procedure for your other coordinate column. You are ready to use the **SPATIAL** menu to click the **Create Points** command.

Note: You can also use the Degree Converter to convert decimal degrees back to degrees, minutes, seconds format. Use this feature if you must return the data to its original format.

Frequently Asked Projection File Questions

What do the \p#### codes mean in the MAPINFOW.PRJ file?

Answer: MapInfo Pro uses the \p#### or Projected Coordinate System (PCS) codes shown in the example when registering GeoTIFF images or other georeferenced raster images. GeoTIFF files often identify their coordinate system with a single code number instead of listing the coordinate system parameters, so MapInfo Pro scans the `MAPINFOW.PRJ` file to find a matching supported code. MapInfo Pro supports a subset of PCS codes, depending on the projection they use, in values between 20000 and 32760). Codes cannot be used more than once in the `MAPINFOW.PRJ` file.

Example:

```
"- Australian Map Grid (AGD 66) -"
"AMG Zone 47 (AGD 66)", 8, 12, 7, 99, 0, 0.9996, 500000, 10000000
"AMG Zone 48 (AGD 66)\p20248", 8, 12, 7, 105, 0, 0.9996, 500000, 10000000
```

How do I convert a coordinate system with units in meters to feet?

Answer: You will need to edit the `MAPINFOW.PRJ` file to modify the same projection in a different measurement system and adjust the False Eastings and Northings used for the difference.

For example below, the first line is the original projection expressed in meters. The second line is a copied modification of the first, where the units were changed from "7" (meters) to "8" (feet) indicating this coordinate system is now using feet, and the False Easting (2000000) and Northing (500000) components were divided by .3048 to convert them from meters to feet.

Example:

```
"California, Zone I (1983)\p26941", 3, 74, 7, -122, 39.3333333333, 40,
41.6666666667, 2000000, 500000
"California, Zone I FT (1983)\p26941", 3, 74, 8, -122, 39.3333333333,
40,
41.6666666667, 6561679.7, 164041.99
```

I chose Longitude/Latitude (NAD 83) as my projection; however, whenever I look at the Choose Projection dialog, it keeps saying Longitude/Latitude (GRS 80). Why will not my projection change?

Answer: The GRS 80 datum is identical to NAD 83 datum. MapInfo Pro uses the numeric parameters, not the name, to decide which coordinate system to highlight in the **Choose Projection** dialog. Since GRS 80 has the same numeric parameters as NAD 83, and GRS 80 datum comes earlier in the list, MapInfo Pro chooses GRS 80 instead of NAD 83.

Coordinate System Enhancements by Version

Introduction

This chapter describes the coordinate system enhancements by product version. The `MAPINFOW.PRJ` file has been updated to support these changes.

Coordinate System and Datum Additions for MapInfo Pro 2021

New Croatia Projections added

"Croatia (HTRS96/TM)\p3765", 8, 115, 7, 16.5, 0, 0.9999, 500000, 0

"Croatia (HTRS96/LCC)\p3766", 3, 115, 7, 16.5, 0, 45.9166666666667, 43.0833333333333, 0, 0

New Datum 1029 for Luxembourg (LURES) added:

Added to projection category: "--- Luxembourg (International 1924) ---"

"National Gauss Luxembourg (LURES)", 8, 1029, 7, 6.1666666667, 49.833333333, 1, 80000, 100000

- No change in TAB file version – uses existing International 1924 ellipsoid.
- Usage of datum #1029 in Set Map statement will make a WOR version 2100
- Export to MIF\MID will make a version 2100 MIF file.
- Also known as LUREF
- No known EPSG code for projections using this LUREF datum currently.

More info: <https://act.public.lu/fr/gps-reseaux/spslux1/spsluxgeodeticdatum.html>

Coordinate System and Datum Additions for MapInfo Pro 2019.3

Bounded GDA2020 Projection Entries for Victoria, Australia.

"--- Victorian Bounded Projections GDA2020 ---"

"VIC VicGrid2020 (GDA2020) Bounded", 2003, 1028, 7, 145, -37, -36, -38, 2500000, 2500000, 1500000, 1500000, 3500000, 3500000

"VIC Zone 54 (GDA2020) Bounded", 2008, 1028, 7, 141, 0, 0.9996, 500000, 10000000, -500000, 5000000, 1500000, 7000000

"VIC Zone 55 (GDA2020) Bounded", 2008, 1028, 7, 147, 0, 0.9996, 500000, 10000000, -500000, 5000000, 1500000, 7000000

"VIC Longitude/Latitude (GDA2020) Bounded", 2001, 1028, 138, -44, 154.666666667, -27.333333333

"Longitude / Latitude (Victoria GDA2020) Bounded", 2001, 1028, 132, -26.8, 154, -43.8

Russian Projection entries

"--- Russia Longitude/Latitude (GOST 32453-2017) ---"

"Longitude/Latitude (PZ-90)", 1, 9999, 57, -1.43, 0.05, 0.2, 0, 0, -0.13, -0.22, 0

"Longitude/Latitude (PZ-90.02)", 1, 9999, 57, -0.36, 0.08, 0.18, 0, 0, 0, 0, 0

"Longitude/Latitude (PZ-90.11)", 1, 9999, 57, 0.013, -0.106, -0.022, 0.0023, -0.00354, 0.00421, 0.008, 0

"Longitude/Latitude (SK-42)", 1, 9999, 3, 23.57, -140.95, -79.8, 0, -0.35, -0.79, -0.22, 0

"Longitude/Latitude (SK-95)", 1, 9999, 3, 24.47, -130.89, -81.56, 0, 0, -0.13, -0.22, 0

Coordinate System and Datum Additions for MapInfo Pro 2019

New Projection entries added to MapInfow.prj

New Polar Stereographic entries added for use in the Universal Polar Stereographic projection category. These systems can apply either a standard parallel OR scale factor at the pole.

The two parameters are linked and one of these parameters can be calculated from the other one. MapInfoPro uses a scale factor computed from the standard parallel of 70 degrees to achieve correct result.

Details here:

http://earth-info.nga.mil/GandG/coordsys/polar_stereographic/polar_stereographic_computation.html

"NSIDC Sea Ice Polar Stereographic North\p3413", 20, 104, 7, -45, 90, 0.969858190326, 0, 0

"NSIDC Sea Ice Polar Stereographic South\p3412", 20, 104, 7, 0, -70, 0.969858190326, 0, 0

Details here: <https://epsg.io/>***Use \p or EPSG code to find information.

"--- Norwegian Transversal Mercator (EUREF89/ETRS89) ---"

"Nowegian NTM Zone 5 (EUREF89/ETRS89)\p5105", 8, 115, 7, 5.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 6 (EUREF89/ETRS89)\p5106", 8, 115, 7, 6.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 7 (EUREF89/ETRS89)\p5107", 8, 115, 7, 7.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 8 (EUREF89/ETRS89)\p5108", 8, 115, 7, 8.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 9 (EUREF89/ETRS89)\p5109", 8, 115, 7, 9.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 10 (EUREF89/ETRS89)\p5110", 8, 115, 7, 10.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 11 (EUREF89/ETRS89)\p5111", 8, 115, 7, 11.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 12 (EUREF89/ETRS89)\p5112", 8, 115, 7, 12.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 13 (EUREF89/ETRS89)\p5113", 8, 115, 7, 13.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 14 (EUREF89/ETRS89)\p5114", 8, 115, 7, 14.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 15 (EUREF89/ETRS89)\p5115", 8, 115, 7, 15.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 16 (EUREF89/ETRS89)\p5116", 8, 115, 7, 16.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 17 (EUREF89/ETRS89)\p5117", 8, 115, 7, 17.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 18 (EUREF89/ETRS89)\p5118", 8, 115, 7, 18.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 19 (EUREF89/ETRS89)\p5119", 8, 115, 7, 19.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 20 (EUREF89/ETRS89)\p5120", 8, 115, 7, 20.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 21 (EUREF89/ETRS89)\p5121", 8, 115, 7, 21.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 22 (EUREF89/ETRS89)\p5122", 8, 115, 7, 22.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 23 (EUREF89/ETRS89)\p5123", 8, 115, 7, 23.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 24 (EUREF89/ETRS89)\p5124", 8, 115, 7, 24.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 25 (EUREF89/ETRS89)\p5125", 8, 115, 7, 25.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 26 (EUREF89/ETRS89)\p5126", 8, 115, 7, 26.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 27 (EUREF89/ETRS89)\p5127", 8, 115, 7, 27.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 28 (EUREF89/ETRS89)\p5128", 8, 115, 7, 28.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 29 (EUREF89/ETRS89)\p5129", 8, 115, 7, 29.5, 58, 1.0000, 100000, 1000000
 "Nowegian NTM Zone 30 (EUREF89/ETRS89)\p5130", 8, 115, 7, 30.5, 58, 1.0000, 100000, 1000000

Additionally, if users require a bounded coordsys for these Norwegian TM zones, the following can be inserted into the Mapinfo.PRJ file (In MIPRO Program Directory) with any text editor.

"--- Nowegian Transversal Mercator (EUREF89/ETRS89) Bounded ---"

"Bounded Nowegian NTM Zone 5 (EUREF89/ETRS89)\p5105", 2008, 115, 7, 5.5, 58, 1.0000, 100000, 1000000, -1940686.20, -1576790.57, 470275.24, 4034613.75

"Bounded Nowegian NTM Zone 6 (EUREF89/ETRS89)\p5106", 2008, 115, 7, 6.5, 58, 1.0000, 100000, 1000000, -2037028.36, -1555540.88, 460859.05, 4028252.41

"Bounded Nowegian NTM Zone 7 (EUREF89/ETRS89)\p5107", 2008, 115, 7, 7.5, 58, 1.0000, 100000, 1000000, -2133612.31, -1533162.42, 451334.29, 4022056.56

"Bounded Nowegian NTM Zone 8 (EUREF89/ETRS89)\p5108", 2008, 115, 7, 8.5, 58, 1.0000, 100000, 1000000, -2230445.89, -1509631.57, 441703.88, 4016028.02

"Bounded Nowegian NTM Zone 9 (EUREF89/ETRS89)\p5109", 2008, 115, 7, 9.5, 58, 1.0000, 100000, 1000000, -2327536.48, -1484923.41, 431970.75, 4010168.54

"Bounded Nowegian NTM Zone 10 (EUREF89/ETRS89)\p5110", 2008, 115, 7, 10.5, 58, 1.0000, 100000, 1000000, -2424890.97, -1459011.63, 422137.88, 4004479.85

"Bounded Nowegian NTM Zone 11 (EUREF89/ETRS89)\p5111", 2008, 115, 7, 11.5, 58, 1.0000, 100000, 1000000, -2522515.68, -1431868.52, 412208.26, 3998963.60

"Bounded Nowegian NTM Zone 12 (EUREF89/ETRS89)\p5112", 2008, 115, 7, 12.5, 58, 1.0000, 100000, 1000000, -2620416.35, -1403464.91, 402184.90, 3993621.41

"Bounded Nowegian NTM Zone 13 (EUREF89/ETRS89)\p5113", 2008, 115, 7, 13.5, 58, 1.0000, 100000, 1000000, -2718598.09, -1373770.11, 392070.86, 3988454.82

"Bounded Nowegian NTM Zone 14 (EUREF89/ETRS89)\p5114", 2008, 115, 7, 14.5, 58, 1.0000, 100000, 1000000, -2817065.31, -1342751.89, 381869.19, 3983465.34

"Bounded Nowegian NTM Zone 15 (EUREF89/ETRS89)\p5115", 2008, 115, 7, 15.5, 58, 1.0000, 100000, 1000000, -2915821.70, -1310376.42, 371583.01, 3978654.43

"Bounded Nowegian NTM Zone 16 (EUREF89/ETRS89)\p5116", 2008, 115, 7, 16.5, 58, 1.0000, 100000, 1000000, -3014870.13, -1276608.19, 361215.41, 3974023.47

"Bounded Nowegian NTM Zone 17 (EUREF89/ETRS89)\p5117", 2008, 115, 7, 17.5, 58, 1.0000, 100000, 1000000, -3114212.63, -1241409.99, 350769.53, 3969573.81

"Bounded Nowegian NTM Zone 18 (EUREF89/ETRS89)\p5118", 2008, 115, 7, 18.5, 58, 1.0000, 100000, 1000000, -3213850.31, -1204742.84, 340248.54, 3965306.74

"Bounded Nowegian NTM Zone 19 (EUREF89/ETRS89)\p5119", 2008, 115, 7, 19.5, 58, 1.0000, 100000, 1000000, -3313783.30, -1166565.92, 329655.60, 3961223.49

"Bounded Nowegian NTM Zone 20 (EUREF89/ETRS89)\p5120", 2008, 115, 7, 20.5, 58, 1.0000, 100000, 1000000, -3414010.68, -1126836.52, 318993.92, 3957325.24

"Bounded Nowegian NTM Zone 21 (EUREF89/ETRS89)\p5121", 2008, 115, 7, 21.5, 58, 1.0000, 100000, 1000000, -3514530.40, -1085509.96, 308266.69, 3953613.12

"Bounded Nowegian NTM Zone 22 (EUREF89/ETRS89)\p5122", 2008, 115, 7, 22.5, 58, 1.0000, 100000, 1000000, -3615339.22, -1042539.53, 297477.16, 3950088.20

"Bounded Nowegian NTM Zone 23 (EUREF89/ETRS89)\p5123", 2008, 115, 7, 23.5, 58, 1.0000, 100000, 1000000, -3716432.63, -997876.43, 286628.57, 3946751.50

"Bounded Nowegian NTM Zone 24 (EUREF89/ETRS89)\p5124", 2008, 115, 7, 24.5, 58, 1.0000, 100000, 1000000, -3817804.74, -951469.68, 275724.17, 3943603.97

"Bounded Nowegian NTM Zone 25 (EUREF89/ETRS89)\p5125", 2008, 115, 7, 25.5, 58, 1.0000, 100000, 1000000, -3919448.22, -903266.06, 264767.25, 3940646.52

"Bounded Nowegian NTM Zone 26 (EUREF89/ETRS89)\p5126", 2008, 115, 7, 26.5, 58, 1.0000, 100000, 1000000, -4021354.21, -853210.00, 253761.08, 3937880.00

"Bounded Nowegian NTM Zone 27 (EUREF89/ETRS89)\p5127", 2008, 115, 7, 27.5, 58, 1.0000, 100000, 1000000, -4123512.20, -801243.56, 242708.97, 3935305.21

"Bounded Nowegian NTM Zone 28 (EUREF89/ETRS89)\p5128", 2008, 115, 7, 28.5, 58, 1.0000, 100000, 1000000, -4225909.97, -747306.26, 231614.23, 3932922.88

"Bounded Nowegian NTM Zone 29 (EUREF89/ETRS89)\p5129", 2008, 115, 7, 29.5, 58, 1.0000, 100000, 1000000, -4328533.45, -691335.08, 220480.18, 3930733.70

"Bounded Nowegian NTM Zone 30 (EUREF89/ETRS89)\p5130", 2008, 115, 7, 30.5, 58, 1.0000, 100000, 1000000, -4431366.63, -633264.31, 209310.15, 3928738.29

Coordinate System and Datum Additions for MapInfo Pro 17.0.3

New Polar Stereographic entries added for use in the Universal Polar Stereographic Projection category. These systems can apply either a standard parallel OR scale factor at the pole. The two parameters are linked and one of these parameters can be calculated from the other one. MapInfo Pro uses a scale factor computed from the standard parallel of 70 degrees to achieve correct result.

http://earth-info.nga.mil/GandG/coordsys/polar_stereographic/polar_stereographic_computation.html

- "NSIDC Sea Ice Polar Stereographic North\p3413", 20, 104, 7, -45, 90, 0.969858190326, 0, 0
- "NSIDC Sea Ice Polar Stereographic South\p3412", 20, 104, 7, 0, -70, 0.969858190326, 0, 0

Estonian Coordinate systems

Added EPSG codes to bounded and unbounded Estonian Coordinate systems.

"--- Estonian Coordinate Systems ---"

- "L-EST97 1 mm tapsus (EUREF89)\p3301", 2003, 115, 7, 24, 57.51755393056, 58, 59.33333333, 500000, 6375000, -503054.52549999999, 5371945.4740000004, 1503054.5260000001, 7378054.5259999996"
- "L-EST97 1 cm tapsus (EUREF89) \p3301", 2003, 115, 7, 24, 57.51755393056, 58, 59.33333333, 500000, 6375000, -9530545.2550000008, -3655545.2550000013, 10530545.2600000002, 16405545.2600000002"
- "L-EST97 (EUREF89)\p3301", 3, 115, 7, 24, 57.51755393056, 58, 59.33333333, 500000, 6375000"
- "L-EST 1992 (EUREF89)\p3300", 3, 115, 7, 24, 57.51755394, 58, 59.33333333, 500000, 6375000"

There are new datums in this version:

- Geocentric Datum of Australia (GDA 2020 Datum) #1028

For a detailed list of enhancements, see **Coordinate System Enhancements by Version** in MapInfo Pro Help.

Coordinate System and Datum Additions for MapInfo Pro 17.0

Geocentric Datum of Australia (GDA 2020 Datum) #1028

For Longitude Latitude systems::

- "Longitude / Latitude (Australia GDA 2020)\p7842", 1, 1028

For Map Grid of Australia:

"--- Map Grid of Australia 2020 (MGA2020) ---"

- "MGA2020 Zone 46\p7846", 8, 1028, 7, 93, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 47\p7847", 8, 1028, 7, 99, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 48\p7848", 8, 1028, 7, 105, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 49\p7849", 8, 1028, 7, 111, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 50\p7850", 8, 1028, 7, 117, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 51\p7851", 8, 1028, 7, 123, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 52\p7852", 8, 1028, 7, 129, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 53\p7853", 8, 1028, 7, 135, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 54\p7854", 8, 1028, 7, 141, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 55\p7855", 8, 1028, 7, 147, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 56\p7856", 8, 1028, 7, 153, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 57\p7857", 8, 1028, 7, 159, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 58\p7858", 8, 1028, 7, 165, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 59\p7859", 8, 1028, 7, 171, 0, 0.9996, 500000, 10000000

Coordinate System and Datum Additions for MapInfo Pro 16.0.1

There are two new ellipsoid definitions in this maintenance release: GSK-2011 and PZ-90.11.

Ellipsoid #	Ellipsoid Name	Major Semi Axis	Inverse Flattening 1/f
56	GSK-2011	6378136.5	298.2564151
57	PZ-90.11	6378136.0	298.25784

To create custom datums using these new ellipsoid definitions, see the following references for the valid datum parameters:

Using one of these ellipsoids in a TAB, MIF, or WOR (workspace) file upgrades the file to version 1501.

MapInfo Pro 15.2.x and 16.0 cannot correctly use tables containing these new ellipsoid definitions. When you open such a table in MapInfo Pro 15.2.x or 16.0, the CoordSys of the table is set to WGS84. Opening a workspace in 15.2.x or 16.0 that uses the **Set Map CoordSys** statement with one of these ellipsoids definitions generates an error. When you dismiss the error, MapInfo Pro use WGS84 for table's CoordSys. The same error displays from an MBX or MapBasic window and when importing a MIF file that uses one of these new ellipsoids in a Coordsys clause.

Coordinate System and Datum Additions for MapInfo Pro 16

Argentina Gauss-Kruger Campo Inchauspe

Corrected parameters for False Northings, Origin Latitude, and added EPSG codes from spatialreference.org:

- "Argentina Gauss-Kruger Zone 1\p22191", 8, 17, 7, -72, -90, 1, 1500000, 0
- "Argentina Gauss-Kruger Zone 2\p22192", 8, 17, 7, -69, -90, 1, 2500000, 0
- "Argentina Gauss-Kruger Zone 3\p22193", 8, 17, 7, -66, -90, 1, 3500000, 0
- "Argentina Gauss-Kruger Zone 4\p22194", 8, 17, 7, -63, -90, 1, 4500000, 0
- "Argentina Gauss-Kruger Zone 5\p22195", 8, 17, 7, -60, -90, 1, 5500000, 0
- "Argentina Gauss-Kruger Zone 6\p22196", 8, 17, 7, -57, -90, 1, 6500000, 0
- "Argentina Gauss-Kruger Zone 7\p22197", 8, 17, 7, -54, -90, 1, 7500000, 0

Bosnia-Herzegovina Coordinate Systems

New EPSG codes and additional Bounded Coordinate systems:

- "Bosnia-Herzegovina (Zone 5)\p31275", 8, 9999, 10, 472.8677, 187.8769, 544.7084, -5.76198422, -5.3222842, 12.80666941, 1.54517287, 0, 7, 15, 0, 0.9999, 5500000, 0
- "Bosnia-Herzegovina (Zone 6)\p31276", 8, 9999, 10, 472.8677, 187.8769, 544.7084, -5.76198422, -5.3222842, 12.80666941, 1.54517287, 0, 7, 18, 0, 0.9999, 6500000, 0

- "Bosnia-Herzegovina (Zone 7)\p31277", 8, 9999, 10, 472.8677, 187.8769, 544.7084, -5.76198422, -5.3222842, 12.80666941, 1.54517287, 0, 7, 21, 0, 0.9999, 7500000, 0
- "Bosnia-Herzegovina (Zone 5) Bounded", 2008, 9999, 10, 472.8677, 187.8769, 544.7084, -5.76198422, -5.3222842, 12.80666941, 1.54517287, 0, 7, 15, 0, 0.9999, 5500000, 0, 5540000, 4650000, 5880000, 5050000
- "Bosnia-Herzegovina (Zone 6) Bounded", 2008, 9999, 10, 472.8677, 187.8769, 544.7084, -5.76198422, -5.3222842, 12.80666941, 1.54517287, 0, 7, 18, 0, 0.9999, 6500000, 0, 6300000, 4650000, 6700000, 5050000
- "Bosnia-Herzegovina (Zone 7) Bounded", 2008, 9999, 10, 472.8677, 187.8769, 544.7084, -5.76198422, -5.3222842, 12.80666941, 1.54517287, 0, 7, 21, 0, 0.9999, 7500000, 0, 7050000, 4650000, 7400000, 5050000

Brisbane City Survey Grid

New EPSG code:

- "Brisbane City Survey Grid BCSG02 (GDA94)\p3113", 8, 116, 7, 153, -28, 0.99999, 50000, 100000

Cassini-Soldner Systems

Updated EPSG codes:

- "Cassini-Soldner Singapore\p24500", 30, 47, 7, 103.853, 1.287639, 30000, 30000
- "Cassini-Soldner Berlin\p3068", 30, 1000, 7, 13.62720367, 52.41864828, 40000, 10000

Indonesian TM3 Systems

New projection additions:

- "Indonesia DGN95 TM-3 zone 46.2\p23830", 8, 104, 7, 94.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 47.1\p23831", 8, 104, 7, 97.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 47.2\p23832", 8, 104, 7, 100.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 48.1\p23833", 8, 104, 7, 103.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 48.2\p23834", 8, 104, 7, 106.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 49.1\p23835", 8, 104, 7, 109.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 49.2\p23836", 8, 104, 7, 112.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 50.1\p23837", 8, 104, 7, 115.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 50.2\p23838", 8, 104, 7, 118.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 51.1\p23839", 8, 104, 7, 121.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 51.2\p23840", 8, 104, 7, 124.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 52.1\p23841", 8, 104, 7, 127.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 52.2\p23842", 8, 104, 7, 130.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 53.1\p23843", 8, 104, 7, 133.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 53.2\p23844", 8, 104, 7, 136.5, 0, 0.9999, 200000, 1500000
- "Indonesia DGN95 TM-3 zone 54.1\p23845", 8, 104, 7, 139.5, 0, 0.9999, 200000, 1500000

Irish Coordinate Systems

Name change for TM65 and new TM75 that uses a new EPSG code:

- "Irish Grid TM65\p29902", 8, 42, 7, -8, 53.5, 1.000035, 200000, 250000
- "Irish Grid TM75\p29903", 8, 42, 7, -8, 53.5, 1.000035, 200000, 250000
- "Irish Transverse Mercator (ITM)\p2157", 8, 115, 7, -8, 53.5, 0.999820, 600000, 750000

Korean Coordinate Systems(TM Bessel and KATEC)

New projection entries added to the 11.0 Spatial Server

- "Korean 1985 West Zone(125 E)\p5173", 8, 97, 7, 125.00289027778, 38, 1, 200000, 500000
- "Korean 1985 Midst Zone(127 E)\p5174", 8, 97, 7, 127.00289027778, 38, 1, 200000, 500000
- "Korean 1985 Cheju Zone(127 E)\p5175", 8, 97, 7, 127.00289027778, 38, 1, 200000, 550000
- "Korean 1985 East Zone(129 E)\p5176", 8, 97, 7, 129.00289027778, 38, 1, 200000, 500000
- "Korean 1985 Ulung Zone(131 E)\p5177", 8, 97, 7, 131.00289027778, 38, 1, 200000, 500000
- "Korean 1985 Unified\p5178", 8, 97, 7, 127.5, 38, 0.9996, 1000000, 2000000
- "KATEC Coordinate System", 8, 97, 7, 128, 38, 0.9999, 400000, 600000

Korean Coordinate Systems 2000(TM GRS80)

New projection entries added to the 11.0 Spatial Server

- "Korean West Zone (GRS125 E-5)\p5180", 8, 33, 7, 125, 38, 1, 200000, 500000
- "Korean Midst Zone (GRS127 E-5)\p5181", 8, 33, 7, 127, 38, 1, 200000, 500000
- "Korean Cheju Zone (GRS127 E-5)\p5182", 8, 33, 7, 127, 38, 1, 200000, 550000
- "Korean East Zone (GRS129 E-5)\p5183", 8, 33, 7, 129, 38, 1, 200000, 500000
- "Korean Ulung Zone (GRS131 E-5)\p5184", 8, 33, 7, 131, 38, 1, 200000, 500000
- "Korea 2000 West Belt(125 E-6)\p5185", 8, 33, 7, 125, 38, 1, 200000, 600000
- "Korea 2000 Central Belt (127 E-6)\p5186", 8, 33, 7, 127, 38, 1, 200000, 600000
- "Korea 2000 East Belt(129 E-6)\p5187", 8, 33, 7, 129, 38, 1, 200000, 600000
- "Korea 2000 DongHae(131 E-6)\p5188", 8, 33, 7, 131, 38, 1, 200000, 600000
- "Korea 2000 Unified (GRS80)\p5179", 8, 33, 7, 127.5, 38, 0.9996, 1000000, 2000000

Korean Coordinate Systems(GIS UTM-K)

New projection entries added to the 11.0 Spatial Server

- "UTM-K(GRS80)", 8, 33, 7, 127.5, 38, 0.9996, 1000000, 2000000
- "UTM-K(WGS84)", 8, 104, 7, 127.5, 38, 0.9996, 1000000, 2000000

South African and Zimbabwe Projections Clarke 1880 Cape

Update to category names and new Gauss-Kruger LO 33 Arc1950 coordsys:

- "Albers Equal-Area 18/32 South", 9, 19, 7, 23, -23, -18, -32, 0, 0
- "Lambert Conformal Conic", 3, 19, 7, 23, -23, -18, -32, 0, 0
- "Gauss-Kruger LO 17\p22277", 8, 19, 7, 17, 0, 1, 0, 0
- "Gauss-Kruger LO 19\p22279", 8, 19, 7, 19, 0, 1, 0, 0
- "LO19 with offset", 8, 19, 7, 19, 0, 1, 0, 3700000
- "Gauss-Kruger LO 21\p22281", 8, 19, 7, 21, 0, 1, 0, 0
- "Gauss-Kruger LO 23\p22283", 8, 19, 7, 23, 0, 1, 0, 0

- "Gauss-Kruger LO 25\p22285", 8, 19, 7, 25, 0, 1, 0, 0
- "Gauss-Kruger LO 27\p22287", 8, 19, 7, 27, 0, 1, 0, 0
- "Gauss-Kruger LO 29\p22289", 8, 19, 7, 29, 0, 1, 0, 0
- "Gauss-Kruger LO 31\p22291", 8, 19, 7, 31, 0, 1, 0, 0
- "Gauss-Kruger LO 33\p22293", 8, 19, 7, 33, 0, 1, 0, 0

Swedish Coordinate Systems

Projection name changes to match the EPSG database:

- "SWEREF 99 TM RH2000 Onshore\p5845", 8, 33, 7, 15, 0, 0.9996, 500000, 0
- "SWEREF 99 12 00 RH2000\p5846", 8, 33, 7, 12.00, 0, 1, 150000, 0
- "SWEREF 99 13 30 RH2000\p5847", 8, 33, 7, 13.50, 0, 1, 150000, 0
- "SWEREF 99 15 00 RH2000\p5848", 8, 33, 7, 15.00, 0, 1, 150000, 0
- "SWEREF 99 16 30 RH2000\p5849", 8, 33, 7, 16.50, 0, 1, 150000, 0
- "SWEREF 99 18 00 RH2000\p5850", 8, 33, 7, 18.00, 0, 1, 150000, 0
- "SWEREF 99 14 15 RH2000\p5851", 8, 33, 7, 14.25, 0, 1, 150000, 0
- "SWEREF 99 15 45 RH2000\p5852", 8, 33, 7, 15.75, 0, 1, 150000, 0
- "SWEREF 99 17 15 RH2000\p5853", 8, 33, 7, 17.25, 0, 1, 150000, 0
- "SWEREF 99 18 45 RH2000\p5854", 8, 33, 7, 18.75, 0, 1, 150000, 0
- "SWEREF 99 20 15 RH2000\p5855", 8, 33, 7, 20.25, 0, 1, 150000, 0
- "SWEREF 99 21 45 RH2000\p5856", 8, 33, 7, 21.75, 0, 1, 150000, 0
- "SWEREF 99 23 15 RH2000\p5857", 8, 33, 7, 23.25, 0, 1, 150000, 0

Universal Transverse Mercator (Arc 1960)

New projection additions to the mapinfo.prj:

- "UTM Zone 35, Southern Hemisphere (Arc 1960)\p21035", 8, 6, 7, 27, 0, 0.9996, 500000, 10000000
- "UTM Zone 36, Southern Hemisphere (Arc 1960)\p21036", 8, 6, 7, 33, 0, 0.9996, 500000, 10000000
- "UTM Zone 37, Southern Hemisphere (Arc 1960)\p21037", 8, 6, 7, 39, 0, 0.9996, 500000, 10000000

Zambia and Zimbabwe Projections Gauss-Kruger Arc1950

Update to category names and new Gauss-Kruger LO 33 Arc1950 coordsys:

- "Gauss-Kruger LO 24 Arc1950", 8, 5, 7, 24, 0, 1, 0, 0
- "Gauss-Kruger LO 25 Arc1950", 8, 5, 7, 25, 0, 1, 0, 0
- "Gauss-Kruger LO 26 Arc1950", 8, 5, 7, 26, 0, 1, 0, 0
- "Gauss-Kruger LO 27 Arc1950", 8, 5, 7, 27, 0, 1, 0, 0
- "Gauss-Kruger LO 28 Arc1950", 8, 5, 7, 28, 0, 1, 0, 0
- "Gauss-Kruger LO 29 Arc1950", 8, 5, 7, 29, 0, 1, 0, 0
- "Gauss-Kruger LO 30 Arc1950", 8, 5, 7, 30, 0, 1, 0, 0
- "Gauss-Kruger LO 33 Arc1950", 8, 5, 7, 33, 0, 1, 0, 0

Coordinate System and Datum Additions for MapInfo Professional 15.0

New PRJ codes

Portuguese Coordinate Systems

- "PT TM06 ETRS891\p3763", 8, 115, 7, -8.133108333334, 39.668258333333, 1, 0, 0

Colombian Coordinate Systems

- "Colombia East\p21899", 8, 16, 7, -68.08091666666667, 4.599047222222222, 1, 1000000, 1000000
- "Colombia East Central zone\p21898", 8, 16, 7, -71.08091666666667, 4.599047222222222, 1, 1000000, 1000000
- "Colombia West zone\p21896", 8, 16, 7, -77.08091666666667, 4.599047222222222, 1, 1000000, 1000000
- "MAGNA-SIRGAS / Colombia East zone\p3118", 8, 165, 7, -68.07750791666666, 4.596200416666666, 1, 1000000, 1000000
- "MAGNA-SIRGAS / Colombia East Central zone\p3117", 8, 165, 7, -71.07750791666666, 4.596200416666666, 1, 1000000, 1000000
- "MAGNA-SIRGAS / Colombia Bogota zone\p3116", 8, 165, 7, -74.07750791666666, 4.596200416666666, 1, 1000000, 1000000
- "MAGNA-SIRGAS / Colombia West zone\p3115", 8, 165, 7, -77.07750791666666, 4.596200416666666, 1, 1000000, 1000000
- "MAGNA-SIRGAS / Colombia Far West zone\p3114", 8, 165, 7, -80.07750791666666, 4.596200416666666, 1, 1000000, 1000000

We have added the following new EPSG codes:

- "Longitude / Latitude (Anna 1 Astro 1965)\p4708", 1, 4
- "Longitude / Latitude (Ascension Island 1958)\p4712", 1, 7
- "Longitude / Latitude (Astro Beacon E)\p4709", 1, 8
- "Longitude / Latitude (Astro B4 Sorol Atoll)\p4707", 1, 9
- "Longitude / Latitude (Astro DOS 71/4)\p4710", 1, 10
- "Longitude / Latitude (Astronomic Station 1952)\p4711", 1, 11
- "Longitude / Latitude (Bellevue)\p4714", 1, 14
- "Longitude / Latitude (Canton Astro 1966)\p4716", 1, 18
- "Longitude / Latitude (Cape Canaveral)\p4717", 1, 20
- "Longitude / Latitude (Chatham 1971)\p4672", 1, 22
- "Longitude / Latitude (DOS 1968)\p4718", 1, 26
- "Longitude / Latitude (Easter Island 1967)\p4719", 1, 27
- "Longitude / Latitude (ED 79)\p4668", 1, 29
- "Longitude / Latitude (Guam 1963)\p4675", 1, 34

- "Longitude / Latitude (GUX 1 Astro)\p37221", 1, 35
- "Longitude / Latitude (Hong Kong 1963)\p4739", 1, 38
- "Longitude / Latitude (Indian for Thailand, Vietnam)\p4240", 1, 40
- "Longitude / Latitude (ISTS 073 Astro 1969)\p4724", 1, 43
- "Longitude / Latitude (Johnston Island 1961)\p4725", 1, 44
- "Longitude / Latitude (Kerguelen Island)\p4698", 1, 46
- "Longitude / Latitude (Midway Astro 1961)\p4727", 1, 56
- "Longitude / Latitude (Nahrwan for Masirah Island)\p4270", 1, 58
- "Longitude / Latitude (Old Hawaiian)\p4135", 1, 77
- "Longitude / Latitude (Pico de las Nieves)\p4728", 1, 80
- "Longitude / Latitude (Pitcairn Astro 1967)\p4729", 1, 81
- "Longitude / Latitude (Puerto Rico)\p4139", 1, 83
- "Longitude / Latitude (Reunion)\p4626", 1, 86
- "Longitude / Latitude (RT 90)\p4124", 1, 112
- "Longitude / Latitude (Santo DOS)\p4730", 1, 88
- "Longitude / Latitude (Southwest Base)\p4183", 1, 95
- "Longitude / Latitude (Tristan Astro 1968)\p4734", 1, 98
- "Longitude / Latitude (Viti Levu 1916)\p4731", 1, 99
- "Longitude / Latitude (Wake-Eniwetok 1960)\p4732", 1, 100
- "Longitude / Latitude (WGS 66)\p4760", 1, 102
- "Longitude / Latitude (Hungarian HD 72)\p4237", 1, 1004
- "Longitude / Latitude (Hartbeesthoek 94)\p4148", 1, 150
- "Longitude / Latitude (EUREF89)\p4258", 1, 115
- "Longitude / Latitude (New Zealand NZGD2000)\p4167", 1, 117
- "Longitude / Latitude (American Samoa)\p4169", 1, 118
- "Longitude / Latitude (Antigua Island Astro 1943)\p4601", 1, 119
- "Longitude / Latitude (Ayabelle Lighthouse)\p4713", 1, 120
- "Longitude / Latitude (Bukit Rimpah)\p4219", 1, 121
- "Longitude / Latitude (Dabola)\p4155", 1, 123
- "Longitude / Latitude (Deception Island)\p4736", 1, 124
- "Longitude / Latitude (Graciosa Base SW 1948)\p4183", 1, 126
- "Longitude / Latitude (Herat North)\p4255", 1, 127
- "Longitude / Latitude (Indian 1954)\p4239", 1, 130
- "Longitude / Latitude (Indian 1960)\p4131", 1, 131
- "Longitude / Latitude (Indian 1975)\p4240", 1, 132
- "Longitude / Latitude (Indonesian 1974)\p4238", 1, 133
- "Longitude / Latitude (ISTS 061 Astro 1968)\p4722", 1, 134
- "Longitude / Latitude (Kusaie Astro 1951)\p4735", 1, 135
- "Longitude / Latitude (Leigon)\p4250", 1, 136
- "Longitude / Latitude (Montserrat Isl. Astro 1958)\p4604", 1, 137
- "Longitude / Latitude (North Sahara 1959)\p4307", 1, 139

- "Longitude / Latitude (Point 58)\p4620", 1, 141
- "Longitude / Latitude (Pointe Noire 1948)\p4282", 1, 142
- "Longitude / Latitude (Porto Santo 1936)\p4615", 1, 143
- "Longitude / Latitude (Selvagem Grande 1938)\p4616", 1, 144
- "Longitude / Latitude (S-JTSK)\p4156", 1, 146
- "Longitude / Latitude (Tananarive Observatory 1925)\p4297", 1, 147
- "Longitude / Latitude (ATS77 Ellipsoid)\p4122", 1, 151
- "Longitude / Latitude (Russia PZ90)\p4740", 1, 1012
- "Longitude / Latitude (Xian 1980)\p4610", 1, 1017

Projections of the World

- "Equidistant Cylindrical 0 Degree WGS84\p32663", 33, 104, 7, 0, 0, 0, 0

Australian State Grids

- "VicGrid66 (AGD66)\p3110", 3, 12, 7, 145, -37, -36, -38, 2500000, 4500000

Belgian Coordinate Systems

- "Belgium Lambert 2005\p3447", 19, 115, 7, 4.359216, 50.797815, 49.833333, 51.1666666667, 150328, 166262

Double Stereographic Projections for Canada

- "PEI Stereographic Double ATS77\p2290", 31, 151, 7, -63, 47.25, 0.999912, 700000, 400000
- "NB Stereographic Double ATS77\p2200", 31, 151, 7, -66.5, 46.5, 0.999912, 300000, 800000
- "PEI Stereographic Double NAD83\p2954", 31, 74, 7, -63, 47.25, 0.999912, 400000, 800000
- "NB Stereographic Double NAD83\p2953", 31, 74, 7, -66.5, 46.5, 0.999912, 2500000, 7500000

Guernsey Coordinate Systems

- "Guernsey Transverse Mercator Grid\p3108", 8, 104, 7, -2.416667, 49.500000, 0.999997, 47000, 50000

Estonian Coordinate Systems

- "ETRS-TM34\p25834", 2024, 115, 7, 21, 0, 0.9996, 500000, 0, 0, 0, 1500000, 8000000
- "ETRS-TM35\p25835", 2024, 115, 7, 27, 0, 0.9996, 500000, 0, 0, 0, 1500000, 8000000
- "ETRS-TM36\p25836", 2024, 115, 7, 33, 0, 0.9996, 500000, 0, 0, 0, 1500000, 8000000

French Coordinate Systems

- "French Lambert-93\p2154", 3, 33, 7, 3, 46.5, 44, 49, 700000, 6600000

Gauss-Kruger (DHDN)

- "GK Zone 1 (DHDN)\p31461", 8, 1000, 7, 3, 0, 1, 1500000, 0
- "O-Series GK Zone 34 (Pulkovo 1942)\p28404", 8, 1001, 7, 21, 0, 1, 4500000, 0
- "O-Series GK Zone 35 (Pulkovo 1942)\p28405", 8, 1001, 7, 27, 0, 1, 5500000, 0

Hong Kong Coordinate Systems

- "Longitude / Latitude (Hong Kong 1963)\p4739", 1, 38

Japanese Coordinate Systems

- "Japanese Zone I (Tokyo pre-MapInfo v. 7.5 Datum)\p30161", 8, 97, 7, 129.5, 33, 0.9999, 0, 0
- "Japanese Zone II (Tokyo pre-MapInfo v. 7.5 Datum)\p30162", 8, 97, 7, 131, 33, 0.9999, 0, 0
- "Japanese Zone III (Tokyo pre-MapInfo v. 7.5 Datum)\p30163", 8, 97, 7, 132.166666, 36, 0.9999, 0, 0
- "Japanese Zone IV (Tokyo pre-MapInfo v. 7.5 Datum)\p30164", 8, 97, 7, 133.5, 33, 0.9999, 0, 0
- "Japanese Zone V (Tokyo pre-MapInfo v. 7.5 Datum)\p30165", 8, 97, 7, 134.333333, 36, 0.9999, 0, 0
- "Japanese Zone VI (Tokyo pre-MapInfo v. 7.5 Datum)\p30166", 8, 97, 7, 136, 36, 0.9999, 0, 0
- "Japanese Zone VII (Tokyo pre-MapInfo v. 7.5 Datum)\p30167", 8, 97, 7, 137.166666, 36, 0.9999, 0, 0
- "Japanese Zone VIII (Tokyo pre-MapInfo v. 7.5 Datum)\p30168", 8, 97, 7, 138.5, 36, 0.9999, 0, 0
- "Japanese Zone IX (Tokyo pre-MapInfo v. 7.5 Datum)\p30169", 8, 97, 7, 139.833333, 36, 0.9999, 0, 0
- "Japanese Zone X (Tokyo pre-MapInfo v. 7.5 Datum)\p30170", 8, 97, 7, 140.833333, 40, 0.9999, 0, 0
- "Japanese Zone XI (Tokyo pre-MapInfo v. 7.5 Datum)\p30171", 8, 97, 7, 140.25, 44, 0.9999, 0, 0
- "Japanese Zone XII (Tokyo pre-MapInfo v. 7.5 Datum)\p30172", 8, 97, 7, 142.25, 44, 0.9999, 0, 0
- "Japanese Zone XIII (Tokyo pre-MapInfo v. 7.5 Datum)\p30173", 8, 97, 7, 144.25, 44, 0.9999, 0, 0
- "Japanese Zone XIV (Tokyo pre-MapInfo v. 7.5 Datum)\p30174", 8, 97, 7, 142, 26, 0.9999, 0, 0
- "Japanese Zone XV (Tokyo pre-MapInfo v. 7.5 Datum)\p30175", 8, 97, 7, 127.5, 26, 0.9999, 0, 0
- "Japanese Zone XVI (Tokyo pre-MapInfo v. 7.5 Datum)\p30176", 8, 97, 7, 124, 26, 0.9999, 0, 0
- "Japanese Zone XVII (Tokyo pre-MapInfo v. 7.5 Datum)\p30177", 8, 97, 7, 131, 26, 0.9999, 0, 0
- "Japanese Zone XVIII (Tokyo pre-MapInfo v. 7.5 Datum)\p30178", 8, 97, 7, 136, 20, 0.9999, 0, 0
- "Japanese Zone XIX (Tokyo pre-MapInfo v. 7.5 Datum)\p30179", 8, 97, 7, 154, 26, 0.9999, 0, 0
- "Japanese Zone I (JGD2000 Datum)\p2443", 8, 152, 7, 129.5, 33, 0.9999, 0, 0
- "Japanese Zone II (JGD2000 Datum)\p2444", 8, 152, 7, 131, 33, 0.9999, 0, 0
- "Japanese Zone III (JGD2000 Datum)\p2445", 8, 152, 7, 132.166666, 36, 0.9999, 0, 0
- "Japanese Zone IV (JGD2000 Datum)\p2446", 8, 152, 7, 133.5, 33, 0.9999, 0, 0
- "Japanese Zone V (JGD2000 Datum)\p2447", 8, 152, 7, 134.333333, 36, 0.9999, 0, 0
- "Japanese Zone VI (JGD2000 Datum)\p2448", 8, 152, 7, 136, 36, 0.9999, 0, 0
- "Japanese Zone VII (JGD2000 Datum)\p2449", 8, 152, 7, 137.166666, 36, 0.9999, 0, 0
- "Japanese Zone VIII (JGD2000 Datum)\p2450", 8, 152, 7, 138.5, 36, 0.9999, 0, 0
- "Japanese Zone IX (JGD2000 Datum)\p2451", 8, 152, 7, 139.833333, 36, 0.9999, 0, 0
- "Japanese Zone X (JGD2000 Datum)\p2452", 8, 152, 7, 140.833333, 40, 0.9999, 0, 0
- "Japanese Zone XI (JGD2000 Datum)\p2453", 8, 152, 7, 140.25, 44, 0.9999, 0, 0
- "Japanese Zone XII (JGD2000 Datum)\p2454", 8,
- "Japanese Zone XIII (JGD2000 Datum)\p2455", 8, 152, 7, 144.25, 44, 0.9999, 0, 0
- "Japanese Zone XIV (JGD2000 Datum)\p2456", 8, 152, 7, 142, 26, 0.9999, 0, 0

- "Japanese Zone XV (JGD2000 Datum)\p2457", 8, 152, 7, 127.5, 26, 0.9999, 0, 0
- "Japanese Zone XVI (JGD2000 Datum)\p2458", 8, 152, 7, 124, 26, 0.9999, 0, 0
- "Japanese Zone XVII (JGD2000 Datum)\p2459", 8, 152, 7, 131, 26, 0.9999, 0, 0
- "Japanese Zone XVIII (JGD2000 Datum)\p2460", 8, 152, 7, 136, 20, 0.9999, 0, 0
- "Japanese Zone XIX (JGD2000 Datum)\p2461", 8, 152, 7, 154, 26, 0.9999, 0, 0

Lithuanian Coordinate Systems

- "UTM Zone 34 (EUREF89)\p25834", 8, 115, 7, 21, 0, 0.9996, 500000, 0
- "UTM Zone 35 (EUREF89)\p25835", 8, 115, 7, 27, 0, 0.9996, 500000, 0

New Zealand Coordinate Systems

- "Amuri Circuit\p27219", 8, 31, 7, 173.010133389, -42.689116583, 1, 300000, 700000
- "Bay of Plenty Circuit\p27206", 8, 31, 7, 176.466197250, -37.761249806, 1, 300000, 700000
- "Bluff Circuit\p27232", 8, 31, 7, 168.342872000, -46.600009611, 1, 300002.66, 699999.58
- "Buller Circuit\p27217", 8, 31, 7, 171.581260056, -41.810802861, 1, 300000, 700000
- "Collingwood Circuit\p27214", 8, 31, 7, 172.672046500, -40.714759056, 1, 300000, 700000
- "Gawler Circuit\p27225", 8, 31, 7, 171.360748472, -43.748711556, 1, 300000, 700000
- "Grey Circuit\p27218", 8, 31, 7, 171.549771306, -42.333694278, 1, 300000, 700000
- "Hawkes Bay Circuit\p27208", 8, 31, 7, 176.673680528, -39.650929306, 1, 300000, 700000
- "Hokitika Circuit\p27221", 8, 31, 7, 170.979993500, -42.886322361, 1, 300000, 700000
- "Jacksons Bay Circuit\p27223", 8, 31, 7, 168.606267000, -43.977802889, 1, 300000, 700000
- "Karamea Circuit\p27216", 8, 31, 7, 172.109028194, -41.289911528, 1, 300000, 700000
- "Lindis Peak Circuit\p27227", 8, 31, 7, 169.467755083, -44.735267972, 1, 300000, 700000
- "Marlborough Circuit\p27220", 8, 31, 7, 173.802074111, -41.544486667, 1, 300000, 700000
- "Mt. Eden Circuit\p27205", 8, 31, 7, 174.764339361, -36.879865278, 0.9999, 300000, 700000
- "Mt. Nicholas Circuit\p27228", 8, 31, 7, 168.398641194, -45.132902583, 1, 300000, 700000
- "Mt. Pleasant Circuit\p27224", 8, 31, 7, 172.727193583, -43.590637583, 1, 300000, 700000
- "Mt. York Circuit\p27229", 8, 31, 7, 167.738861778, -45.563726167, 1, 300000, 700000
- "Nelson Circuit\p27215", 8, 31, 7, 173.299316806, -41.274544722, 1, 300000, 700000
- "North Taieri Circuit\p27231", 8, 31, 7, 170.282589111, -45.861513361, 0.99996, 300000, 700000
- "Observation Pt. Circuit\p27230", 8, 31, 7, 170.628595167, -45.816196611, 1, 300000, 700000
- "Okarito Circuit\p27222", 8, 31, 7, 170.260925833, -43.110128139, 1, 300000, 700000
- "Poverty Bay Circuit\p27207", 8, 31, 7, 177.885636278, -38.624702778, 1, 300000, 700000
- "Taranaki Circuit\p27209", 8, 31, 7, 174.228011750, -39.135758306, 1, 300000, 700000
- "Timaru Circuit\p27226", 8, 31, 7, 171.057250833, -44.402220361, 1, 300000, 700000
- "Tuhirangi Circuit\p27210", 8, 31, 7, 175.640036806, -39.512470389, 1, 300000, 700000
- "Wairarapa Circuit\p27212", 8, 31, 7, 175.647349667, -40.925532639, 1, 300000, 700000
- "Wanganui Circuit\p27211", 8, 31, 7, 175.488099611, -40.241947139, 1, 300000, 700000
- "Wellington Circuit\p27213", 8, 31, 7, 174.776623111, -41.301319639, 1, 300000, 700000

North American Coordinate Systems

- "Albers Equal-Area Conic (Continental US)\p5069", 9, 62, 7, -96, 23, 29.5, 45.5, 0, 0

- "Albers Equal-Area Conic (Continental US)\p5069", 9, 62, 7, -96, 23, 29.5, 45.5, 0, 0
- "Albers Equal-Area Conic (Alaska)\p2964", 9, 63, 7, -154, 50, 55, 65, 0, 0
- "California Teale Albers NAD27\p3309", 9, 62, 7, -120, 0, 34, 40.5, 0, -4000000
- "California Teale Albers NAD83\p3310", 9, 74, 7, -120, 0, 34, 40.5, 0, -4000000

Portuguese Coordinate Systems

- "Portuguese National System (DLx)\p5018", 8, 113, 7, -8.1319061111, 39.6666666667, 1, 0, 0
- "Portuguese National System (D73)\p27492", 8, 114, 7, -8.1319061111, 39.6666666667, 1, 180.598, -86.99

Quebec Modified Transverse Mercator (NAD 27)

- "Quebec MTM Zone 2 (NAD 27)\p2008", 8, 66, 7, -55.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 3 (NAD 27)\p32083", 8, 66, 7, -58.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 4 (NAD 27)\p32084", 8, 66, 7, -61.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 5 (NAD 27)\p32085", 8, 66, 7, -64.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 6 (NAD 27)\p32086", 8, 66, 7, -67.5, 0, 0.9999, 304800, 0

Quebec Modified Transverse Mercator (NAD 83)

- "Quebec MTM Zone 2 (NAD 83)\p32180", 8, 74, 7, -55.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 3 (NAD 83)\p32183", 8, 74, 7, -58.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 4 (NAD 83)\p32184", 8, 74, 7, -61.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 5 (NAD 83)\p32185", 8, 74, 7, -64.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 6 (NAD 83)\p32186", 8, 74, 7, -67.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 7 (NAD 83)\p2949", 8, 74, 7, -70.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 9 (NAD 83)\p32189", 8, 74, 7, -76.5, 0, 0.9999, 304800, 0
- "Quebec MTM Zone 10 (NAD 83)\p32190", 8, 74, 7, -79.5, 0, 0.9999, 304800, 0

South African Projections Clarke 1880 Cape

- "Gauss-Kruger LO 17\p22277", 8, 19, 7, 17, 0, 1, 0, 0
- "Gauss-Kruger LO 19\p22279", 8, 19, 7, 19, 0, 1, 0, 0
- "Gauss-Kruger LO 21\p22281", 8, 19, 7, 21, 0, 1, 0, 0
- "Gauss-Kruger LO 23\p22283", 8, 19, 7, 23, 0, 1, 0, 0
- "Gauss-Kruger LO 25\p22285", 8, 19, 7, 25, 0, 1, 0, 0
- "Gauss-Kruger LO 27\p22287", 8, 19, 7, 27, 0, 1, 0, 0
- "Gauss-Kruger LO 29\p22289", 8, 19, 7, 29, 0, 1, 0, 0
- "Gauss-Kruger LO 31\p22291", 8, 19, 7, 31, 0, 1, 0, 0
- "Gauss-Kruger LO 33\p22293", 8, 19, 7, 33, 0, 1, 0, 0

South African Projections WGS 84

- "Gauss-Kruger LO 19 WGS\p2048", 8, 150, 7, 19, 0, 1, 0, 0
- "Gauss-Kruger LO 21 WGS\p2049", 8, 150, 7, 21, 0, 1, 0, 0
- "Gauss-Kruger LO 23 WGS\p2050", 8, 150, 7, 23, 0, 1, 0, 0
- "Gauss-Kruger LO 25 WGS\p2051", 8, 150, 7, 25, 0, 1, 0, 0

- "Gauss-Kruger LO 27 WGS\p2052", 8, 150, 7, 27, 0, 1, 0, 0
- "Gauss-Kruger LO 29 WGS\p2053", 8, 150, 7, 29, 0, 1, 0, 0
- "Gauss-Kruger LO 31 WGS\p2054", 8, 150, 7, 31, 0, 1, 0, 0
- "Gauss-Kruger LO 33 WGS\p2055", 8, 150, 7, 33, 0, 1, 0, 0

Turkish Coordinate Systems (GK 3 Degree k = 1 - ED50)

- "GK Central Meridian 27 (ED50)\p2319", 8, 28, 7, 27, 0, 1, 500000, 0
- "GK Central Meridian 30 (ED50)\p2320", 8, 28, 7, 30, 0, 1, 500000, 0
- "GK Central Meridian 33 (ED50)\p2321", 8, 28, 7, 33, 0, 1, 500000, 0
- "GK Central Meridian 36 (ED50)\p2322", 8, 28, 7, 36, 0, 1, 500000, 0
- "GK Central Meridian 39 (ED50)\p2323", 8, 28, 7, 39, 0, 1, 500000, 0
- "GK Central Meridian 42 (ED50)\p2324", 8, 28, 7, 42, 0, 1, 500000, 0
- "GK Central Meridian 45 (ED50)\p2325", 8, 28, 7, 45, 0, 1, 500000, 0

Turkish Coordinate Systems (UTM 6 Degree k = 0,9996 - ED50)

- "UTM Zone 35 Central Meridian 27 (ED50)\p23035", 8, 28, 7, 27, 0, 0.9996, 500000, 0
- "UTM Zone 36 Central Meridian 33 (ED50)\p23036", 8, 28, 7, 33, 0, 0.9996, 500000, 0
- "UTM Zone 37 Central Meridian 39 (ED50)\p23037", 8, 28, 7, 39, 0, 0.9996, 500000, 0

Turkish Coordinate Systems (UTM 6 Degree k = 0,9996 - WGS84)

- "UTM Zone 35 Central Meridian 27 (WGS84)\p32635", 8, 104, 7, 27, 0, 0.9996, 500000, 0
- "UTM Zone 36 Central Meridian 33 (WGS84)\p32636", 8, 104, 7, 33, 0, 0.9996, 500000, 0
- "UTM Zone 37 Central Meridian 39 (WGS84)\p32637", 8, 104, 7, 39, 0, 0.9996, 500000, 0
- "UTM Zone 38 Central Meridian 45 (WGS84)\p32638", 8, 104, 7, 45, 0, 0.9996, 500000, 0

Universal Polar Stereographic

- "UPS North Zone\p32661", 20, 104, 7, 0, 90, 0.994, 2000000, 2000000
- "UPS South Zone\p32761", 20, 104, 7, 0, -90, 0.994, 2000000, 2000000

Universal Transverse Mercator (Corrego Alegre)

- "UTM Zone 21, Southern Hemisphere (Corrego Alegre)\p22521", 8, 24, 7, -57, 0, 0.9996, 500000, 10000000
- "UTM Zone 22, Southern Hemisphere (Corrego Alegre)\p22522", 8, 24, 7, -51, 0, 0.9996, 500000, 10000000
- "UTM Zone 25, Southern Hemisphere (Corrego Alegre)\p22525", 8, 24, 7, -33, 0, 0.9996, 500000, 10000000

Canada Modified Transverse Mercator (NAD 27)

- "Canada 3TM Zone 1 (NAD 27)\p32081", 8, 66, 7, -53, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 2 (NAD 27)\p32082", 8, 66, 7, -56, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 3 (NAD 27)\p32083", 8, 66, 7, -58.5, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 4 (NAD 27)\p32084", 8, 66, 7, -61.5, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 5 (NAD 27)\p32085", 8, 66, 7, -64.5, 0, 0.9999, 304800, 0

- "Canada 3TM Zone 6 (NAD 27)\p32086", 8, 66, 7, -67.5, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 12 (NAD 27)\p2021", 8, 66, 7, -81, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 13 (NAD 27)\p2022", 8, 66, 7, -84, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 14 (NAD 27)\p2023", 8, 66, 7, -87, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 15 (NAD 27)\p2024", 8, 66, 7, -90, 0, 0.9999, 304800, 0
- "Canada 3TM Zone 16 (NAD 27)\p2025", 8, 66, 7, -93, 0, 0.9999, 304800, 0

Universal Transverse Mercator (NAD 83)

- "UTM Zone 1 (NAD 83)\p26901", 8, 74, 7, -177, 0, 0.9996, 500000, 0
- "UTM Zone 2 (NAD 83)\p26902", 8, 74, 7, -171, 0, 0.9996, 500000, 0

Universal Transverse Mercator (Tokyo pre-MapInfo v. 7.5 Datum)

- "UTM Zone 51 (Tokyo pre-MapInfo v. 7.5)\p3092", 8, 97, 7, 123, 0, 0.9996, 500000, 0
- "UTM Zone 52 (Tokyo pre-MapInfo v. 7.5)\p3093", 8, 97, 7, 129, 0, 0.9996, 500000, 0
- "UTM Zone 53 (Tokyo pre-MapInfo v. 7.5)\p3094", 8, 97, 7, 135, 0, 0.9996, 500000, 0
- "UTM Zone 54 (Tokyo pre-MapInfo v. 7.5)\p3095", 8, 97, 7, 141, 0, 0.9996, 500000, 0
- "UTM Zone 55 (Tokyo pre-MapInfo v. 7.5)\p3096", 8, 97, 7, 147, 0, 0.9996, 500000, 0

Universal Transverse Mercator (JGD2000 Datum)

- "UTM Zone 51 (JGD2000)\p3097", 8, 152, 7, 123, 0, 0.9996, 500000, 0
- "UTM Zone 52 (JGD2000)\p3098", 8, 152, 7, 129, 0, 0.9996, 500000, 0
- "UTM Zone 53 (JGD2000)\p3099", 8, 152, 7, 135, 0, 0.9996, 500000, 0
- "UTM Zone 54 (JGD2000)\p3100", 8, 152, 7, 141, 0, 0.9996, 500000, 0
- "UTM Zone 55 (JGD2000)\p3101", 8, 152, 7, 147, 0, 0.9996, 500000, 0

US State Plane Coordinate Systems (1927)

- "Louisiana 1703, Offshore Zone (1927)\p32099", 3, 62, 8, -91.3333333333, 25.6666666667, 26.1666666667, 27.8333333333, 2000000, 0

US State Plane Coordinate Systems (1983, meters)

- "Louisiana 1703, Offshore Zone (1983, meters)\p32199", 3, 74, 7, -91.3333333333, 25.5, 26.1666666667, 27.8333333333, 1000000, 0

US State Plane Coordinate Systems (1983, feet)

- "Arkansas 0301, Northern Zone (1983, US Survey feet)\p3433", 3, 74, 8, -92, 34.3333333333, 34.9333333333, 36.2333333333, 1312333.333, 0
- "Arkansas 0302, Southern Zone (1983, US Survey feet)\p3434", 3, 74, 8, -92, 32.6666666667, 33.3, 34.7666666667, 1312333.333, 1312333.333
- "Hawaii 5103, Zone 3 (1983, US Survey feet)\p3759", 8, 74, 8, -158, 21.1666666667, 0.99999, 1640416.667, 0
- "Illinois 1201, Eastern Zone (1983, US Survey feet)\p3435", 8, 74, 8, -88.3333333333, 36.6666666667, 0.999975, 984250, 0

- "Illinois 1202, Western Zone (1983, US Survey feet)\p3436", 8, 74, 8, -90.1666666667, 36.6666666667, 0.9999411765, 2296583.333, 0
- "Iowa 1401, Northern Zone (1983, US Survey feet)\p3417", 3, 74, 8, -93.5, 41.5, 42.0666666667, 43.2666666667, 4921250, 3280833.333
- "Iowa 1402, Southern Zone (1983, US Survey feet)\p3418", 3, 74, 8, -93.5, 40, 40.6166666667, 41.7833333333, 1640416.667, 0
- "Kansas 1501, Northern Zone (1983, US Survey feet)\p3419", 3, 74, 8, -98, 38.3333333333, 38.7166666667, 39.7833333333, 1312333.333, 0
- "Kansas 1502, Southern Zone (1983, US Survey feet)\p3420", 3, 74, 8, -98.5, 36.6666666667, 38.5666666667, 37.2666666667, 1312333.333, 1312333.333
- "Louisiana 1701, Northern Zone (1983, US Survey feet)\p3451", 3, 74, 8, -92.5, 30.5, 31.1666666667, 32.6666666667, 3280833.333, 0
- "Louisiana 1702, Southern Zone (1983, US Survey feet)\p3452", 3, 74, 8, -91.3333333333, 28.5, 29.3, 30.7, 3280833.333, 0
- "Maine 1801, Eastern Zone (1983, US Survey feet)\p26847", 8, 74, 8, -68.5, 43.6666666667, 0.9999, 984250, 0
- "Maine 102, Western Zone (1983, US Survey feet)\p26848", 8, 74, 8, -70.1666666667, 42.8333333333, 0.9999666667, 2952750, 0
- "Minnesota 2201, Northern Zone (1983, US Survey feet)\p26849", 3, 74, 8, -93.1, 46.5, 47.0333333333, 48.6333333333, 2624666.667, 328083.3333
- "Minnesota 2202, Central Zone (1983, US Survey feet)\p26850", 3, 74, 8, -94.25, 45, 45.6166666667, 47.05, 2624666.667, 328083.3333
- "Minnesota 2203, South Zone (1983, US Survey feet)\p26851", 3, 74, 8, -94, 43, 43.7833333333, 45.2166666667, 2624666.667, 328083.3333
- "Nebraska 2600 (1983, US Survey feet)\p26852", 3, 74, 8, -100, 39.8333333333, 40, 43, 1640416.667, 0
- "Nevada 2701, Eastern Zone (1983, US Survey feet)\p3421", 8, 74, 8, -115.5833333333, 34.75, 0.9999, 656166.6667, 2624666.67
- "Nevada 2702, Central Zone (1983, US Survey feet)\p3422", 8, 74, 8, -116.6666666667, 34.75, 0.9999, 1640416.667, 19685000
- "Nevada 2703, Western Zone (1983, US Survey feet)\p3423", 8, 74, 8, -118.5833333333, 34.75, 0.9999, 2624666.667, 13123333.33
- "New Hampshire 2800 (1983, US Survey feet)\p3437", 8, 74, 8, -71.6666666667, 42.5, 0.9999666667, 984250, 0
- "New Jersey 2900 (1983, US Survey feet)\p2260", 8, 74, 8, -74.5, 38.8333333333, 0.9999, 492125, 0
- "Ohio 3401, Northern Zone (1983, US Survey feet)\p3734", 3, 74, 8, -82.5, 39.6666666667, 40.4333333333, 41.7, 1968500, 0
- "Ohio 3402, Southern Zone (1983, US Survey feet)\p3735", 3, 74, 8, -82.5, 38, 38.7333333333, 40.0333333333, 1968500, 0
- "Rhode Island 3800 (1983, US Survey feet)\p3438", 8, 74, 8, -71.5, 41.0833333333, 0.99999375, 328083.3333, 0

- "South Dakota 4001, Northern Zone (1983, US Survey feet)\p3454", 3, 74, 8, -100, 43.8333333333, 44.4166666667, 45.6833333333, 1968500, 0
- "Utah 4301, Northern Zone (1983, US Survey feet)\p3560", 3, 74, 8, -111.5, 40.3333333333, 40.7166666667, 41.7833333333, 1640416.667, 3280833.333
- "Utah 4302, Central Zone (1983, US Survey feet)\p3566", 3, 74, 8, -111.5, 38.3333333333, 39.0166666667, 40.65, 1640416.667, 6561666.667
- "West Virginia 4701, Northern Zone (1983, US Survey feet)\p26853", 3, 74, 8, -79.5, 38.5, 39, 40.25, 1968500, 0
- "West Virginia 4702, Southern Zone (1983, US Survey feet)\p26854", 3, 74, 8, -81, 37, 37.4833333333, 38.8833333333, 1968500, 0
- "Wyoming 4902, East Central Zone (1983, US Survey feet)\p3737", 8, 74, 8, -107.3333333333, 40.5, 0.9999375, 1312333.333, 328083.3333
- "Wyoming 4903, West Central Zone (1983, US Survey feet)\p3738", 8, 74, 8, -108.75, 40.5, 0.9999375, 1968500, 0
- "Wyoming 4904, Western Zone (1983, US Survey feet)\p3739", 8, 74, 8, -110.0833333333, 40.5, 0.9999375, 2624666.667, 328083.3333

Vietnam Coordinate Systems

- "Hanoi 1972 / GK zone 19 (6 Degree)\p2509", 8, 1001, 7, 111, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 20 (6 Degree)\p2510", 8, 1001, 7, 117, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 181 (3 Degree)\p2610", 8, 1001, 7, 102, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 182 (3 Degree)\p2508", 8, 1001, 7, 105, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 191 (3 Degree)\p2612", 8, 1001, 7, 108, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 192 (3 Degree)\p2509", 8, 1001, 7, 111, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 201 (3 Degree)\p2614", 8, 1001, 7, 114, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 202 (3 Degree)\p2510", 8, 1001, 7, 117, 0, 1, 500000, 0
- "Hanoi 1972 / GK zone 1811 (1.5 Degree)\p2508", 8, 1001, 7, 105, 0, 1, 500000, 0
- "WGS 72BE / TM 106 NE (offshore Nam Con Son basin)\p2094", 8, 103, 7, 106, 0, 0.9996, 500000, 0
- "Indian 1960 / TM 106 NE (offshore-Everest 1830)\p3176", 8, 131, 7, 106, 0, 0.9996, 500000, 0
- "Indian 1960 Vietnam / UTM zone 48N (6 Degree)\p3148", 8, 131, 7, 105, 0, 0.9996, 500000, 0
- "Indian 1960 Vietnam / UTM zone 49N (6 Degree)\p3149", 8, 131, 7, 111, 0, 0.9996, 500000, 0

Vietnam Coordinate Systems Gauss-Kruger (Pulkovo 1942)

- "GK Zone 18 (Pulkovo 1942) (6 Degree)\p2508", 8, 1001, 7, 105, 0, 1, 500000, 0
- "GK Zone 19 (Pulkovo 1942) (6 Degree)\p2509", 8, 1001, 7, 111, 0, 1, 500000, 0
- "GK Zone 20 (Pulkovo 1942) (6 Degree)\p2510", 8, 1001, 7, 117, 0, 1, 500000, 0
- "GK zone 181 (Pulkovo 1942) (3 Degree)\p2610", 8, 1001, 7, 102, 0, 1, 500000, 0
- "GK zone 182 (Pulkovo 1942) (3 Degree)\p2508", 8, 1001, 7, 105, 0, 1, 500000, 0
- "GK zone 191 (Pulkovo 1942) (3 Degree)\p2612", 8, 1001, 7, 108, 0, 1, 500000, 0
- "GK zone 192 (Pulkovo 1942) (3 Degree)\p2509", 8, 1001, 7, 111, 0, 1, 500000, 0
- "GK zone 201 (Pulkovo 1942) (3 Degree)\p2614", 8, 1001, 7, 114, 0, 1, 500000, 0

- "GK zone 202 (Pulkovo 1942) (3 Degree)\p2510", 8, 1001, 7, 117, 0, 1, 500000, 0

Argentina Gauss-Kruger POSGAR94 (WGS-84)

- "Argentina Gauss-Kruger Zone 1 (WGS 84)\p22181", 8, 104, 7, -72, 0, 1, 1500000, 10001965.730
- "Argentina Gauss-Kruger Zone 2 (WGS 84)\p22182", 8, 104, 7, -69, 0, 1, 2500000, 10001965.730
- "Argentina Gauss-Kruger Zone 3 (WGS 84)\p22183", 8, 104, 7, -66, 0, 1, 3500000, 10001965.730
- "Argentina Gauss-Kruger Zone 4 (WGS 84)\p22184", 8, 104, 7, -63, 0, 1, 4500000, 10001965.730
- "Argentina Gauss-Kruger Zone 5 (WGS 84)\p22185", 8, 104, 7, -60, 0, 1, 5500000, 10001965.730
- "Argentina Gauss-Kruger Zone 6 (WGS 84)\p22186", 8, 104, 7, -57, 0, 1, 6500000, 10001965.730
- "Argentina Gauss-Kruger Zone 7 (WGS 84)\p22187", 8, 104, 7, -54, 0, 1, 7500000, 10001965.730

Following are the new datums added in this version:

- Number - The number used to identify the datum in the MAPINFOW.PRJ file.
- Datum Name - The datum's name
- Area of Coverage - The maps for which the datum is typically used
- Ellipsoid - The datum's reference ellipsoid

Number	Datum Name	Area of Coverage	Ellipsoid
166	Aratu	Brazil	4
167	Barbados	Barbados	6
168	Beduaram	Guinea	30
170	Dealul Piscului 1930	Romania	4
171	Douala	Cameroon	4
172	Final_Datum_1958	Iran	6
173	Makassar	Indonesia	10
174	Manoca	Cameroon	30
1026	NGO_1948	Norway	1026
1927	Palestine_1923	Asia / Middle East	1027

Coordinate System and Datum Additions for MapInfo Pro 12.5.3

Support has been added for the Rectified Skewed Orthomographic projection used in Malaysia. The following is a list of required parameters to be used with the new projection type (a parameter reference is at [Projections and Their Parameters](#)). As an example, the Peninsular RSO GDM2000 datum parameters are:

Parameter	Description
Name	Peninsular RSO GDM2000
Projection Number	35 – New projection type: Rectified Skewed Orthomorphic
Datum	164 – GDM2000 (based on GRS80 ellipsoid)
Units	7 – Units in meters
Origin Longitude	102.5 – Origin of Longitude for projection
Origin Latitude	4 – Origin of Latitude for projection
Azimuth of Central Line	323.025796466667 - Azimuth of Central Line
Rectified Skew to Grid	323.130102361111 - Rectified to Skew Grid
Scale Factor	0.99984 – Scale factor
False Easting	804671 – False Easting in meters
False Northing	0 – False Northing in meters

We have added new datums (for details, see [Seven or Eight Parameter Datums here](#)):

- JGD2011 - Datum for Japan
- Timbalai 1948, Everest 1968
- MAGNA-SIRGAS
- GDM2000

We have added new EPSG codes:

- "Longitude / Latitude (Japan Datum 2011 JGD2011)", 1, 162
- "Longitude / Latitude (Timbalai 1948, Modified Everest Ellipsoid)", 1, 163
- "Longitude / Latitude (MAGNA-SIRGAS)\p4686", 1, 165
- "Longitude / Latitude (GDM2000 Datum)", 1, 164

Japanese Projections

We have added new Japanese Universal Transverse Mercator (Japan Datum 2011 JGD2011) projections:

- "UTM Zone 51 (Japan Datum 2011 JGD2011)", 8, 162, 7, 123, 0, 0.9996, 500000, 0
- "UTM Zone 52 (Japan Datum 2011 JGD2011)", 8, 162, 7, 129, 0, 0.9996, 500000, 0
- "UTM Zone 53 (Japan Datum 2011 JGD2011)", 8, 162, 7, 135, 0, 0.9996, 500000, 0
- "UTM Zone 54 (Japan Datum 2011 JGD2011)", 8, 162, 7, 141, 0, 0.9996, 500000, 0
- "UTM Zone 55 (Japan Datum 2011 JGD2011)", 8, 162, 7, 147, 0, 0.9996, 500000, 0
- "UTM Zone 56 (Japan Datum 2011 JGD2011)", 8, 162, 7, 153, 0, 0.9996, 500000, 0
- "UTM Zone 57 (Japan Datum 2011 JGD2011)", 8, 162, 7, 159, 0, 0.9996, 500000, 0

Japanese Coordinate Systems

We have added new Japanese coordinate systems:

- "Japanese Zone I (Japan Datum 2011 JGD2011)", 8, 162, 7, 129.5, 33, 0.9999, 0, 0
- "Japanese Zone II (Japan Datum 2011 JGD2011)", 8, 162, 7, 131, 33, 0.9999, 0, 0
- "Japanese Zone III (Japan Datum 2011 JGD2011)", 8, 162, 7, 132.166666, 36, 0.9999, 0, 0
- "Japanese Zone IV (Japan Datum 2011 JGD2011)", 8, 162, 7, 133.5, 33, 0.9999, 0, 0
- "Japanese Zone V (Japan Datum 2011 JGD2011)", 8, 162, 7, 134.333333, 36, 0.9999, 0, 0
- "Japanese Zone VI (Japan Datum 2011 JGD2011)", 8, 162, 7, 136, 36, 0.9999, 0, 0
- "Japanese Zone VII (Japan Datum 2011 JGD2011)", 8, 162, 7, 137.166666, 36, 0.9999, 0, 0
- "Japanese Zone VIII (Japan Datum 2011 JGD2011)", 8, 162, 7, 138.5, 36, 0.9999, 0, 0
- "Japanese Zone IX (Japan Datum 2011 JGD2011)", 8, 162, 7, 139.833333, 36, 0.9999, 0, 0
- "Japanese Zone X (Japan Datum 2011 JGD2011)", 8, 162, 7, 140.833333, 40, 0.9999, 0, 0
- "Japanese Zone XI (Japan Datum 2011 JGD2011)", 8, 162, 7, 140.25, 44, 0.9999, 0, 0
- "Japanese Zone XII (Japan Datum 2011 JGD2011)", 8, 162, 7, 142.25, 44, 0.9999, 0, 0
- "Japanese Zone XIII (Japan Datum 2011 JGD2011)", 8, 162, 7, 144.25, 44, 0.9999, 0, 0
- "Japanese Zone XIV (Japan Datum 2011 JGD2011)", 8, 162, 7, 142, 26, 0.9999, 0, 0
- "Japanese Zone XV (Japan Datum 2011 JGD2011)", 8, 162, 7, 127.5, 26, 0.9999, 0, 0
- "Japanese Zone XVI (Japan Datum 2011 JGD2011)", 8, 162, 7, 124, 26, 0.9999, 0, 0
- "Japanese Zone XVII (Japan Datum 2011 JGD2011)", 8, 162, 7, 131, 26, 0.9999, 0, 0
- "Japanese Zone XVIII (Japan Datum 2011 JGD2011)", 8, 162, 7, 136, 20, 0.9999, 0, 0
- "Japanese Zone XIX (Japan Datum 2011 JGD2011)", 8, 162, 7, 154, 26, 0.9999, 0, 0

Malaysian Coordinate Systems

We have added new Malaysian coordinate systems:

- "Peninsular RSO GDM2000 Datum", 35, 164, 7, 102.25, 4, 323.025796466667, 323.130102361111, 0.99984, 804671, 0
- "Peninsular RSO Kertau Datum", 35, 47, 7, 102.25, 4, 323.025796466667, 323.130102361111, 0.99984, 804671.2996, 0
- "East Malaysia (BRSO) GDM2000 Datum", 35, 164, 7, 115, 4, 53.31582047, 53.13010236, 0.99984, 0, 0
- "East Malaysia (BRSO) Timbalai Datum", 35, 163, 7, 115, 4, 53.31582047, 53.13010236, 0.99984, 0, 0

Coordinate System and Datum Additions for MapInfo Pro 12.5.0

We have added a new PRJ code:

- 5514 – "S-JTSK (Krovak) Coordinate system - Updated"

We have added new EPSG codes:

- "Longitude / Latitude (NOAA GCS_Sphere)", 1, 161

Adindan Projections

We have added new Adindan projections:

- "Burkina Faso Adindan UTM Zone 30N", 8, 1, 7, -3, 0, 0.9996, 500000, 0
- "Burkina Faso Adindan UTM Zone 31N", 8, 1, 7, 3, 0, 0.9996, 500000, 0
- "Ethiopia Adindan UTM Zone 37N", 8, 1, 7, 39, 0, 0.9996, 500000, 0

WA Project Grid

We have added new WA Project Grid projections:

- "Albany Grid 1984", 8, 13, 7, 117.916666666667, 0, 1.000012, 50000, 4000000
- "Albany Grid 1994", 8, 116, 7, 117.883333333334, 0, 1.0000044, 50000, 4000000
- "Barrow Island and Onslow Grid 1994", 8, 116, 7, 115.25, 0, 1.0000022, 60000, 2600000
- "Broome Grid 1984", 8, 13, 7, 122.333333333334, 0, 1.000003, 50000, 2200000
- "Broome Grid 1994", 8, 116, 7, 122.333333333334, 0, 1.00000298, 50000, 2200000
- "Busselton Coastal Grid 1984", 8, 13, 7, 115.433333333334, 0, 1.000007, 50000, 3900000
- "Busselton Coastal Grid 1994", 8, 116, 7, 115.433333333334, 0, 0.99999592, 50000, 3900000
- "Carnarvon Grid 1984", 8, 13, 7, 113.666666666667, 0, 1.000005, 50000, 3050000
- "Carnarvon Grid 1994", 8, 116, 7, 113.666666666667, 0, 0.99999796, 50000, 2950000
- "Christmas Island Grid 1992", 8, 104, 7, 105.625, 0, 1.000024, 50000, 1300000
- "Christmas Island Grid 1994", 8, 116, 7, 105.625, 0, 1.00002514, 50000, 1300000
- "Cocos (Keeling) Islands Grid 1992", 8, 104, 7, 96.875, 0, 1, 50000, 1400000
- "Cocos (Keeling) Islands Grid 1994", 8, 116, 7, 96.875, 0, 0.99999387, 50000, 1500000
- "Collie Grid 1994", 8, 116, 7, 115.933333333334, 0, 1.000019, 40000, 4000000
- "Esperance Grid 1984", 8, 13, 7, 121.883333333334, 0, 1.000012, 50000, 3950000

- "Esperance Grid 1994", 8, 116, 7, 121.8833333333334, 0, 1.0000055, 50000, 3950000
- "Exmouth Grid 1984", 8, 13, 7, 114.0666666666667, 0, 1.000009, 60000, 2750000
- "Exmouth Grid 1994", 8, 116, 7, 114.0666666666667, 0, 1.00000236, 50000, 2650000
- "Geraldton Coastal Grid 1984", 8, 13, 7, 114.6666666666667, 0, 1.000016, 50000, 3350000
- "Geraldton Coastal Grid 1994", 8, 116, 7, 114.5833333333334, 0, 1.00000628, 50000, 3350000
- "Goldfields Grid 1984", 8, 13, 7, 121.45, 0, 1.000057, 60000, 4000000
- "Goldfields Grid 1994", 8, 116, 7, 121.5, 0, 1.00004949, 60000, 3700000
- "Jurien Coastal Grid 1984", 8, 13, 7, 114.9833333333334, 0, 1.00001, 50000, 3550000
- "Jurien Coastal Grid 1994", 8, 116, 7, 114.9833333333334, 0, 1.00000314, 50000, 3550000
- "Kalbarri Grid 1994", 8, 116, 7, 114.31527777778, 0, 1.000014, 55000, 3600000
- "Karratha Grid 1984", 8, 13, 7, 116.9333333333334, 0, 1.000004, 50000, 2450000
- "Karratha Grid 1994", 8, 116, 7, 116.9333333333334, 0, 0.9999989, 50000, 2450000
- "Kununurra Grid 1984", 8, 13, 7, 128.75, 0, 1.000014, 50000, 2000000
- "Kununurra Grid 1994", 8, 116, 7, 128.75, 0, 1.0000165, 50000, 2000000
- "Lancelin Coastal Grid 1984", 8, 13, 7, 115.3666666666667, 0, 1.000008, 50000, 3650000
- "Lancelin Coastal Grid 1994", 8, 116, 7, 115.3666666666667, 0, 1.00000157, 50000, 3650000
- "Margaret River Coastal Grid 1984", 8, 13, 7, 115.1, 0, 1.000014, 50000, 4050000
- "Margaret River Coastal Grid 1994", 8, 116, 7, 115.1666666666667, 0, 1.0000055, 50000, 4050000
- "Perth Coastal Grid 1984", 8, 13, 7, 115.8333333333334, 0, 1.000006, 40000, 3800000
- "Perth Coastal Grid 1994", 8, 116, 7, 115.8166666666667, 0, 0.99999906, 50000, 3800000
- "Port Hedland Grid 1984", 8, 13, 7, 118.5833333333334, 0, 1.000004, 50000, 2400000
- "Port Hedland Grid 1994", 8, 116, 7, 118.6, 0, 1.00000135, 50000, 2400000

Balkans Coordinate Systems

We have added new Balkans coordinate systems:

- "MGI / Balkans Zone 7\p31277", 8, 9999, 10,577.326,90.129,463.919,5.137,1.474,5.297,2.4232, 0, 7, 21, 0, 0.9999, 7500000, 0
- "Hungarian Projection System (EOV) - Updated", 8, 1023, 7, 19.04857178, 47.14439372, 0.99993, 650000, 200000

Krovak Coordinate Systems

We have added new Krovak coordinate systems:

- "S-JTSK (Krovak) Coordinate system - Updated\p102067", 32, 1024, 7, 24.8333333333333, 49.5, 78.5, 30.2881397222222, 0, 0
- "JTSK03 for Slovak Republic", 32, 1025, 7, 24.8333333333333, 49.5, 78.5, 30.2881397222222, 0, 0
- "S-JTSK (Krovak) Coordinate system", 32, 1020, 7, 42.5, 49.5, 78.5, 30.28813972, 0, 0

Swiss Coordinate Systems (bounded)

We have added new Swiss coordinate systems:

- "CH1903.LV03 bounded",2025, 158, 7, 7.439583333333, 46.952405555556, 600000, 200000, -1000000, -1000000, 3000000, 3000000
- "CH1903plus.LV95 bounded",2025, 158, 7, 7.439583333333, 46.952405555556, 2600000, 1200000, 1000000, 0, 5000000, 4000000

Coordinate System and Datum Additions for MapInfo Pro 12.0.3

We have added a new EPSG code:

- "NOAA GCS_Sphere", 1, 161

Coordinate System and Datum Additions for MapInfo Pro 12.0

Extended Transverse Mercator Coordinate Systems

We have added a new Transverse Mercator (WGS 84) coordinate system based on "A highly accurate world wide algorithm for the transverse Mercator mapping (almost)" by K. E. Engsager and K. Poder, 2007:

"Extended TM Zone 1, Northern Hemisphere (WGS 84)", 34, 104, 7, -177, 0, 0.9996, 500000, 0

"Extended TM Zone 1, Southern Hemisphere (WGS 84)", 34, 104, 7, -177, 0, 0.9996, 500000, 1000000

"Extended TM Zone 2, Northern Hemisphere (WGS 84)", 34, 104, 7, -171, 0, 0.9996, 500000, 0

"Extended TM Zone 2, Southern Hemisphere (WGS 84)", 34, 104, 7, -171, 0, 0.9996, 500000, 1000000

"Extended TM Zone 3, Northern Hemisphere (WGS 84)", 34, 104, 7, -165, 0, 0.9996, 500000, 0

"Extended TM Zone 3, Southern Hemisphere (WGS 84)", 34, 104, 7, -165, 0, 0.9996, 500000, 1000000

"Extended TM Zone 4, Northern Hemisphere (WGS 84)", 34, 104, 7, -159, 0, 0.9996, 500000, 0

"Extended TM Zone 4, Southern Hemisphere (WGS 84)", 34, 104, 7, -159, 0, 0.9996, 500000, 1000000

"Extended TM Zone 5, Northern Hemisphere (WGS 84)", 34, 104, 7, -153, 0, 0.9996, 500000, 0

"Extended TM Zone 5, Southern Hemisphere (WGS 84)", 34, 104, 7, -153, 0, 0.9996, 500000, 1000000

"Extended TM Zone 6, Northern Hemisphere (WGS 84)", 34, 104, 7, -147, 0, 0.9996, 500000, 0

"Extended TM Zone 6, Southern Hemisphere (WGS 84)", 34, 104, 7, -147, 0, 0.9996, 500000, 1000000

"Extended TM Zone 7, Northern Hemisphere (WGS 84)", 34, 104, 7, -141, 0, 0.9996, 500000, 0

"Extended TM Zone 7, Southern Hemisphere (WGS 84)", 34, 104, 7, -141, 0, 0.9996, 500000, 1000000

"Extended TM Zone 8, Northern Hemisphere (WGS 84)", 34, 104, 7, -135, 0, 0.9996, 500000, 0

"Extended TM Zone 8, Southern Hemisphere (WGS 84)", 34, 104, 7, -135, 0, 0.9996, 500000, 1000000

"Extended TM Zone 9, Northern Hemisphere (WGS 84)", 34, 104, 7, -129, 0, 0.9996, 500000, 0

"Extended TM Zone 9, Southern Hemisphere (WGS 84)", 34, 104, 7, -129, 0, 0.9996, 500000, 1000000

"Extended TM Zone 10, Northern Hemisphere (WGS 84)", 34, 104, 7, -123, 0, 0.9996, 500000, 0

"Extended TM Zone 10, Southern Hemisphere (WGS 84)", 34, 104, 7, -123, 0, 0.9996, 500000, 1000000

"Extended TM Zone 11, Northern Hemisphere (WGS 84)", 34, 104, 7, -117, 0, 0.9996, 500000, 0

"Extended TM Zone 11, Southern Hemisphere (WGS 84)", 34, 104, 7, -117, 0, 0.9996, 500000, 1000000

"Extended TM Zone 12, Northern Hemisphere (WGS 84)", 34, 104, 7, -111, 0, 0.9996, 500000, 0

"Extended TM Zone 12, Southern Hemisphere (WGS 84)", 34, 104, 7, -111, 0, 0.9996, 500000, 1000000

"Extended TM Zone 13, Northern Hemisphere (WGS 84)", 34, 104, 7, -105, 0, 0.9996, 500000, 0

"Extended TM Zone 13, Southern Hemisphere (WGS 84)", 34, 104, 7, -105, 0, 0.9996, 500000, 1000000

"Extended TM Zone 14, Northern Hemisphere (WGS 84)", 34, 104, 7, -99, 0, 0.9996, 500000, 0

"Extended TM Zone 14, Southern Hemisphere (WGS 84)", 34, 104, 7, -99, 0, 0.9996, 500000, 1000000

"Extended TM Zone 15, Northern Hemisphere (WGS 84)", 34, 104, 7, -93, 0, 0.9996, 500000, 0

"Extended TM Zone 15, Southern Hemisphere (WGS 84)", 34, 104, 7, -93, 0, 0.9996, 500000, 1000000

"Extended TM Zone 16, Northern Hemisphere (WGS 84)", 34, 104, 7, -87, 0, 0.9996, 500000, 0

"Extended TM Zone 16, Southern Hemisphere (WGS 84)", 34, 104, 7, -87, 0, 0.9996, 500000, 1000000

"Extended TM Zone 17, Northern Hemisphere (WGS 84)", 34, 104, 7, -81, 0, 0.9996, 500000, 0

"Extended TM Zone 17, Southern Hemisphere (WGS 84)", 34, 104, 7, -81, 0, 0.9996, 500000, 1000000

"Extended TM Zone 18, Northern Hemisphere (WGS 84)", 34, 104, 7, -75, 0, 0.9996, 500000, 0

"Extended TM Zone 18, Southern Hemisphere (WGS 84)", 34, 104, 7, -75, 0, 0.9996, 500000, 10000000

"Extended TM Zone 19, Northern Hemisphere (WGS 84)", 34, 104, 7, -69, 0, 0.9996, 500000, 0

"Extended TM Zone 19, Southern Hemisphere (WGS 84)", 34, 104, 7, -69, 0, 0.9996, 500000, 10000000

"Extended TM Zone 20, Northern Hemisphere (WGS 84)", 34, 104, 7, -63, 0, 0.9996, 500000, 0

"Extended TM Zone 20, Southern Hemisphere (WGS 84)", 34, 104, 7, -63, 0, 0.9996, 500000, 10000000

"Extended TM Zone 21, Northern Hemisphere (WGS 84)", 34, 104, 7, -57, 0, 0.9996, 500000, 0

"Extended TM Zone 21, Southern Hemisphere (WGS 84)", 34, 104, 7, -57, 0, 0.9996, 500000, 10000000

"Extended TM Zone 22, Northern Hemisphere (WGS 84)", 34, 104, 7, -51, 0, 0.9996, 500000, 0

"Extended TM Zone 22, Southern Hemisphere (WGS 84)", 34, 104, 7, -51, 0, 0.9996, 500000, 10000000

"Extended TM Zone 23, Northern Hemisphere (WGS 84)", 34, 104, 7, -45, 0, 0.9996, 500000, 0

"Extended TM Zone 23, Southern Hemisphere (WGS 84)", 34, 104, 7, -45, 0, 0.9996, 500000, 10000000

"Extended TM Zone 24, Northern Hemisphere (WGS 84)", 34, 104, 7, -39, 0, 0.9996, 500000, 0

"Extended TM Zone 24, Southern Hemisphere (WGS 84)", 34, 104, 7, -39, 0, 0.9996, 500000, 10000000

"Extended TM Zone 25, Northern Hemisphere (WGS 84)", 34, 104, 7, -33, 0, 0.9996, 500000, 0

"Extended TM Zone 25, Southern Hemisphere (WGS 84)", 34, 104, 7, -33, 0, 0.9996, 500000, 10000000

"Extended TM Zone 26, Northern Hemisphere (WGS 84)", 34, 104, 7, -27, 0, 0.9996, 500000, 0

"Extended TM Zone 26, Southern Hemisphere (WGS 84)", 34, 104, 7, -27, 0, 0.9996, 500000, 10000000

"Extended TM Zone 27, Northern Hemisphere (WGS 84)", 34, 104, 7, -21, 0, 0.9996, 500000, 0

"Extended TM Zone 27, Southern Hemisphere (WGS 84)", 34, 104, 7, -21, 0, 0.9996, 500000, 10000000

"Extended TM Zone 28, Northern Hemisphere (WGS 84)", 34, 104, 7, -15, 0, 0.9996, 500000, 0

"Extended TM Zone 28, Southern Hemisphere (WGS 84)", 34, 104, 7, -15, 0, 0.9996, 500000, 10000000

"Extended TM Zone 29, Northern Hemisphere (WGS 84)", 34, 104, 7, -9, 0, 0.9996, 500000, 0

"Extended TM Zone 29, Southern Hemisphere (WGS 84)", 34, 104, 7, -9, 0, 0.9996, 500000, 10000000

"Extended TM Zone 30, Northern Hemisphere (WGS 84)", 34, 104, 7, -3, 0, 0.9996, 500000, 0

"Extended TM Zone 30, Southern Hemisphere (WGS 84)", 34, 104, 7, -3, 0, 0.9996, 500000, 10000000

"Extended TM Zone 31, Northern Hemisphere (WGS 84)", 34, 104, 7, 3, 0, 0.9996, 500000, 0

"Extended TM Zone 31, Southern Hemisphere (WGS 84)", 34, 104, 7, 3, 0, 0.9996, 500000, 10000000

"Extended TM Zone 32, Northern Hemisphere (WGS 84)", 34, 104, 7, 9, 0, 0.9996, 500000, 0

"Extended TM Zone 32, Southern Hemisphere (WGS 84)", 34, 104, 7, 9, 0, 0.9996, 500000, 10000000

"Extended TM Zone 33, Northern Hemisphere (WGS 84)", 34, 104, 7, 15, 0, 0.9996, 500000, 0

"Extended TM Zone 33, Southern Hemisphere (WGS 84)", 34, 104, 7, 15, 0, 0.9996, 500000, 10000000

"Extended TM Zone 34, Northern Hemisphere (WGS 84)", 34, 104, 7, 21, 0, 0.9996, 500000, 0

"Extended TM Zone 34, Southern Hemisphere (WGS 84)", 34, 104, 7, 21, 0, 0.9996, 500000, 10000000

"Extended TM Zone 35, Northern Hemisphere (WGS 84)", 34, 104, 7, 27, 0, 0.9996, 500000, 0

"Extended TM Zone 35, Southern Hemisphere (WGS 84)", 34, 104, 7, 27, 0, 0.9996, 500000, 10000000

"Extended TM Zone 36, Northern Hemisphere (WGS 84)", 34, 104, 7, 33, 0, 0.9996, 500000, 0

"Extended TM Zone 36, Southern Hemisphere (WGS 84)", 34, 104, 7, 33, 0, 0.9996, 500000, 10000000

"Extended TM Zone 37, Northern Hemisphere (WGS 84)", 34, 104, 7, 39, 0, 0.9996, 500000, 0

"Extended TM Zone 37, Southern Hemisphere (WGS 84)", 34, 104, 7, 39, 0, 0.9996, 500000, 10000000

"Extended TM Zone 38, Northern Hemisphere (WGS 84)", 34, 104, 7, 45, 0, 0.9996, 500000, 0

"Extended TM Zone 38, Southern Hemisphere (WGS 84)", 34, 104, 7, 45, 0, 0.9996, 500000, 10000000

"Extended TM Zone 39, Northern Hemisphere (WGS 84)", 34, 104, 7, 51, 0, 0.9996, 500000, 0

"Extended TM Zone 39, Southern Hemisphere (WGS 84)", 34, 104, 7, 51, 0, 0.9996, 500000, 10000000

"Extended TM Zone 40, Northern Hemisphere (WGS 84)", 34, 104, 7, 57, 0, 0.9996, 500000, 0

"Extended TM Zone 40, Southern Hemisphere (WGS 84)", 34, 104, 7, 57, 0, 0.9996, 500000, 10000000

"Extended TM Zone 41, Northern Hemisphere (WGS 84)", 34, 104, 7, 63, 0, 0.9996, 500000, 0

"Extended TM Zone 41, Southern Hemisphere (WGS 84)", 34, 104, 7, 63, 0, 0.9996, 500000, 10000000

"Extended TM Zone 42, Northern Hemisphere (WGS 84)", 34, 104, 7, 69, 0, 0.9996, 500000, 0

"Extended TM Zone 42, Southern Hemisphere (WGS 84)", 34, 104, 7, 69, 0, 0.9996, 500000, 10000000

"Extended TM Zone 43, Northern Hemisphere (WGS 84)", 34, 104, 7, 75, 0, 0.9996, 500000, 0

"Extended TM Zone 43, Southern Hemisphere (WGS 84)", 34, 104, 7, 75, 0, 0.9996, 500000, 10000000

"Extended TM Zone 44, Northern Hemisphere (WGS 84)", 34, 104, 7, 81, 0, 0.9996, 500000, 0

"Extended TM Zone 44, Southern Hemisphere (WGS 84)", 34, 104, 7, 81, 0, 0.9996, 500000, 10000000

"Extended TM Zone 45, Northern Hemisphere (WGS 84)", 34, 104, 7, 87, 0, 0.9996, 500000, 0

"Extended TM Zone 45, Southern Hemisphere (WGS 84)", 34, 104, 7, 87, 0, 0.9996, 500000, 10000000

"Extended TM Zone 46, Northern Hemisphere (WGS 84)", 34, 104, 7, 93, 0, 0.9996, 500000, 0

"Extended TM Zone 46, Southern Hemisphere (WGS 84)", 34, 104, 7, 93, 0, 0.9996, 500000, 10000000

"Extended TM Zone 47, Northern Hemisphere (WGS 84)", 34, 104, 7, 99, 0, 0.9996, 500000, 0

"Extended TM Zone 47, Southern Hemisphere (WGS 84)", 34, 104, 7, 99, 0, 0.9996, 500000, 10000000

"Extended TM Zone 48, Northern Hemisphere (WGS 84)", 34, 104, 7, 105, 0, 0.9996, 500000, 0

"Extended TM Zone 48, Southern Hemisphere (WGS 84)", 34, 104, 7, 105, 0, 0.9996, 500000, 10000000

"Extended TM Zone 49, Northern Hemisphere (WGS 84)", 34, 104, 7, 111, 0, 0.9996, 500000, 0

"Extended TM Zone 49, Southern Hemisphere (WGS 84)", 34, 104, 7, 111, 0, 0.9996, 500000, 10000000

"Extended TM Zone 50, Northern Hemisphere (WGS 84)", 34, 104, 7, 117, 0, 0.9996, 500000, 0

"Extended TM Zone 50, Southern Hemisphere (WGS 84)", 34, 104, 7, 117, 0, 0.9996, 500000, 10000000

"Extended TM Zone 51, Northern Hemisphere (WGS 84)", 34, 104, 7, 123, 0, 0.9996, 500000, 0

"Extended TM Zone 51, Southern Hemisphere (WGS 84)", 34, 104, 7, 123, 0, 0.9996, 500000, 10000000

"Extended TM Zone 52, Northern Hemisphere (WGS 84)", 34, 104, 7, 129, 0, 0.9996, 500000, 0

"Extended TM Zone 52, Southern Hemisphere (WGS 84)", 34, 104, 7, 129, 0, 0.9996, 500000, 10000000

"Extended TM Zone 53, Northern Hemisphere (WGS 84)", 34, 104, 7, 135, 0, 0.9996, 500000, 0

"Extended TM Zone 53, Southern Hemisphere (WGS 84)", 34, 104, 7, 135, 0, 0.9996, 500000, 10000000

"Extended TM Zone 54, Northern Hemisphere (WGS 84)", 34, 104, 7, 141, 0, 0.9996, 500000, 0

"Extended TM Zone 54, Southern Hemisphere (WGS 84)", 34, 104, 7, 141, 0, 0.9996, 500000, 10000000

"Extended TM Zone 55, Northern Hemisphere (WGS 84)", 34, 104, 7, 147, 0, 0.9996, 500000, 0

"Extended TM Zone 55, Southern Hemisphere (WGS 84)", 34, 104, 7, 147, 0, 0.9996, 500000, 10000000

"Extended TM Zone 56, Northern Hemisphere (WGS 84)", 34, 104, 7, 153, 0, 0.9996, 500000, 0

"Extended TM Zone 56, Southern Hemisphere (WGS 84)", 34, 104, 7, 153, 0, 0.9996, 500000, 10000000

"Extended TM Zone 57, Northern Hemisphere (WGS 84)", 34, 104, 7, 159, 0, 0.9996, 500000, 0

"Extended TM Zone 57, Southern Hemisphere (WGS 84)", 34, 104, 7, 159, 0, 0.9996, 500000, 10000000

"Extended TM Zone 58, Northern Hemisphere (WGS 84)", 34, 104, 7, 165, 0, 0.9996, 500000, 0

"Extended TM Zone 58, Southern Hemisphere (WGS 84)", 34, 104, 7, 165, 0, 0.9996, 500000, 10000000

"Extended TM Zone 59, Northern Hemisphere (WGS 84)", 34, 104, 7, 171, 0, 0.9996, 500000, 0

"Extended TM Zone 59, Southern Hemisphere (WGS 84)", 34, 104, 7, 171, 0, 0.9996, 500000, 10000000

"Extended TM Zone 60, Northern Hemisphere (WGS 84)", 34, 104, 7, 177, 0, 0.9996, 500000, 0

"Extended TM Zone 60, Southern Hemisphere (WGS 84)", 34, 104, 7, 177, 0, 0.9996, 500000, 10000000

South America Coordinate Systems

This release adds support for SIRGAS 2000 datum commonly used in South America. We support highly accurate NTv2 datum transformation between Corrego Alegre and SIRGAS 2000 datum. Also, the NTv2 transformation is supported for datum transformation between South American 1969 and SIRGAS 2000 datum.

We added the following SIRGAS 2000 based coordinate systems:

"Longitude / Latitude (SIRGAS 2000)\p4674", 1, 160

"UTM Zone 11, Northern Hemisphere (SIRGAS 2000)\p31965", 8, 160, 7, -117, 0, 0.9996, 500000, 0

"UTM Zone 12, Northern Hemisphere (SIRGAS 2000)\p31966", 8, 160, 7, -111, 0, 0.9996, 500000, 0

"UTM Zone 13, Northern Hemisphere (SIRGAS 2000)\p31967", 8, 160, 7, -105, 0, 0.9996, 500000, 0

"UTM Zone 14, Northern Hemisphere (SIRGAS 2000)\p31968", 8, 160, 7, -99, 0, 0.9996, 500000, 0

"UTM Zone 15, Northern Hemisphere (SIRGAS 2000)\p31969", 8, 160, 7, -93, 0, 0.9996, 500000, 0

"UTM Zone 16, Northern Hemisphere (SIRGAS 2000)\p31970", 8, 160, 7, -87, 0, 0.9996, 500000, 0

"UTM Zone 17, Northern Hemisphere (SIRGAS 2000)\p31971", 8, 160, 7, -81, 0, 0.9996, 500000, 0

"UTM Zone 17, Southern Hemisphere (SIRGAS 2000)\p31977", 8, 160, 7, -81, 0, 0.9996, 500000, 1000000

"UTM Zone 18, Northern Hemisphere (SIRGAS 2000)\p31972", 8, 160, 7, -75, 0, 0.9996, 500000, 0

"UTM Zone 18, Southern Hemisphere (SIRGAS 2000)\p31978", 8, 160, 7, -75, 0, 0.9996, 500000, 1000000

"UTM Zone 19, Northern Hemisphere (SIRGAS 2000)\p31973", 8, 160, 7, -69, 0, 0.9996, 500000, 0

"UTM Zone 19, Southern Hemisphere (SIRGAS 2000)\p31979", 8, 160, 7, -69, 0, 0.9996, 500000, 1000000

"UTM Zone 20, Northern Hemisphere (SIRGAS 2000)\p31974", 8, 160, 7, -63, 0, 0.9996, 500000, 0

"UTM Zone 20, Southern Hemisphere (SIRGAS 2000)\p31980", 8, 160, 7, -63, 0, 0.9996, 500000, 1000000

"UTM Zone 21, Northern Hemisphere (SIRGAS 2000)\p31975", 8, 160, 7, -57, 0, 0.9996, 500000, 0

"UTM Zone 21, Southern Hemisphere (SIRGAS 2000)\p31981", 8, 160, 7, -57, 0, 0.9996, 500000, 1000000

"UTM Zone 22, Northern Hemisphere (SIRGAS 2000)\p31976", 8, 160, 7, -51, 0, 0.9996, 500000, 0

"UTM Zone 22, Southern Hemisphere (SIRGAS 2000)\p31982", 8, 160, 7, -51, 0, 0.9996, 500000, 1000000

"UTM Zone 23, Southern Hemisphere (SIRGAS 2000)\p31983", 8, 160, 7, -45, 0, 0.9996, 500000, 1000000

"UTM Zone 24, Southern Hemisphere (SIRGAS 2000)\p31984", 8, 160, 7, -39, 0, 0.9996, 500000, 1000000

"UTM Zone 25, Southern Hemisphere (SIRGAS 2000)\p31985", 8, 160, 7, -33, 0, 0.9996, 500000, 1000000

Swedish Coordinate Systems

We added EPSG codes for the following coordinate systems:

"SWEREF 99 TM\p5845", 8, 33, 7, 15, 0, 0.9996, 500000, 0
 "SWEREF 99 12 00\p5846", 8, 33, 7, 12.00, 0, 1, 150000, 0
 "SWEREF 99 13 30\p5847", 8, 33, 7, 13.50, 0, 1, 150000, 0
 "SWEREF 99 15 00\p5848", 8, 33, 7, 15.00, 0, 1, 150000, 0
 "SWEREF 99 16 30\p5849", 8, 33, 7, 16.50, 0, 1, 150000, 0
 "SWEREF 99 18 00\p5850", 8, 33, 7, 18.00, 0, 1, 150000, 0
 "SWEREF 99 14 15\p5851", 8, 33, 7, 14.25, 0, 1, 150000, 0
 "SWEREF 99 15 45\p5852", 8, 33, 7, 15.75, 0, 1, 150000, 0
 "SWEREF 99 17 15\p5853", 8, 33, 7, 17.25, 0, 1, 150000, 0
 "SWEREF 99 18 45\p5854", 8, 33, 7, 18.75, 0, 1, 150000, 0
 "SWEREF 99 20 15\p5855", 8, 33, 7, 20.25, 0, 1, 150000, 0
 "SWEREF 99 21 45\p5856", 8, 33, 7, 21.75, 0, 1, 150000, 0
 "SWEREF 99 23 15\p5857", 8, 33, 7, 23.25, 0, 1, 150000, 0

Coordinate System and Datum Additions for MapInfo Pro 11.5

We have added new coordinate systems:

- "Longitude / Latitude (CH 1903+)\p4150", 1, 158
- "Mercator WGS84\p3395", 10, 104, 7, 0
- "Popular Visualization CRS\p900913", 10, 157, 7, 0
- "Belgium Lambert 2005", 19, 115, 7, 4.359216, 50.797815, 49.833333, 51.1666666667, 150328, 166262
- "Belgium Lambert 2008", 19, 115, 7, 4.359216, 50.797815, 49.833333, 51.1666666667, 649328, 665262

We have added a new EPSG code:

- "Longitude / Latitude (JGD2000)\p4612", 1, 152
- "VicGrid94 (GDA94)\p3111", 3, 116, 7, 145, -37, -36, -38, 2500000, 2500000

We have modified the following coordinate systems:

- "CH1903.LV03\p21781", 25, 158, 7, 7.439583333333, 46.952405555556, 600000, 200000
- "CH1903.LV03C\p21782", 25, 158, 7, 7.439583333333, 46.952405555556, 0, 0
- "CH1903plus.LV95\p2056", 25, 158, 7, 7.439583333333, 46.952405555556, 2600000, 1200000

Colombia Coordinate Systems

We have added new Colombian coordinate systems:

- "Columbia Bogota UTM Zone\p21897", 8, 16, 7, -74.08091666666667, 4.599047222222222, 1, 1000000, 1000000
- "Bogota 1975 / UTM Zone 18\p21818", 8, 16, 7, -75, 0, .9996, 500000, 0

Namibia Coordinate Systems

We have added a new Namibian coordinate system:

- "LO (Gauss Conformal)", 8, 159, 7, 15, -22, 1, 0, 0

Republic of Serbia Coordinate Systems

We have added a new Serbian coordinate system:

- "Serbia (Zone 7) MGI\p3909", 8, 1021, 7, 21, 0, 0.9999, 7500000, 0

Algeria Coordinate Systems

We have added new Algerian coordinate systems:

- "UTM Zone 31, Northern Hemisphere (WGS 84)\p32631", 8, 104, 7, 3, 0, 0.9996, 500000, 0
- "UTM Zone 31 North Sahara (7 parameters)", 8, 1022, 7, 3, 0, 0.9996, 500000, 0
- "Lambert Conformal Conic Lambert (7 parameters)", 3, 1022, 7, 2.7, 36, 37.575, 34.425, 500135, 300090

Coordinate System and Datum Additions for MapInfo Pro 11.0

We have added a new Base Geographic Region (BGR) coordinate system:

- "Lambert Conique Conforme BGR", 3, 74, 7, -68.5, 44, 46, 60, 0, 0

We have modified the following coordinate system:

- "Lambert Azimuthal Equal-Area (ETRS89)\p3035", 1029, 115, 7, 10, 52, 180, 7, 1, 0, 4321000, 0, 1, 3210000

Argentina Coordinate Systems

We have added new Argentina coordinate systems:

Gauss-Kruger (Argentina) Campo Inchauspe

- "Argentina Gauss-Kruger Zone 1", 8, 17, 7, -72, 0, 1, 1500000, 10002283.3
- "Argentina Gauss-Kruger Zone 2", 8, 17, 7, -69, 0, 1, 2500000, 10002283.3
- "Argentina Gauss-Kruger Zone 3", 8, 17, 7, -66, 0, 1, 3500000, 10002283.3
- "Argentina Gauss-Kruger Zone 4", 8, 17, 7, -63, 0, 1, 4500000, 10002283.3
- "Argentina Gauss-Kruger Zone 5", 8, 17, 7, -60, 0, 1, 5500000, 10002283.3
- "Argentina Gauss-Kruger Zone 6", 8, 17, 7, -57, 0, 1, 6500000, 10002283.3
- "Argentina Gauss-Kruger Zone 7", 8, 17, 7, -54, 0, 1, 7500000, 10002283.3

Gauss-Kruger POSGAR94 (Argentina, WGS-84)

- "Argentina Gauss-Kruger Zone 1 (WGS 84)", 8, 104, 7, -72, 0, 1, 1500000, 10001965.730
- "Argentina Gauss-Kruger Zone 2 (WGS 84)", 8, 104, 7, -69, 0, 1, 2500000, 10001965.730
- "Argentina Gauss-Kruger Zone 3 (WGS 84)", 8, 104, 7, -66, 0, 1, 3500000, 10001965.730
- "Argentina Gauss-Kruger Zone 4 (WGS 84)", 8, 104, 7, -63, 0, 1, 4500000, 10001965.730
- "Argentina Gauss-Kruger Zone 5 (WGS 84)", 8, 104, 7, -60, 0, 1, 5500000, 10001965.730
- "Argentina Gauss-Kruger Zone 6 (WGS 84)", 8, 104, 7, -57, 0, 1, 6500000, 10001965.730
- "Argentina Gauss-Kruger Zone 7 (WGS 84)", 8, 104, 7, -54, 0, 1, 7500000, 10001965.730

Borné Coordinate Systems

We have added new Borné coordinate systems:

Systèmes français RGF93 - Greenwich - Conique Conforme 9 zones - borné par zone

- "Lambert-93 CC50 (zone 9) - Borné\p3950", 2003, 33, 7, 3, 50, 49.25, 50.75, 1700000, 9200000, 1000000, 9000000, 2400000, 9400000
- "Lambert-93 CC49 (zone 8) - Borné\p3949", 2003, 33, 7, 3, 49, 48.25, 49.75, 1700000, 8200000, 1000000, 8000000, 2400000, 8400000
- "Lambert-93 CC48 (zone 7) - Borné\p3948", 2003, 33, 7, 3, 48, 47.25, 48.75, 1700000, 7200000, 1000000, 7000000, 2400000, 7400000
- "Lambert-93 CC47 (zone 6) - Borné\p3947", 2003, 33, 7, 3, 47, 46.25, 47.75, 1700000, 6200000, 1000000, 6000000, 2400000, 6400000
- "Lambert-93 CC46 (zone 5) - Borné\p3946", 2003, 33, 7, 3, 46, 45.25, 46.75, 1700000, 5200000, 1000000, 5000000, 2400000, 5400000
- "Lambert-93 CC45 (zone 4) - Borné\p3945", 2003, 33, 7, 3, 45, 44.25, 45.75, 1700000, 4200000, 1000000, 4000000, 2400000, 4400000
- "Lambert-93 CC44 (zone 3) - Borné\p3944", 2003, 33, 7, 3, 44, 43.25, 44.75, 1700000, 3200000, 1000000, 3000000, 2400000, 3400000
- "Lambert-93 CC43 (zone 2) - Borné\p3943", 2003, 33, 7, 3, 43, 42.25, 43.75, 1700000, 2200000, 1000000, 2000000, 2400000, 2400000
- "Lambert-93 CC42 (zone 1) - Borné\p3942", 2003, 33, 7, 3, 42, 41.25, 42.75, 1700000, 1200000, 1000000, 1000000, 2400000, 1400000

Singapore Coordinate Systems

We have added new Singapore coordinate systems:

- "SVY21 Transverse Mercator System", 8, 104, 7, 103.83333333, 1.36666667, 1, 28001.642, 38744.572

Turkish Coordinate Systems

We have added new Turkish coordinate systems:

Turkish Coordinate Systems (GK 3 Degree k = 1 - WGS84)

- "GK Central Meridian 27 (WGS84)", 8, 104, 7, 27, 0, 1, 500000, 0
- "GK Central Meridian 30 (WGS84)", 8, 104, 7, 30, 0, 1, 500000, 0

- "GK Central Meridian 33 (WGS84)", 8, 104, 7, 33, 0, 1, 500000, 0
- "GK Central Meridian 36 (WGS84)", 8, 104, 7, 36, 0, 1, 500000, 0
- "GK Central Meridian 39 (WGS84)", 8, 104, 7, 39, 0, 1, 500000, 0
- "GK Central Meridian 42 (WGS84)", 8, 104, 7, 42, 0, 1, 500000, 0
- "GK Central Meridian 45 (WGS84)", 8, 104, 7, 45, 0, 1, 500000, 0

Turkish Coordinate Systems (UTM 6 Degree k = 0,9996 - WGS84)

- "UTM Zone 35 Central Meridian 27 (WGS84)", 8, 104, 7, 27, 0, 0.9996, 500000, 0
- "UTM Zone 36 Central Meridian 33 (WGS84)", 8, 104, 7, 33, 0, 0.9996, 500000, 0
- "UTM Zone 37 Central Meridian 39 (WGS84)", 8, 104, 7, 39, 0, 0.9996, 500000, 0
- "UTM Zone 38 Central Meridian 45 (WGS84)", 8, 104, 7, 45, 0, 0.9996, 500000, 0

Turkish Coordinate Systems (Lambert)

- "Turkish Lambert Conformal (K.Eren - WGS84)", 3, 104, 7, 36.0, 25.0, 37.5, 40.5, 1003827.11, -1183453.08
- "Turkish Lambert Conformal Modified(K.Eren - WGS84)", 3, 104, 7, 36, 25, 37.5, 40.5, 1003827.11, -1183453.0800000001
- "Turkish Lambert Conformal (ED50)", 3, 28, 7, 36.0, 25.0, 37.5, 40.5, 1000000, 0

Turkish Coordinate Systems With Datum Conversion (from ED50 to WGS84)

- "Longitude / Latitude (WGS84)", 1, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0
- "GK Central Meridian 27 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 27, 0, 1, 500000, 0
- "GK Central Meridian 30 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 30, 0, 1, 500000, 0
- "GK Central Meridian 33 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 33, 0, 1, 500000, 0
- "GK Central Meridian 36 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 36, 0, 1, 500000, 0
- "GK Central Meridian 39 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 39, 0, 1, 500000, 0
- "GK Central Meridian 42 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 42, 0, 1, 500000, 0
- "GK Central Meridian 45 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 45, 0, 1, 500000, 0
- "UTM Zone 35 Central Meridian 27 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 27, 0, 0.9996, 500000, 0
- "UTM Zone 36 Central Meridian 33 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 33, 0, 0.9996, 500000, 0
- "UTM Zone 37 Central Meridian 39 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 39, 0, 0.9996, 500000, 0

- "UTM Zone 38 Central Meridian 45 (WGS84)", 8, 9999, 4, -84.003, -102.315, -129.879, -0.0183, 0.0003, -0.4738, 1.0347, 0, 7, 45, 0, 0.9996, 500000, 0

Danish Coordinate Systems

We have modified Danish coordinate systems:

- "DKTM1 - Western Jylland\p4093", 8, 115, 7, 9, 0, 0.99998, 200000, -5000000
- "DKTM2 - Eastern Jylland and Fyn\p4094", 8, 115, 7, 10, 0, 0.99998, 400000, -5000000
- "DKTM3 - Sjaelland\p4095", 8, 115, 7, 11.75, 0, 0.99998, 600000, -5000000
- "DKTM4 - Bornholm\p4096", 8, 115, 7, 15, 0, 1.00000, 800000, -5000000

Danish Bounded Coordinate Systems

- "Bounded DKTM1 - Western Jylland\p4093", 2008, 115, 7, 9, 0, 0.99998, 200000, -5000000, 0, 750000, 1000000, 1750000
- "Bounded DKTM2 - Eastern Jylland and Fyn\p4094", 2008, 115, 7, 10, 0, 0.99998, 400000, -5000000, 0, 750000, 1000000, 1750000
- "Bounded DKTM3 - Sjaelland\p4095", 2008, 115, 7, 11.75, 0, 0.99998, 600000, -5000000, 0, 750000, 1000000, 1750000
- "Bounded DKTM4 - Bornholm\p4096", 2008, 115, 7, 15, 0, 1.00000, 800000, -5000000, 0, 750000, 1000000, 1750000
- "Bounded KP2000 Bornholm\p18403", 2008, 115, 7, 15.0, 0, 1.00000, 900000, 0, 300000.0, 5750000.0, 1300000.0, 6750000.0

Finnish Coordinate Systems

We have modified Finnish coordinate systems:

Finnish Coordinate Systems, ETRS-GK(ETRS89)

- "ETRS-GK19FIN\p3873", 2008, 115, 7, 19, 0, 1, 19500000, 0, 19000000, 6500000, 20000000, 8000000
- "ETRS-GK20FIN\p3874", 2008, 115, 7, 20, 0, 1, 20500000, 0, 20000000, 6500000, 21000000, 8000000
- "ETRS-GK21FIN\p3875", 2008, 115, 7, 21, 0, 1, 21500000, 0, 21000000, 6500000, 22000000, 8000000
- "ETRS-GK22FIN\p3876", 2008, 115, 7, 22, 0, 1, 22500000, 0, 22000000, 6500000, 23000000, 8000000
- "ETRS-GK23FIN\p3877", 2008, 115, 7, 23, 0, 1, 23500000, 0, 23000000, 6500000, 24000000, 8000000
- "ETRS-GK24FIN\p3878", 2008, 115, 7, 24, 0, 1, 24500000, 0, 24000000, 6500000, 25000000, 8000000
- "ETRS-GK25FIN\p3879", 2008, 115, 7, 25, 0, 1, 25500000, 0, 25000000, 6500000, 26000000, 8000000
- "ETRS-GK26FIN\p3880", 2008, 115, 7, 26, 0, 1, 26500000, 0, 26000000, 6500000, 27000000, 8000000

- "ETRS-GK27FIN\p3881", 2008, 115, 7, 27, 0, 1, 27500000, 0, 27000000, 6500000, 28000000, 8000000
- "ETRS-GK28FIN\p3882", 2008, 115, 7, 28, 0, 1, 28500000, 0, 28000000, 6500000, 29000000, 8000000
- "ETRS-GK29FIN\p3883", 2008, 115, 7, 29, 0, 1, 29500000, 0, 29000000, 6500000, 30000000, 8000000
- "ETRS-GK30FIN\p3884", 2008, 115, 7, 30, 0, 1, 30500000, 0, 30000000, 6500000, 31000000, 8000000
- "ETRS-GK31FIN\p3885", 2008, 115, 7, 31, 0, 1, 31500000, 0, 31000000, 6500000, 32000000, 8000000

Finnish Coordinate Systems ETRS (v 10.5 and later projections)

- "ETRS-TM35FIN", 2024, 115, 7, 27, 0, 0.9996, 500000, 0, -100000, 6000000, 1000000, 8000000

Greenwich Coordinate Systems

We have modified Greenwich coordinate systems:

Systèmes français Méridien de Greenwich (MIW avant 3 - Obsolète)

- "Lambert I Carto - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 49.5, 48.59852278, 50.39591167, 600000, 1200000
- "Lambert II Carto - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 46.8, 45.89891889, 47.69601444, 600000, 2200000
- "Lambert III Carto - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 44.1, 43.19929139, 44.99609389, 600000, 3200000
- "Lambert IV Carto - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 42.165, 41.56038778, 42.76766333, 234.358, 4185861.369
- "Lambert I Nord - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 49.5, 48.59852278, 50.39591167, 600000, 200000
- "Lambert II Centre - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 46.8, 45.89891889, 47.69601444, 600000, 200000
- "Lambert III Sud - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 44.1, 43.19929139, 44.99609389, 600000, 200000
- "Lambert IV Corse - Greenwich (Obsolète)", 3, 999, 6, -168, -60, 320, 7, 2.3372291667, 42.165, 41.56038778, 42.76766333, 234.358, 185861.369

Hong Kong Coordinate Systems

We have modified a Hong Kong coordinate system:

- "Hong Kong 1980 Grid System\p2326", 8, 9999, 4, -162.619, -276.959, -161.764, -0.067753, 2.243649, 1.158827, -1.094246, 0, 7, 114.178555, 22.3121333, 1, 836694.05, 819069.8

Hungarian Coordinate Systems

We have modified a Hungarian coordinate system:

- "Hungarian Projection System (EOV)", 8, 1004, 7, 19.04857178, 47.14439372, 0.99993, 650000, 200000

Polish Coordinate Systems

We have modified a Polish coordinate system:

- "Universal polar stereographic (WGS84)", 20, 104, 7, 19.16666667, 52, 0.99981917452019, 0, 0

Swedish Coordinate Systems

We have modified a Swedish coordinate system:

- "SWEREF 99 18 45\p3015", 8, 33, 7, 18.75, 0, 1, 150000, 0

Swiss Coordinate Systems

We have modified Swiss coordinate systems:

- "CH1903.LV03\p21781", 25, 999, 10, 674.374, 15.156, 405.346, 7, 7.439583333333, 46.952405555556, 600000, 200000
- "CH1903.LV03C\p21782", 25, 999, 10, 674.374, 15.156, 405.346, 7, 7.439583333333, 46.952405555556, 0, 0
- "CH1903plus.LV95\p2056", 25, 999, 10, 674.374, 15.156, 405.346, 7, 7.439583333333, 46.952405555556, 2600000, 1200000

Coordinate System and Datum Additions for MapInfo Pro 10.5

Australian Coordinate Systems

We have added new Australian coordinate systems:

- "Longitude / Latitude (Victoria GDA94)", 2001, 116, 132, -26.8, 154, -43.8
- "SA - Lambert Conformal Conic (GDA94)", 3, 116, 7, 135, -32, -28, -36, 1000000, 2000000

Danish Coordinate Systems

We have updated and added Danish coordinate systems:

- "UTM Zone 32 Euref89\p25832", 8, 115, 7, 9.0, 0, 0.9996, 500000, 0
- "UTM Zone 33 Euref89\p25833", 8, 115, 7, 15.0, 0, 0.9996, 500000, 0
- "DKTM1 - Western Jylland\p4093", 8, 115, 7, 9, 0, 0.99998, 200000, 5000000
- "DKTM2 - Eastern Jylland and Fyn\p4094", 8, 115, 7, 10, 0, 0.99998, 400000, 5000000
- "DKTM3 - Sjaelland\p4095", 8, 115, 7, 11.75, 0, 0.99998, 600000, 5000000
- "DKTM4 - Bornholm\p4096", 8, 115, 7, 15, 0, 1.00000, 800000, 5000000
- "KP2000 Jylland-Fyn\p18401", 8, 115, 7, 9.5, 0, 0.99995, 200000, 0
- "KP2000 Sjaelland\p18402", 8, 115, 7, 12.0, 0, 0.99995, 500000, 0
- "KP2000 Bornholm\p18403", 8, 115, 7, 15.0, 0, 1.00000, 900000, 0
- "UTM Zone 32 (ED 50)\p23032", 8, 28, 7, 9, 0, 0.9996, 500000, 0

- "UTM Zone 33 (ED 50)\p23033", 8, 28, 7, 15, 0, 0.9996, 500000, 0
- "System 34 Jylland-Fyn\p34003", 21, 28, 7, 9, 0, 0.9996, 500000, 0
- "System 34 Sjaelland\p34005", 22, 28, 7, 9, 0, 0.9996, 500000, 0
- "System 45 Bornholm\p45001", 23, 28, 7, 15, 0, 0.9996, 500000, 0

Danish Bounded Coordinate Systems

- "Bounded UTM Zone 32 ETRS89\p25832", 2008, 115, 7, 9.0, 0, 0.9996, 500000, 0, 50000.0, 5750000.0, 1050000.0, 6750000.0
- "Bounded UTM Zone 33 ETRS89\p25833", 2008, 115, 7, 15.0, 0, 0.9996, 500000, 0, -200000.0, 5750000.0, 800000.0, 6750000.0
- "Bounded DKTm1 - Western Jylland\p4093", 2008, 115, 7, 9, 0, 0.99998, 200000, 5000000, 0, 750000, 1000000, 1750000
- "Bounded DKTm2 - Eastern Jylland and Fyn\p4094", 2008, 115, 7, 10, 0, 0.99998, 400000, 5000000, 0, 750000, 1000000, 1750000
- "Bounded DKTm3 - Sjaelland\p4095", 2008, 115, 7, 11.75, 0, 0.99998, 600000, 5000000, 0, 750000, 1000000, 1750000
- "Bounded DKTm4 - Bornholm\p4096", 2008, 115, 7, 15, 0, 1.00000, 800000, 5000000, 0, 750000, 1000000, 1750000
- "Bounded KP2000 Jylland-Fyn\p18401", 2008, 115, 7, 9.5, 0, 0.99995, 200000, 0, -200000.0, 5750000.0, 800000.0, 6750000.0
- "Bounded KP2000 Sjaelland\p18402", 2008, 115, 7, 12.0, 0, 0.99995, 500000, 0, -200000.0, 5750000.0, 800000.0, 6750000.0
- "Bounded KP2000 Bornholm\p18403", 2008, 115, 7, 15.0, 0, 1.00000, 900000, 0, -200000.0, 5750000.0, 800000.0, 6750000.0
- "Bounded UTM Zone 32 (ED 50)\p23032", 2008, 28, 7, 9, 0, 0.9996, 500000, 0, 50000.0, 5750000.0, 1050000.0, 6750000.0
- "Bounded UTM Zone 33 (ED 50)\p23033", 2008, 28, 7, 15, 0, 0.9996, 500000, 0, -200000.0, 5750000.0, 800000.0, 6750000.0
- "Bounded System 34 Jylland-Fyn\p34003", 2021, 28, 7, 9, 0, 0.9996, 500000, 0, -700000.0, -300000, 300000, 700000
- "Bounded System 34 Sjaelland\p34005", 2022, 28, 7, 9, 0, 0.9996, 500000, 0, -700000.0, -300000, 300000, 700000
- "Bounded System 45 Bornholm\p45001", 2023, 28, 7, 15, 0, 0.9996, 500000, 0, -700000.0, -300000, 300000, 700000

European Projection

We have added a new European projection system:

- "Longitude / Latitude (EUREF89)\p4258", 1, 115

French Coordinate System

We have added a new French coordinate system:

- "Longitude / Latitude (RGF93)\p4171", 1, 33

Finnish Coordinate Systems

We have added new Finnish coordinate systems:

- "Finnish KKJ Zone 0\p3386", 2024, 1016, 7, 18, 0, 1, 500000, 0, 0, 6000000, 1500000, 8000000
- "Finnish KKJ Zone 5\p3387", 2024, 1016, 7, 33, 0, 1, 5500000, 0, 4000000, 6000000, 6000000, 8000000

ETRS-GK(ETRS89)

- "ETRS-GK19FIN (ETRS89)\p3126", 2008, 115, 7, 19, 0, 1, 19500000, 0, 19200000, 6500000, 19800000, 8000000
- "ETRS-GK20FIN (ETRS89)\p3127", 2008, 115, 7, 20, 0, 1, 20500000, 0, 20200000, 6500000, 20800000, 8000000
- "ETRS-GK21FIN (ETRS89)\p3128", 2008, 115, 7, 21, 0, 1, 21500000, 0, 21200000, 6500000, 21800000, 8000000
- "ETRS-GK22FIN (ETRS89)\p3129", 2008, 115, 7, 22, 0, 1, 22500000, 0, 22200000, 6500000, 22800000, 8000000
- "ETRS-GK23FIN (ETRS89)\p3130", 2008, 115, 7, 23, 0, 1, 23500000, 0, 23200000, 6500000, 23800000, 8000000
- "ETRS-GK24FIN (ETRS89)\p3131", 2008, 115, 7, 24, 0, 1, 24500000, 0, 24200000, 6500000, 24800000, 8000000
- "ETRS-GK25FIN (ETRS89)\p3132", 2008, 115, 7, 25, 0, 1, 25500000, 0, 25200000, 6500000, 25800000, 8000000
- "ETRS-GK26FIN (ETRS89)\p3133", 2008, 115, 7, 26, 0, 1, 26500000, 0, 26200000, 6500000, 26800000, 8000000
- "ETRS-GK27FIN (ETRS89)\p3134", 2008, 115, 7, 27, 0, 1, 27500000, 0, 27200000, 6500000, 27800000, 8000000
- "ETRS-GK28FIN (ETRS89)\p3135", 2008, 115, 7, 28, 0, 1, 28500000, 0, 28200000, 6500000, 28800000, 8000000
- "ETRS-GK29FIN (ETRS89)\p3136", 2008, 115, 7, 29, 0, 1, 29500000, 0, 29200000, 6500000, 29800000, 8000000
- "ETRS-GK30FIN (ETRS89)\p3137", 2008, 115, 7, 30, 0, 1, 30500000, 0, 30200000, 6500000, 30800000, 8000000
- "ETRS-GK31FIN (ETRS89)\p3138", 2008, 115, 7, 31, 0, 1, 31500000, 0, 31200000, 6500000, 31800000, 8000000

Gauss-Kruger

- "ETRS-GK19FIN", 2024, 115, 7, 19, 0, 1.0, 19500000, 0, 19000000, 6000000, 19999999, 8000000
- "ETRS-GK20FIN", 2024, 115, 7, 20, 0, 1.0, 20500000, 0, 20000000, 6000000, 20999999, 8000000
- "ETRS-GK21FIN", 2024, 115, 7, 21, 0, 1.0, 21500000, 0, 21000000, 6000000, 21999999, 8000000
- "ETRS-GK22FIN", 2024, 115, 7, 22, 0, 1.0, 22500000, 0, 22000000, 6000000, 22999999, 8000000
- "ETRS-GK23FIN", 2024, 115, 7, 23, 0, 1.0, 23500000, 0, 23000000, 6000000, 23999999, 8000000
- "ETRS-GK24FIN", 2024, 115, 7, 24, 0, 1.0, 24500000, 0, 24000000, 6000000, 24999999, 8000000
- "ETRS-GK25FIN", 2024, 115, 7, 25, 0, 1.0, 25500000, 0, 25000000, 6000000, 25999999, 8000000

- "ETRS-GK26FIN", 2024, 115, 7, 26, 0, 1.0, 26500000, 0, 26000000, 6000000, 26999999, 8000000
- "ETRS-GK27FIN", 2024, 115, 7, 27, 0, 1.0, 27500000, 0, 27000000, 6000000, 27999999, 8000000
- "ETRS-GK28FIN", 2024, 115, 7, 28, 0, 1.0, 28500000, 0, 28000000, 6000000, 28999999, 8000000
- "ETRS-GK29FIN", 2024, 115, 7, 29, 0, 1.0, 29500000, 0, 29000000, 6000000, 29999999, 8000000
- "ETRS-GK30FIN", 2024, 115, 7, 30, 0, 1.0, 30500000, 0, 30000000, 6000000, 30999999, 8000000
- "ETRS-GK31FIN", 2024, 115, 7, 31, 0, 1.0, 31500000, 0, 31000000, 6000000, 31999999, 8000000

UTM

- "ETRS-TM34", 2024, 115, 7, 21, 0, 0.9996, 500000, 0, 0, 0, 1500000, 8000000
- "ETRS-TM35", 2024, 115, 7, 27, 0, 0.9996, 500000, 0, 0, 0, 1500000, 8000000
- "ETRS-TM36", 2024, 115, 7, 33, 0, 0.9996, 500000, 0, 0, 0, 1500000, 8000000
- "ETRS-TM35FIN", 8, 115, 7, 27, 0, 0.9996, 500000, 0
- "ETRS-TM35FIN (central meridian 8500 km)", 8, 115, 7, 27, 0, 0.9996, 8500000, 0
- "ETRS-TM35FIN\p3067", 2008, 115, 7, 27, 0, 0.9996, 500000, 0, -100000, 6000000, 1000000, 8000000

Morocco Coordinate Systems

New coordinate systems for Morocco:

Lambert Maroc (Merchich)

- "Zone I (Nord Maroc)\p26191", 3, 55, 7, -5.4, 33.3, 31.72786641202, 34.8717272112, 500000, 300000
- "Zone II (Agadir)\p26192", 3, 55, 7, -5.4, 29.7, 28.1063294800, 31.2932791054, 500000, 300000
- "Zone III (La'youn)\p26194", 3, 55, 7, -5.4, 26.1, 24.5075340813, 27.6921073632, 1200000, 400000
- "Zone IV (Ad-Dakhla)\p26195", 3, 55, 7, -5.4, 22.5, 20.9075742561, 24.0921050540, 1500000, 400000

Slovenian Projections

We have added new Slovenian projections:

- "Slovenia (D-48 Slovenia) 3-parameters", 8, 999, 10, 668, -205, 472, 7, 15, 0, 0.9999, 500000, -5000000
- "Slovenia (D-48 Slovenia) 7-parameters", 8, 9999, 10, 438.7669, 126.6093, 457.938, -4.323931, -4.1076, 12.245081, -16.5199, 0, 7, 15, 0, 0.9999, 500000, -5000000

Swiss Coordinate Systems

We have updated coordinate systems:

- "Liechtenstein National System", 25, 1003, 7, 7.43958333333, 46.9524055555, 0, 0
- "Swiss National System", 25, 1003, 7, 7.43958333333, 46.9524055555, 600000, 200000
- "CH1903.LV03\p21781", 25, 999, 10, 674.374, 15.156, 405.346, 7, 7.439583333333333, 46.95240555555556, 600000, 200000
- "CH1903.LV03C\p21782", 25, 999, 10, 674.374, 15.156, 405.346, 7, 7.439583333333333, 46.95240555555556, 0, 0

- "CH1903plus.LV95\p2056", 25, 999, 10, 674.374, 15.156, 405.346, 7, 7.439583333333333, 46.9524055555556, 2600000, 1200000

United States of America (USA) Coordinate Systems

We have added new USA coordinate systems:

- "California Teale Albers NAD27", 9, 62, 7, -120, 0, 34, 40.5, 0, -4000000
- "California Teale Albers NAD83", 9, 74, 7, -120, 0, 34, 40.5, 0, -4000000

Zambia Projections

We have added new Zambian projections:

Gauss-Kruger Arc1950

- "Gauss-Kruger LO 24 Arc1950", 8, 5, 7, 24, 0, 1, 0, 0
- "Gauss-Kruger LO 25 Arc1950", 8, 5, 7, 25, 0, 1, 0, 0
- "Gauss-Kruger LO 26 Arc1950", 8, 5, 7, 26, 0, 1, 0, 0
- "Gauss-Kruger LO 27 Arc1950", 8, 5, 7, 27, 0, 1, 0, 0
- "Gauss-Kruger LO 28 Arc1950", 8, 5, 7, 28, 0, 1, 0, 0
- "Gauss-Kruger LO 29 Arc1950", 8, 5, 7, 29, 0, 1, 0, 0
- "Gauss-Kruger LO 30 Arc1950", 8, 5, 7, 30, 0, 1, 0, 0

Gauss-Kruger Arc1950 (**Affine Transformation, False Coords)

- "Gauss-Kruger LO 24 Arc1950", 8, 1005, 7, 24, 0.9996, 1, 500000, 10000000
- "Gauss-Kruger LO 25 Arc1950", 8, 1005, 7, 25, 0.9996, 1, 500000, 10000000
- "Gauss-Kruger LO 26 Arc1950", 8, 1005, 7, 26, 0.9996, 1, 500000, 10000000
- "Gauss-Kruger LO 27 Arc1950", 8, 1005, 7, 27, 0.9996, 1, 500000, 10000000
- "Gauss-Kruger LO 28 Arc1950", 8, 1005, 7, 28, 0.9996, 1, 500000, 10000000
- "Gauss-Kruger LO 29 Arc1950", 8, 1005, 7, 29, 0.9996, 1, 500000, 10000000
- "Gauss-Kruger LO 30 Arc1950", 8, 1005, 7, 30, 0.9996, 1, 500000, 10000000

Gauss-Kruger Arc1950 (No Affine Transformation, False Coords)

- "Gauss-Kruger LO 24 Arc1950", 8, 5, 7, 24, 0, 0.9996, 500000, 10000000
- "Gauss-Kruger LO 25 Arc1950", 8, 5, 7, 25, 0, 0.9996, 500000, 10000000
- "Gauss-Kruger LO 26 Arc1950", 8, 5, 7, 26, 0, 0.9996, 500000, 10000000
- "Gauss-Kruger LO 27 Arc1950", 8, 5, 7, 27, 0, 0.9996, 500000, 10000000
- "Gauss-Kruger LO 28 Arc1950", 8, 5, 7, 28, 0, 0.9996, 500000, 10000000
- "Gauss-Kruger LO 29 Arc1950", 8, 5, 7, 29, 0, 0.9996, 500000, 10000000
- "Gauss-Kruger LO 30 Arc1950", 8, 5, 7, 30, 0, 0.9996, 500000, 10000000

Coordinate System and Datum Additions for MapInfo Pro 10.0.1

Coordinate System Transformation Improvements for the UK

This release significantly improves the accuracy of the coordinate system conversion between WGS 84 (and EUREF89) based coordinate systems and British National Grid. This improvement is achieved by using the NTV2 datum conversion algorithm between OSGB36 and WGS 84 (and EUREF89) datum.

If you need to disable this NTV2 datum conversion, open the ntv2.xml file in the MapInfo application folder and make the following entries "false".

```
<NTv2Conversion>
  <Description>NTv2 Conversion for UK</Description>
  <GridFile>england-wales.gsb</GridFile>
  <Enabled>true</Enabled>
  <SourceDatum>
    <DatumID>79</DatumID>
  </SourceDatum>
  <DestinationDatum>
    <DatumID>104</DatumID>
  </DestinationDatum>
</NTv2Conversion>
<NTv2Conversion>
  <Description>NTv2 Conversion for UK</Description>
  <GridFile>scotland.gsb</GridFile>
  <Enabled>true</Enabled>
  <SourceDatum>
    <DatumID>79</DatumID>
  </SourceDatum>
  <DestinationDatum>
    <DatumID>104</DatumID>
  </DestinationDatum>
</NTv2Conversion>
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  <Description>NTv2 Conversion for UK</Description>
  <GridFile>england-wales.gsb</GridFile>
  <Enabled>true</Enabled>
  <SourceDatum>
    <DatumID>79</DatumID>
  </SourceDatum>
  <DestinationDatum>
    <DatumID>115</DatumID>
  </DestinationDatum>
</NTv2Conversion>
<NTv2Conversion>
  <Description>NTv2 Conversion for UK</Description>
  <GridFile>scotland.gsb</GridFile>
  <Enabled>true</Enabled>
  <SourceDatum>
    <DatumID>79</DatumID>
  </SourceDatum>
  <DestinationDatum>
    <DatumID>115</DatumID>
  </DestinationDatum>
</NTv2Conversion>
```


Coordinate System and Datum Additions for MapInfo Pro 10.0

Canadian Coordinate Systems

We have added Ministry of Transport of Quebec Coordinate Systems:

- "NAD27/MTQ Lambert\p3797", 3, 66, 7, -70, 44, 50, 46, 800000, 0
- "NAD83/MTQ Lambert\p3798", 3, 74, 7, -70, 44, 50, 46, 800000, 0
- "NAD83(CSRS)/MTQ Lambert\p3799", 3, 74, 7, -70, 44, 50, 46, 800000, 0

Vietnamese Coordinate Systems

We have added new Vietnamese Coordinate Systems:

- "Hanoi 1972 / GK 106 NE (Meekong delta)", 8, 1001, 7, 106, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 18 (6 Degree)", 8, 1001, 7, 105, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 19 (6 Degree)", 8, 1001, 7, 111, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 20 (6 Degree)", 8, 1001, 7, 117, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 181 (3 Degree)", 8, 1001, 7, 102, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 182 (3 Degree)", 8, 1001, 7, 105, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 191 (3 Degree)", 8, 1001, 7, 108, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 192 (3 Degree)", 8, 1001, 7, 111, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 201 (3 Degree)", 8, 1001, 7, 114, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 202 (3 Degree)", 8, 1001, 7, 117, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 1811 (1.5 Degree)", 8, 1001, 7, 105, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 1812 (1.5 Degree)", 8, 1001, 7, 105.75, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 1813 (1.5 Degree)", 8, 1001, 7, 106.5, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 1814 (1.5 Degree)", 8, 1001, 7, 107.25, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "Hanoi 1972 / GK zone 1815 (1.5 Degree)", 8, 1001, 7, 108, 0, 1, 500000, 0, -17.51, -108.32, -62.39
- "WGS 72BE / TM 106 NE (offshore Nam Con Son basin)", 8, 103, 7, 106, 0, 0.9996, 500000, 0, 182, 915, 344
- "Indian 1960 / TM 106 NE (offshore-Everest 1830)", 8, 131, 7, 106, 0, 0.9996, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 48N (6 Degree)", 8, 131, 7, 105, 0, 0.9996, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 49N (6 Degree)", 8, 131, 7, 111, 0, 0.9996, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 50N (6 Degree)", 8, 131, 7, 117, 0, 0.9996, 500000, 0, 198, 881, 317

- "Indian 1960 Vietnam / UTM zone 481N (3 Degree)", 8, 131, 7, 102, 0, 0.9999, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 482N (3 Degree)", 8, 131, 7, 105, 0, 0.9999, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 491N (3 Degree)", 8, 131, 7, 108, 0, 0.9999, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 492N (3 Degree)", 8, 131, 7, 111, 0, 0.9999, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 501N (3 Degree)", 8, 131, 7, 114, 0, 0.9999, 500000, 0, 198, 881, 317
- "Indian 1960 Vietnam / UTM zone 502N (3 Degree)", 8, 131, 7, 117, 0, 0.9999, 500000, 0, 198, 881, 317
- "VN 2000 / WGS 84 zone 48 (6 Degree)", 8, 104, 7, 105, 0, 0.9996, 500000, 0
- "VN 2000 / WGS 84 zone 49 (6 Degree)", 8, 104, 7, 111, 0, 0.9996, 500000, 0
- "VN 2000 / WGS 84 zone 50 (6 Degree)", 8, 104, 7, 117, 0, 0.9996, 500000, 0
- "VN 2000 / WGS 84 zone 481 (3 Degree)", 8, 104, 7, 102, 0, 0.9999, 500000, 0
- "VN 2000 / WGS 84 zone 482 (3 Degree)", 8, 104, 7, 105, 0, 0.9999, 500000, 0
- "VN 2000 / WGS 84 zone 491 (3 Degree)", 8, 104, 7, 108, 0, 0.9999, 500000, 0
- "VN 2000 / WGS 84 zone 492 (3 Degree)", 8, 104, 7, 111, 0, 0.9999, 500000, 0
- "VN 2000 / WGS 84 zone 501 (3 Degree)", 8, 104, 7, 114, 0, 0.9999, 500000, 0
- "VN 2000 / WGS 84 zone 502 (3 Degree)", 8, 104, 7, 117, 0, 0.9999, 500000, 0
- "Dong Nai VN 2000 (3 Degree)", 8, 104, 7, 107.75, 0, 0.9999, 500000, 0

We have added Vietnamese Coordinate Systems Gauss-Kruger (Pulkovo 1942):

- "GK Zone 106 (Pulkovo 1942) (6 Degree)", 8, 1001, 7, 106, 0, 1, 500000, 0
- "GK Zone 18 (Pulkovo 1942) (6 Degree)", 8, 1001, 7, 105, 0, 1, 500000, 0
- "GK Zone 19 (Pulkovo 1942) (6 Degree)", 8, 1001, 7, 111, 0, 1, 500000, 0
- "GK Zone 20 (Pulkovo 1942) (6 Degree)", 8, 1001, 7, 117, 0, 1, 500000, 0
- "GK zone 181 (Pulkovo 1942) (3 Degree)", 8, 1001, 7, 102, 0, 1, 500000, 0
- "GK zone 182 (Pulkovo 1942) (3 Degree)", 8, 1001, 7, 105, 0, 1, 500000, 0
- "GK zone 191 (Pulkovo 1942) (3 Degree)", 8, 1001, 7, 108, 0, 1, 500000, 0
- "GK zone 192 (Pulkovo 1942) (3 Degree)", 8, 1001, 7, 111, 0, 1, 500000, 0
- "GK zone 201 (Pulkovo 1942) (3 Degree)", 8, 1001, 7, 114, 0, 1, 500000, 0
- "GK zone 202 (Pulkovo 1942) (3 Degree)", 8, 1001, 7, 117, 0, 1, 500000, 0

Coordinate System and Datum Additions for MapInfo Pro 9.5

Belgian EPSG Code Added

We have added a new EPSG Code:

- Belgian National System (7 parameters)\p31370

Croatian Coordinate System

We added the following coordinate system:

- Gauss Kruger zone 5

Egyptian Coordinate System

We have added a new Egyptian coordinate system:

- Egyptian Transverse Mercator

Estonian Coordinate System

We have added a new EPSG Codes for Estonian coordinate systems:

- L-EST97 (EUREF89)\p3301
- L-EST 1992 (EUREF89)\p3300

Fijian Coordinate Systems

We have added new Fijian coordinate systems:

- Fiji Map Grid (WGS72)
- Fiji Lat/Long(Viti Levu - Clarke 1880 datum)

Finnish Coordinate Systems

We have added new Finnish coordinate systems:

- Finnish Coordinate Systems (2003) Finnish KKJ Zone 0 through Zone 5
- Finnish Coordinate Systems (Old, 1996) Finnish KKJ Zone 0 through Zone 5
- Finnish Coordinate Systems (Old, 1990) Finnish KKJ Zone 0 through Zone 5

French Coordinate Systems

We have added the following coordinate systems:

- Lambert I Carto - Paris (Borne monde)\p27571
- Lambert II Carto - Paris (Borne monde)\p27572
- Lambert III Carto - Paris (Borne monde)\p27573
- Lambert IV Carto - Paris (Borne monde)\p27574
- Lambert I Nord - Paris (Borne monde)\p27561
- Lambert II Centre - Paris (Borne monde)\p275620
- Lambert III Sud - Paris (Borne monde)\p27563
- Lambert IV Corse - Paris (Borne monde)\p27564

Systèmes français Méridien de Paris (Borne Europe) (V7.8)

- "Lambert I Carto - Paris (Borne Europe)\p27571
- "Lambert II Carto - Paris (Borne Europe)\p27572
- "Lambert III Carto - Paris (Borne Europe)\p27573
- "Lambert IV Carto - Paris (Borne Europe)\p27574

- "Lambert I Nord - Paris (Borne Europe)\p27561
- "Lambert II Centre - Paris (Borne Europe)\p27562
- "Lambert III Sud - Paris (Borne Europe)\p27563
- "Lambert IV Corse - Paris (Borne Europe)\p27564

Systèmes français Méridien de Paris (Borne France) (V7.8)

- "Lambert I Carto - Paris (Borne France)\p27571
- "Lambert II Carto - Paris (Borne France)\p27572
- "Lambert III Carto - Paris (Borne France)\p27573
- "Lambert IV Carto - Paris (Borne France)\p27574
- "Lambert I Nord - Paris (Borne France)\p27561
- "Lambert II Centre - Paris (Borne France)\p27562
- "Lambert III Sud - Paris (Borne France)\p27563
- "Lambert IV Corse - Paris (Borne France)\p27564

Systèmes français RGF93 - Méridien de Greenwich (Borne monde)

- "France Lambert-93 (Borne monde)\p21540

Systèmes Français RGF93 - Méridien de Greenwich (Borne Europe) ---"

- "France Lambert-93 (Borne Europe)\p2154

Systèmes français RGF93 - Méridien de Greenwich (Borne France

- "France Lambert-93 (Borne France)\p2154

DOM-TOM IGN

- "Réunion, RGR92 - UTM 40S - IGN\p2975
- "PDN-Gauss Laborde Réunion-IGN\p2990
- "Antilles Françaises, RRAF1991 - UTM 20SN - IGN\p2989
- "Guadeloupe, Ste Anne- UTM 20N- IGN\p2970
- "Guadeloupe, Fort Marigot- UTM 20- IGN\p2969
- "Martinique, Fort Desaix- UTM 20- IGN\p2973
- "Guyane, RGFG95 - UTM 22N - IGN\p2972
- "Guyane, CSG67- UTM 22N- IGN\p2971
- "Guyane, RGFG95 - UTM 21N - IGN\p3313
- "Guyane, CSG67- UTM 21N- IGN\p3312
- "Nouvelle Calédonie, Grande Terre - UTM 58S - IGN72\p3060
- "Nouvelle Calédonie, Maré - UTM 58S - IGN53\p2995
- "Nouvelle Calédonie, Lifou - UTM 58S - IGN56\p2981
- "Mayotte, Combani1950 - UTM 38S - IGN\p2980
- "Mayotte, RGM04 - UTM 38S - IGN
- "Mayotte, Cadastre 1997 - UTM 38S - IGN
- "St Pierre et Miquelon - UTM 21N - IGN1950\p2987

Systèmes français Méridien de Greenwich (MIW avant 3 - Obsolète)

- "Lambert I Carto - Greenwich (Obsolète)
- "Lambert II Carto - Greenwich (Obsolète)
- "Lambert III Carto - Greenwich (Obsolète)
- "Lambert IV Carto - Greenwich (Obsolète)
- "Lambert I Nord - Greenwich (Obsolète)
- "Lambert II Centre - Greenwich (Obsolète)
- "Lambert III Sud - Greenwich (Obsolète)
- "Lambert IV Corse - Greenwich (Obsolète)

Réunion IGN

- "Réunion, RGR 92 - UTM 40 sud - IGN 1989\p10012
- "PDN-Gauss Laborde Réunion IGN\p4626

LABORDE Madagascar

- "Laborde Madagascar (mètre)
- "Laborde Madagascar (kilomètre)
- "Laborde Madagascar

German Coordinate Systems

We have added bounded coordinate systems:

- Gauss-Kruger (DHDN) bounded Zone 1 through 5

Irish Coordinate System

We have updated our Irish Coordinate System as follows:

- Irish Grid
- Irish Transverse Mercator (ITM)

Libyan Coordinate Systems

We have added new Libyan coordinate systems:

- LTM 2 Zone 5 through 13
- LTM 2 Zone 13
- UTM Zone 32 (LGD 2006) through UTM Zone 35 (LGD 2006)
- LTM 16

155 - A new Datum for Libya (LGD 2006) its parameters:

Ellipsoid - International

ShiftX = 208.4058 m

ShiftY = 109.8777

ShiftZ = 2.5764 m

Netherlands Coordinate System

We have added a bounded coordinate system:

- Netherlands National System (mm acc)

Polish Coordinate Systems

We have added new coordinate systems:

- "PUW 42/GK Zone (Pulkowo 1942)\p3333
- "PUW 42/GK Zone 4 (Pulkowo 1942)\p3334
- "Poland ETRS89 / CS92\p2180
- "GUGiK 80\p3328
- "Universal polar stereographic (WGS84)
- "Polish Lambert conformal
- "1965/1\p3120
- "1965/2\p2172
- "1965/3\p2173
- "1965/4\p2174
- "1965/5\p2175
- "ETRS89 / Poland CS2000 zone 5\p2176
- "ETRS89 / Poland CS2000 zone 6\p2177
- "ETRS89 / Poland CS2000 zone 7\p2178
- "ETRS89 / Poland CS2000 zone 8\p2179

Romanian Coordinate System

We have added two Romanian Coordinate Systems as follows:

- Romanian Stereo 1970
- Romanian Transverse Mercator

156 - Dealul Piscului 1970 datum for Romania

Krassovsky Ellipsoid #3

Shift X = 28

Shift Y = -121

Shift Z = -77

Swedish Coordinate System

We have added a new coordinate system:

- ST74\p3152

Turkish Coordinate Systems

We have added the following coordinate systems:

- UTM Central Meridian 27 Zone 35 (ED50)
- UTM Central Meridian 30 (ED50)
- UTM Central Meridian 33 Zone 36
- UTM Central Meridian 36 (ED50)
- UTM Central Meridian 39 Zone 37 (ED50)
- UTM Central Meridian 42 (ED50)
- UTM Central Meridian 45 Zone 38 (ED50)
- GK Central Meridian 27 (GRS80)
- GK Central Meridian 30 (GRS80)
- GK Central Meridian 33 (GRS80)
- GK Central Meridian 36 (GRS80)
- GK Central Meridian 39 (GRS80)
- GK Central Meridian 42 (GRS80)
- GK Central Meridian 45 (GRS80)
- UTM Central Meridian 27 Zone 35 (GRS80)
- UTM Central Meridian 33 Zone 36 (GRS80)
- UTM Central Meridian 39 Zone 37 (GRS80)
- UTM Central Meridian 45 Zone 38 (GRS80)

Coordinate System and Datum Additions for MapInfo Pro 9.0

For the details of these projections, see the Custom Datums section in the Appendices.

Added Bosnia-Herzegovina Coordinate Systems. We have added the following projections to the PRJ file:

- Bosnia-Herzegovina (Zone 5)
- Bosnia-Herzegovina (Zone 6)
- Bosnia-Herzegovina (Zone 7)

Added Luxembourg Projections. We have added the following projection to the PRJ file:

- Luxembourg 1930 / Gauss\p2169

Added S-JTSK (KROVAK) Coordinate System. We have added a new S-JTSK projection to the .PRJ file to serve the Czech Republic and Slovakia. We have added using new Projection #32 and new Datum #1020:

The last PRJ entry is using the following parameters:

- Datum:1020 (S-JTSK datum with Ferro Prime meridian)
- Units:- meters
- Origin, Longitude: 42.5 degree (East of Ferro)
- Origin, Latitude: 49.5 degree

- Standard Parallel: 78.5 degree
- Azimuth: 30.28813972 degree

Added Swedish Coordinate System. We have added the following projection to the PRJ file.

- ST 74

Updated EPSG Aliases for Swedish Coordinate Systems. We have added two new EPSG aliases for Swedish coordinate systems to the PRJ file to maintain consistency with the latest update to MapXtreme:

- EPSG:2326
- EPSG:3152

Updated Hong Kong EPSG Code. We have added the following EPSG code entry to the PRJ file:

- Hong Kong 1980 Grid System\p2326

Updated Australian Victorian Coordinate System

We have added the following Australian bounded projections to the PRJ file:

- VIC VicGrid66 (AGD 66)
- VIC VicGrid94 (GDA 94)
- VIC AMG Zone 54 (AGD 66)
- VIC AMG Zone 55 (AGD 66)
- VIC MGA Zone 54 (GDA 94)
- VIC MGA Zone 55 (GDA 94)
- VIC Longitude/Latitude (AGD 66)
- VIC Longitude/Latitude (GDA 94)

Updated Danish Coordinate System Entries

We have added the following Danish projections to the PRJ file

- UTM Zone 32 Euref89\p25832
- UTM Zone 33 Euref89\p25833
- UTM Zone 32 (ED 50)\p23032
- UTM Zone 33 (ED 50)\p23033
- System 34 Jylland-Fyn\p34003
- System 34 Sjaelland\p34005
- System 45 Bornholm\p45001
- KP2000 Jylland-Fyn\p18401
- KP2000 Sjaelland\p18402
- KP2000 Bornholm\p18403

New Irish Transverse Mercator Projection Added

To accommodate the Ordnance Survey projection for Ireland, we have added a projection algorithm to MapInfo Pro. The Irish Transverse Mercator (ITM) is a newly derived GPS-compatible mapping

projection that is associated with the ETRS89 and the GRS80 ellipsoids. You can use the new ITM projection to correctly transform data from the Irish Grid to the ITM projection. It involves replacing current datum conversion algorithm between datums 42 (Ireland 1965) and datum 115 (EUREF89\ETRS89) with an algorithm using different datum conversion parameters.

Currently, the `MAPINFOW.PRJ` entries for the Irish coordinate systems are:

```
"--- Irish Coordinate Systems ---"
```

```
"Irish Transverse Mercator Grid\p29902", 8, 42, 7, -8, 53.5, 1.000035,
200000, 250000
```

To use the new conversion algorithm in MapInfo Pro 9.02, use Notepad or another text editor to replace the `MAPINFOW.PRJ` entries above with the following entries:

```
"--- Irish Coordinate Systems ---"
```

```
"Irish Grid\p29902", 8, 42, 7, -8, 53.5, 1.000035, 200000, 250000
```

```
"Irish Transverse Mercator (ITM)\p2157", 8, 115, 7, -8, 53.5, 0.999820,
600000, 750000
```

NTv2 Datum Transformation Conversion Added

The National Transformation v. 2 (NTv2) algorithm and grid shift file format, developed by the Geodetic Survey Division of Geomatics Canada, enables you to convert data between the NAD 27 reference system and the NAD 83 reference system; that is, this algorithm allows you to convert these two reference systems between each other. Grid shift files used with the algorithm contain one or more rectangular grids that indicate the coordinate differences between NAD 27 and NAD 83.

The National Transformation was originally designed to convert Canadian data from NAD 27 to NAD 83. The NTv2 grid was an enhancement to compensate for the primary and secondary points that were based on the GRS80 ellipsoid. This format was later adopted for datum conversion in Australia, New Zealand, and Germany.

MapInfo Pro has implemented the general NTv2 algorithm and this maintenance release installs grid shift files for each country to which this transformation applies. These countries and their grid shift file names are specified in the next section.

Countries Served by this Conversion

Below is a description of supported NTv2 transformation grid shift files for each of the countries that use the NTv2 algorithm:

Canada

There are two different grids for Canada. They convert between NAD 1927 or NAD 1927 (Definition 1976) and NAD 1983. The NAD 1927 (Definition 1976) coordinate system is a readjustment of NAD 1927 for Ontario. The grid shift files are:

- NTV2_0.GSB - used for converting NAD 1927 to NAD 1983
- MAY76V20.GSB - used for converting NAD 1927 (Definition 1976) to NAD 1983 for Ontario

Detailed information about the algorithm, software and grid shift files can be downloaded from the Natural Resource Canada web site:

<http://www.nrcan.gc.ca/maps-tools-and-publications/tools/geodetic-reference-systems-tools/tools-applications/10925#ntv2>

You can also use INTGRID program on this web site that allows you to convert coordinates interactively or to provide a list of points to be converted.

To use the NAD 1927 for Ontario instead of the generic NTV2 grid shift file for all of Canada:

- Remove or rename the NTV2_0.gsb file in your MapInfo Pro program directory

Australia

The Australian grids convert between either AGD 1966 or AGD 1984 and GDA 1994. It contains two grid shift files:

- A66_National.gsb - used for converting AGD 1966 to GDA94.
- National_84.gsb - used for converting AGD 1984 to GDA94

It also contains links to the software that can be used for testing MapInfo implementation.

You can download detailed information about the conversion and grid shift files from the Intergovernmental Committee on Surveying and Mapping (ICSM) web site:

<http://www.icsm.gov.au/australian-datums-and-how-move-between-them>

To use the AGD 1984 to GDA94 conversion instead of the AGD 1966 to GDA94 grid shift file for all of Australia:

- Remove or rename the A66_National.gsb file in your MapInfo Pro program directory

New Zealand

New Zealand grid shift files convert from coordinates in the NZGD49 datum to the NZGD2000 datum. The grid shift file is:

- nzgd2kgrid0005.gsb

You can find detailed information and an online converter on the Land Information New Zealand web site:

<http://www.linz.govt.nz/geodetic/>

To ignore the grid shift file for all of New Zealand:

- Remove or rename the nzgd2kgrid0005.gsb file in your MapInfo Pro program directory

Germany

The grid shift file for Germany is:

- BETA2007.gsb

This file is used for converting from the DHDN datum to the ETRS89 datum. You can find detailed information and an online converter at the Bundesamt für Kartographie und Geodäsie web site:

http://crs.bkg.bund.de/crseu/crs/dscrtrans/BeTA/de_dhdn2etrs_beta.php

To ignore the grid shift file for all of Germany:

- Remove or rename the BETA2007.gsb file in your MapInfo Pro program directory

Note: The NTV2 algorithm and grid shift files for Canada are protected under the following copyright: © 1995 Her Majesty the Queen in Right of Canada, represented by the Minister of Natural Resources.

7 - Managing the Look of Your Map

This section explains how to change and manage the look of your map to adjust and customize information for your needs.

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Mini Toolbar for Map Window

You can use the Mini Toolbar on the Map window for quick access to often used actions. Tasks like Select, Pan, Zoom In / Zoom Out, Alignment and many more are directly available on the Map window when you right-click inside (above or below the context menu depending on where you click in the window).

The mini toolbar name is visible in the **Status Bar** when a map window is active. It will either be **default** or the name of a customized mini-toolbar, whichever is active. For customizing a map mini toolbar, see [Customize Mini Toolbar for Map Window](#)

In addition, you can switch between your map mini toolbars by pressing the **Space** key. It will switch to the next mini toolbar and change the name on the **Status Bar** to reflect that. If you click on the mini toolbar name text or the arrow next to it, a menu of the available map mini toolbars is shown with the current one highlighted. You can make one of the mini toolbars current by clicking on its name.

Available options are:

Command	Description
Select	<p>Radius Selection: Selects all objects that fall within a given radius.</p> <p>Marquee Selection: Selects objects within a rectangle.</p> <p>Polygon Selection: Selects map objects within a polygon.</p> <p>Boundry Selection: Selects objects that fall within a given region or boundary.</p> <p>Clear: To unselect the currently selected objects in a map.</p>
Pan	Repositions a Map within its window. Active when a Map window is active.
Zoon In / Zoom Out	Zoom In Provides a closer area view of a Map window. To display a wider area view of the current Map window, choose Zoom Out .
Info	To display the Object Attribute dialog box for a selected object (editable or read only) in a Map window instead of double clicking on the object. Use this dialog box to specify geographic attributes for an object.
Ruler	To display the distance between two map points.
Add Labels	To add a custom label to the map at the cursor location.

Command	Description
Label Styles	These commands control how label text looks on a map. These commands set label font, size, color, and effects. These effects may be applied to a single label selected on the map, or to all of the labels for selected layers.

Customize Mini Toolbar for Map Window

The Map window Mini Toolbar can be customized to suit your needs and work style. Commands can be added to and removed from the toolbars.

To customize a toolbar:

1. Right-click on the ribbon and choose **Customize Quick Access Toolbar** to open the **Customize Ribbon** dialog box.

This dialog is also available from the **Customize Quick Access Toolbar** menu, in the upper left corner of the desktop, by choosing **More Commands**.

2. Highlight **Map Toolbar** in the left pane to access the customizable settings.
3. In the left pane, highlight a command and click the **Add** button.
4. To remove a command from a custom tab or group, click the **Remove** button.
5. To organize the commands within a tab or group, use as the Up and Down arrows. You can also reorder any of the tabs, including the standard ones.
6. Click **OK** to save your changes.

You can also create toolbar customizations for added ease of use. This would allow you to have a different selection of commands on the toolbar for every customization.

To create a new customization:

1. Customize a toolbar as per your requirement.
2. Enter a Name in the **Customization Name** text box.
3. Click on the "+" icon above the **Customization Name** text box to add and save the customization.
4. Use the Save and Delete icons to save updates to or delete a customization.

Changing a Map's Style

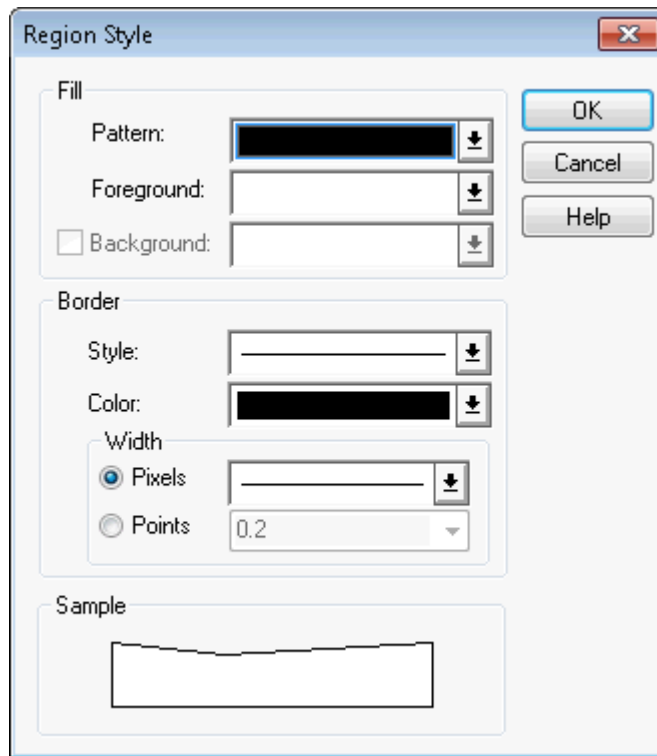
Changing the look of the map is an important part of making it more effective. In this section, we review how to change the way your map looks one piece at a time. For a more comprehensive change in your map's appearance, see [Creating Thematic Maps](#).

Changing a Region's Style

To change the style of a region:

1. Do one of the following:
 - To change the style of one region, right-click on the region and choose **Make Selection Editable**. On the **STYLE** tab, toggle the **Apply Style** command on, and choose **Region Style** from the **Style** group.
 - To change the style of all regions in the same layer, first make the layer editable in the **Layers** or **Explorer** windows. Double-click the layer to open the **Layer Properties** dialog box. On the **Layer Display** tab click the **Style Override** swatch.

Using either method the **Region Style** dialog box displays.



*This dialog box includes a Preview button when launched from the **Region Style** command on the **STYLE** tab.*

2. Make the region changes you want to see in your map window in this dialog box and click **OK** to save them.
 - **Fill** - These are the fill options you have in the **Region Style** dialog box.
 - **Pattern** - Choose a palette for patterns. If you do not want to use a pattern, choose the letter **N**, for none; the foreground and background color are disabled. If you choose the solid black pattern, the background color is disabled.
 - **Color** - Choose a color for the object(s)' foreground. The Sample box displays the pattern using the foreground color you chose. The foreground color is applied to the part of the pattern that displays as black. Therefore, to make the object a solid color, choose the solid black pattern in the Fill Pattern palette and a color from the Foreground Color palette. The color you chose displays in the Sample box as a solid-colored region.
 - **Background Color** - Select the check box to display a background color; clear for a "transparent" background. Choose a color for the object's background. The background color is applied to the part of the pattern that displays as white. Background color is grayed if you chose the solid pattern.
 - **Border** - These are the border options you have in the **Region Style** dialog box.
 - **Style** - Choose the border line style.
 - **Color** - Choose the border line color.
 - **Width** - Choose the border line width. In the **Pixels** field, enter a number from 1-7, each number represents a line width in pixels. In the **Points** field, select or enter a point size.

- **Sample** - Displays the sample of the pattern and color selections you have made.

Creating Custom Colors

The **Define Custom Colors** dialog box gives you access to a palette containing a range of colors that you can customize. You can then save the customized color, which automatically replaces the original color on the palette.

Note: You might want to record the color settings for the original color before making changes. Once your customized color is saved, you cannot automatically return to the original color.

The color palette containing your customized color is accessible from the Style dialog boxes for line, region, symbol, and text objects.

To create custom colors:

1. On the **PRO** tab, click **Options**, and **Custom Colors** to open the **Define Custom Colors** dialog box.
2. Click the desired color to select it.
3. Click the **Define** button to display the **Pick Color** dialog box.

The box at the top of the dialog box displays the color you selected. This color will change accordingly as the color settings are changed. You can change the settings for **Hue**, **Sat**, and **Val**. You can also vary the amount of red, green, and blue in your customized color.

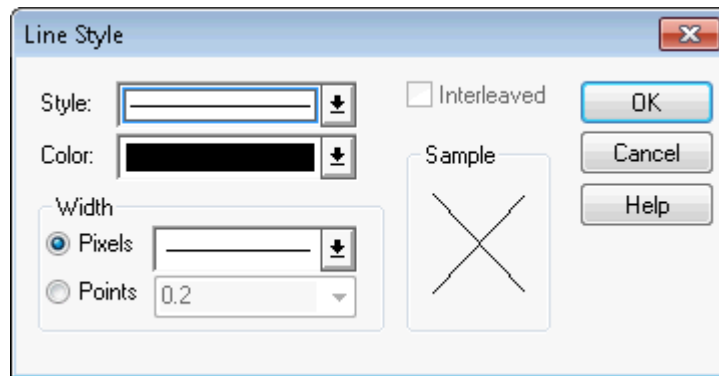
4. Click on the arrows to change settings one increment at a time or type the desired setting.
5. Click **OK** when you have the color you want.
6. Click the **OK** to save the new color for future work sessions.

The new color automatically appears on the palette in place of the original color.

Changing a Line's Style

To change the style of a line:

1. Do one of the following to display the **Line Style** dialog box:
 - To change the style of one line, right-click on the region and choose **Make Selection Editable**. From the **STYLE** tab, toggle the **Apply Style** command on and choose **Line Style** from the **Style** group.
 - To change the style of all lines in the same layer, first make the layer editable in the **Layers** or **Explorer** windows. Double-click the layer to open the **Layer Properties** dialog box. On the **Layer Display** tab click the **Style Override** swatch.



This dialog box includes a Preview button when launched from the **Line Style** command on the **STYLE** tab.

2. Make the line style changes you want to see in your map window in this dialog box and click **OK** to save them.

- **Style** - Select the new line style from the drop-down list.
- **Color** - Choose a color for the line from this drop-down list. The **Sample** box displays the pattern using the color and line style you select.
- **Width (in Pixels and Points)** - Choose the line width from one of these drop-down lists. In the Pixels field, select a width of the line in pixels. In the Points field, select a point size from the drop-down list, or enter a point size.
- **Interleaved** - If you select a line style that uses multiple passes to create it, MapInfo Pro enables the **Interleaved** check box. Keep in mind these notes:

The Interleaved option is not enabled for solid lines

The Interleaved option is not activated for borders

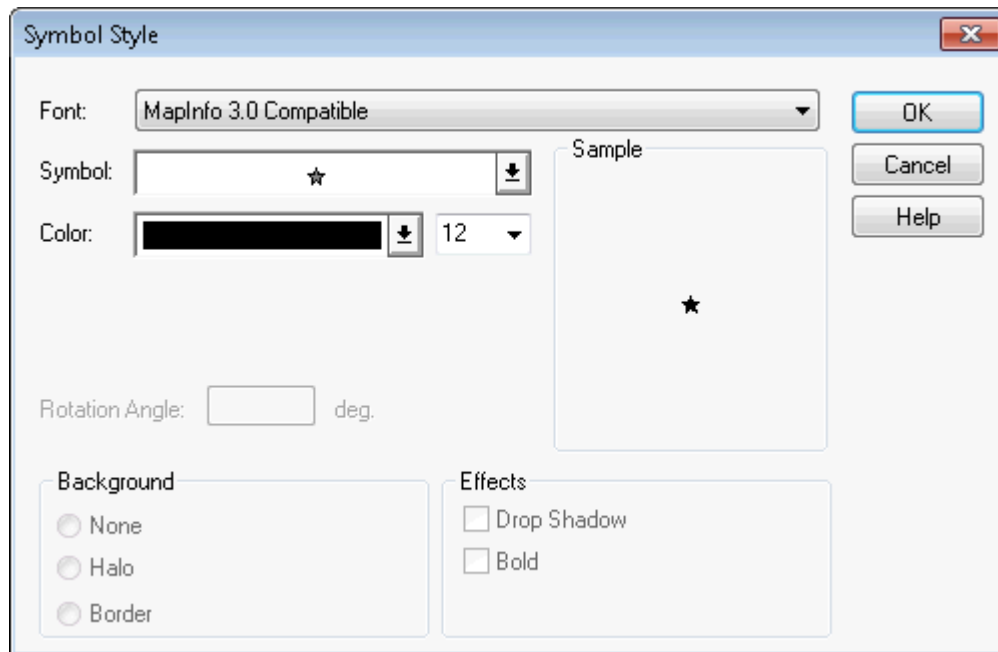
The Interleaved option is not appropriate for all multiple pass lines

Changing a Symbol's Style

To change the style of a symbol:

1. Do one of the following:
 - To change the style of one symbol, right-click on the symbol and choose **Make Selection Editable**. From the **STYLE** tab, toggle the **Apply Style** command on and choose **Symbol Style** from the **Style** group.
 - To change the style of all symbols in the same layer, first make the layer editable in the **Layers** or **Explorer** windows. Double-click the layer to open the **Layer Properties** dialog box. On the **Layer Display** tab click the **Style Override** swatch.

Using either method the **Symbol Style** dialog box displays.



*This dialog box includes a **Preview** button when launched the from the **Symbol Style** command on the **STYLE** tab..*

Note: The options in this dialog box may be different based on the symbol(s) you selected.

2. Complete your selections and entries in this dialog box and click **OK**.
 - **Font** - Choose a font from the drop-down list. In addition to the symbol sets, the list displays any fonts installed on Windows. The Custom Symbols category lists those bitmaps you have created and saved to the CUSTSYMB directory.
 - **Size** - Choose a size or type a different point size. The maximum size is 240 points.
 - **Symbol** - Choose a symbol type from the symbol palette.
 - **Color** - Choose a color from this list for the symbol.
 - **Reload** - Click this button when you have added your own custom symbols to update the list. If you restarted MapInfo Pro since adding the new custom symbols you do not need to select the **Reload** button.
 - **Full View** - Click this button to display large images in a separate window.
 - **Rotation Angle** - Specify number of degrees the symbol should be rotated; 0-360.
 - **Background** - In this box, you can specify a background. Select one of these:
 - None:** Click this option to display no background.
 - Halo:** Click this option to display the symbol with a white border outline.
 - Border:** Click this option to display the symbol with a black border outline.

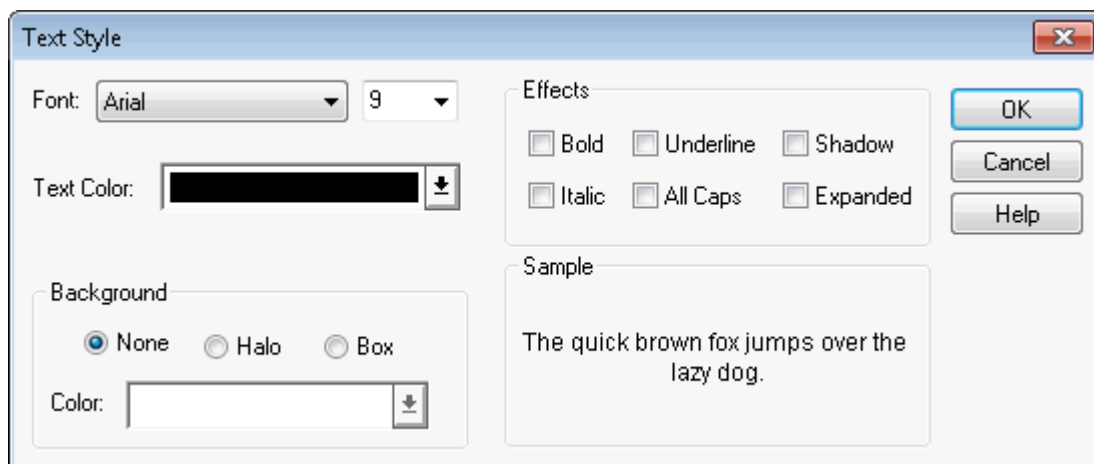
- **Effects** - In this box, you can specify special effects for the symbol. Not all of these options display all the time. You can select one or more of these:
 - Bold**: Click this check box to draw the symbol in boldface.
 - Drop Shadow**: Click this check box to draw a drop shadow under the symbol.
 - Show Background**: Click this check box to display the custom bitmap symbol with the background with which it was created.
 - Apply Color**: Click this check box to replace all non-white bitmap pixels with the color you select from the Color palette.
 - Display at Actual Size**: Click this check box to display the image at the actual size.
- **Sample** - When you select a symbol style, it displays in this box to show you a sample of the symbol using the designated selections.

Changing the Text Style

To change the style of text:

1. Do one of the following:
 - To change the style of one text entry, right-click on the text and choose **Make Selection Editable**. From the **STYLE** tab, toggle the **Apply Style** command on and choose **Text Style** from the **Style** group.
 - To change the style of all text entries in the same layer, first make the layer editable in the **Layers** or **Explorer** windows. Double-click the layer to open the **Layer Properties** dialog box. On the **Layer Display** tab click the **Style Override** swatch.

The **Text Style** dialog box opens.



2. Make your selections and entries in this dialog box and click **OK**.

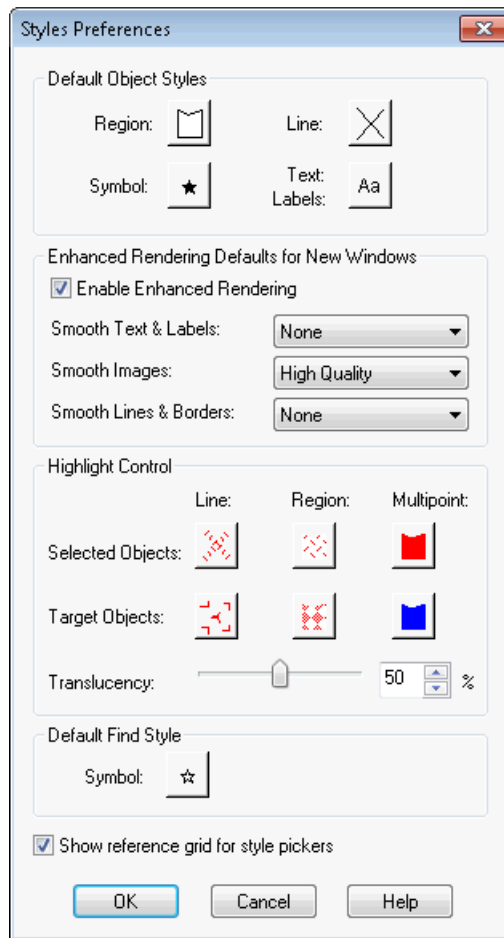
- **Font** - Choose a font from the Font drop-down list.
 - **Size** - Choose a point size from the Point Size drop-down list.
 - **Text Color** - Display the color palette; choose a text color.
 - **Background** - In this box, you can specify background options for the selected text. You can select only one of these options:
 - None** - Set no specific background for the selected text.
 - Halo** - Display the text outlined in a designated color.
 - Box** - Surround the text with a box in a designated color.
 - Color** - Display the color palette; select a color to halo or box the text.
 - **Effects** - In this box, you can specify special effects for the selected text. Not all of these options display all the time. You can select one or more of these:
 - Bold** - Select this check box to display text in boldface.
 - Italic** - Select this check box to display text in italic.
 - Underline** - Select this check box to display text underlined.
 - All Caps** - Select this check box to display text in all upper case letters.
 - Shadow** - Select this check box to display a grey "drop" shadow under the text.
 - Expanded** - Select this check box to insert double spaces between each letter in the text.
 - **Sample** - The results of the options you choose show in this box.
3. Click **Preview** to display your settings on the map, and then click **OK** to apply them.

Setting Your Style Preferences

The Style preferences allow you to preset the look of your objects regions, text, and lines.

To set the default style preferences:

1. On the **PRO** tab, click **Options**, and **Styles** to open the **Styles Preferences** dialog box.



When you set the text styles you are also setting the label styles.

2. Set your preferences style preferences for:

- Default Object Styles

Click the **Region**, **Symbol**, **Line**, and **Text Labels** buttons to set these style options. These selections will serve to create the default settings for these style elements.

- Enhanced Rendering Defaults for New Windows

Click the **Enable Enhanced Rendering** check box to apply anti-aliasing and object translucency options.

Smooth Text & Labels - Use this drop-down list to select Anti-Aliasing to smooth your labels and text.

Smooth Images - Use this drop-down list to select High Quality, Low Quality, or None for smoothing all images.

Smooth Lines & Borders - Use this drop-down list to select Anti-Aliasing to smooth your lines and borders.

- **Highlight Control**

Click this button to specify the Line, Region, and Multipoint styles of selected and target objects, as well as highlighting specifications in the Map window. Additionally, specify the style of selected and target multipoint objects. The default settings are shown in the **Style** boxes of the **Highlight Control** group. Click one of the boxes to display the corresponding style dialog box and change its settings.

Translucency - Use this slider to set the translucency for your objects.

- **Default Find Style**

Symbol - Click this button to set the default symbol style for tasks when selecting **Find** on the **TABLE** and **MAP** tabs. In the **Symbol Style** dialog box, select the new symbol style and click **OK** to save it.

- **Show reference grid for style pickers** - Click this check box to display reference grids on the style picker dialog boxes. This option allows you to refer to a particular style based on the intersection of the column letters and row numbers. Clear this check box to stop the reference grids from displaying.

3. Click **OK** to close the dialog and save your settings.

For more information, see *Inserting Styles into Tables* in the *MapInfo Pro: Getting Started* Guide.

Inserting Styles into Tables

There are two kinds of styles in MapInfo Pro. Global styles are set in the **Style Preferences** dialog box and persist every time you open MapInfo Pro. Session Styles are styles you create during an edit session and only exist for that session. Session styles apply regardless of the table being edited. This feature allows you to define a table-based insert style that can be used to add features to an editable table. The style information is saved as metadata in the table record and so persists beyond the session.

To insert a table-based style:

1. On the **HOME** tab, in the **File** group, click **Open**, and **Table**.
2. In the **Open** dialog box, from the **Preferred View** list, select **New Mapper**, and click **Open**.
3. On the **Explorer** window, on the **Maps** panel, highlight the layer name of the table you just opened and then click the **Editable** icon to make the layer editable.
4. Double-click the layer's **Style Override** swatch to open the style dialog box.

If the layer contains more than one type of object, such as regions and symbols, then it will have more than one **Style Override** swatch in the **Maps** list. Click the **Style Override** swatch for the type of object you want to customize.

5. Click **OK** to save your style settings to the table.

To see this "persistent" quality of the insert style command, save the **Map** window and close MapInfo Pro. Then start MapInfo Pro again and display the map again.

Labeling Your Map

About Labeling

The labeling features in MapInfo Pro make it easy for you to display, edit, and save labels. You can specify whether to display labels automatically when you display the map or display the map without labels. You can edit automatic labels, use the customizing options to make your labels unique, and create individual labels with the Label command. Haloing and positioning options enable you to get the precise look you want for your labels.

Label options are available from the **Layer Properties** dialog box when you double-click on a layer. A **Labels** tab is available on the ribbon when you highlight a layer in the **Layers** window. While both access points give you control over the labeling, the Labels tab on the ribbon provides quicker access and a few additional capabilities. See [LABELS Tab](#).

Understanding the design of the label feature in MapInfo Pro is important for understanding how to create and manipulate labels on your map. Most important among the design elements are the following:

- Labels are attributes of geographic objects in the map layer. The text is based on data associated with that object.
- Labels are always selectable and editable.
- Edited labels are saved to a workspace.

A label is a short description of one geographic object from a map layer, so a street label states the name of that street for example. The label's text comes from the same table that the layer is based on.

A label is located at or near its geographic object. You can choose a preset position in the **Layer Properties** dialog box to place point labels, such as on top of or to the right of points.


As attributes, labels are *dynamically* connected to their map objects. If the layer is closed or is made invisible, the labels no longer display. If the data or geographic information changes, the labels change. If you create an expression for your labels and change the expression, the current labels are dynamically replaced with new ones.

Labels are always selectable and editable, so you do not have to make the map layer editable or selectable to work with them. And, since labels are not Cosmetic objects, you do not have to remember to make the Cosmetic layer selectable or editable to label your map. They are already part of the map layer.


Saving labels is easy. Because labels are attributes of the map object, you do not have to remember to save them to a separate table. Any label edits you have pending, or changes you have made to

the Layer Properties settings, are easily saved to a workspace. Because labels are saved in a workspace, you can always create and edit whatever custom label settings you want, and you can always save those labels—even if the tables you are using are read-only.

You can label your map automatically through the **Layer Properties** dialog box which is accessible from the **Explorer** window by double-clicking on a layer name in the **Maps** list. You can customize how labels display from this dialog or customize them directly on the map.

- To see labels displayed for your entire map layer, click the **Automatic Labels**  icon beside the layer name. The display of custom (edited) labels is not affected by the **Automatic Labels** command.
- To make a change that applies to all the automatic labels in your layer, double-click the layer name in the **Explorer** window and make your changes in the **Layer Properties** dialog box. All automatic labels are updated to use the settings that you choose: for example, if you change the label font so that it is Italic, all automatic labels for that layer refresh to use Italic.
- To customize a single label, double-click that label on the map. For example, you might want most of your labels to draw in 9-point Arial, but you might want one particular label to display in 18-point text to show the importance of that geographic feature. Double-click the label that you want to customize on the map, and in the **Label Style** dialog box customize the label.
- When you edit a label, the label becomes less dynamic. For example, if you double-click a label to change its font, then that label has its own font setting. If you then assign a different label font to your layer, the new label font will not apply to the label that you edited, because the edited label remembers that it has a custom font. You can reset all edited labels on the **MAP** tab, in the **Label** group, by clicking **Clear Custom**.
- As an alternative to turning on automatic labels, you can label geographic features by hand one at a time on the **MAP** tab, in the **Label** group, by clicking **Label Tool** and then clicking the geographic feature that you want to label.

Note: The **Label Tool** only draws labels if the layer that you are clicking on is marked **Selectable** in the **Explorer** window.

To control whether you can select labels when you click on the map, click **Selectable Labels**  in the **Layers** window. By default, labels are selectable. You might make labels unselectable if you find that you are accidentally selecting labels on the map when you were trying to select points or lines. This is a per map setting, so each Map window has its own setting. Each map's Selectable Labels setting is preserved when you save a workspace.


For an overview of the **LABELS** tab on the MapInfo Pro ribbon, see [Enable Preview Command](#).

About Customizing Layer Properties

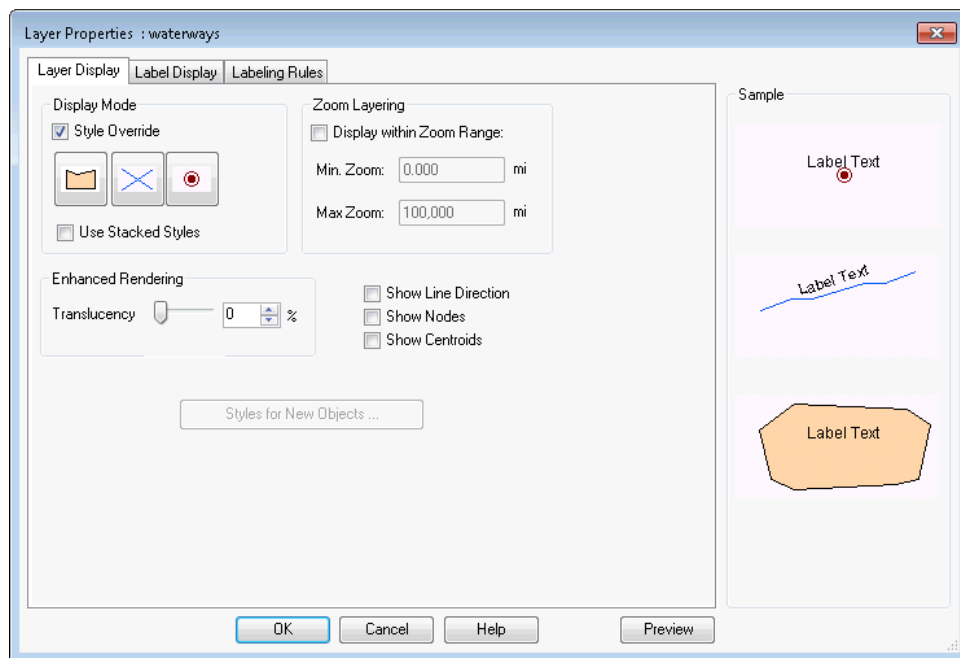
You can customize display properties for a layer by double-clicking on a layer name in the **Layers** window. This opens the **Layer Properties** dialog box where you can set properties for how to display the layer and its labels.

For an alternative to using the Layer Properties dialog, you can access label options from the Labels tab on the ribbon. See [LABELS Tab](#).

You can customize properties for multiple layers at the same time by selecting the layers (press **Ctrl** while clicking on layer names) and then either right-clicking and selecting **Layer Properties** from the pop-up menu or by clicking on the Labels tab on the ribbon.

You can easily turn automatic labels on or off by clicking the **Automatic Labels**  icon on the **Layers** window. Even after you have turned off automatic labels for a layer, the layer may still have some labels if any of that layer's labels have been edited. To turn off all labels for your layer, including edited labels, click the **Off** radio button in the **Labeling Rules** tab of the **Layer Properties** dialog box.

When a check box is filled in (not blank and without a check mark) it means that there are different properties set for that option among the layers you have selected. Selecting the check box applies it to all of the layers in your selection.



Label Display tab

Options on the Label Display tab include:

- **Label with** - Choose the column that you want reflected in the label. You can only set a Label with expression on a single layer. After selecting multiple layers in the Layer list, the Label with list disables and shows a message that says Mixed.
- **Expression** - Click to open the **Expression** dialog box and create an expression query of your data.
- **Allow abbreviated labels** - Select this check box to use an alternate abbreviation field expression for labels that cannot be drawn, because they overlap other labels or do not fit within a region.

From this drop-down list, select the table field (column) that contains the abbreviations. Abbreviations must be shorter than the labels selected for **Label with**, otherwise they will not be drawn.





- **Font** - Click this button to display the **Text Style** dialog box, to set all properties of the labeling font.
- **Size** - Sets the font size of the labeling font.
- **Color** - Sets the foreground color of the labeling font.
- **Translucency** - Use this slider bar to indicate the translucency of the selected object of the labels. Translucency can be set between 0 to 100%. A 0% translucency is completely opaque (or cannot be seen through). A 100% translucency is completely transparent (or completely invisible).
- **Label Lines** - Select a line type, or no line type, to attach the label to the anchor point.
 - **None** - Do not display a line with the label.
 - **Simple** - Create a callout by using a simple line that connects the label to the anchor point. Label lines display after you move the label from where it was originally created.
 - **Arrow** - Create a callout by using an arrow and line that connects the label to anchor point. Label lines display after you move the label from where it was originally created.






Labeling Rules tab

Options on the Labeling Rules tab include:

- **Label Position buttons** - Use the label position (Anchor Point) buttons and the label offset to specify the label's placement. The anchor point is the label's position relative to the map object.

Click one of the buttons to select an anchor point. The default anchor point varies with the type of map object you are labeling: Regions default to Center, Lines default to Above Center, and Points default to Right.

Anchor Point Button	Position	Description
	Upper Left	Places the label above and to the left of the anchor point.
	Upper Center	Centers the label directly above the anchor point.
	Upper Right	Places the label above and to the right of the anchor point.
	Left	Places the label directly to the left of the anchor point.

Anchor Point Button	Position	Description
	Center	Centers the label at the anchor point.
	Right	Places the label directly to the right of the anchor point.
	Lower Left	Places the label below and to the left of the anchor point.
	Lower Center	Centers the label directly below the anchor point.
	Lower Right	Places the label below and to the right of the anchor point.

The anchor point is an ongoing attribute of the label. For example, if you anchor a point object's label at Center Left and you increase the label's font size, the text will grow to the left. This way, the text can never overwrite the point.

- **Label offset** - Designate number of points (a measurement of text size) label should be placed from the anchor point.

Note: The label's anchor point and offset move a label with respect to its current location and the current zoom. Whenever you want to make minor adjustments to the label's position, you should use these two options.

Lines: These options display when the layer has line objects.

- **Horizontal** - Select to display all labels horizontally.
- **Rotated** - Select to run the label text parallel to the line segment. Using this option, a horizontal polyline would display parallel horizontal labels and a vertical polyline would display vertical street labels.
- **Curved** - Select to display the label along the curve of the polyline or arc segment.
- **Auto position along line** - Select to find the most suitable location along a polyline, because a polyline bends too sharply at the location where the label is to be placed. MapInfo Pro draws the label at one of the best three positions that it finds.
- **Allow rotated as fallback** - Select to have curved labels that cannot be drawn fall back to being normal labels that are rotated.

- **Overhang** - Use this slider bar to indicate the amount a label may extend beyond the end of a line (such as a street) The default amount is 40%.

Regions: These options display when the layer has region objects.

- **Label at centroid** - Place labels relative to region centroids (center points).
- **Auto position label within region** - If you select this, MapInfo Pro ignores the **Label Position** setting for region labels and instead calculates each region's ideal label position based on the shape of that region. The **Label Position** setting still affects point or line labels in the same layer, and MapInfo Pro places these labels around their centroid.
- **Allow font reduction for better fit** - Lets you specify a percent as the limit to which label font sizes will reduce to make labels fit within region boundaries. Labels will not reduce past this value. You can use the slider or select the value from the drop-down list. The default value is 50%.
- **Maximum # of font sizes** - Limits the number of font sizes to use when resizing labels for a region layer. The default value is four (4).
- **Confine labels to region boundary** - Select to display only the labels that fit within their region boundaries.
- **Place outside if necessary (callout)** - Select to display labels that do not fit within their region boundaries by positioning them outside of their region with a callout (a line connecting the label to its region). This option is only available after selecting the **Confine labels to region boundary** check box.

Label Fit and Density:

- **Discard Label** - Select to remove labels that overlap each other.
- **Try other positions** - Select to avoid overlapping labels and display more label options. When labels would overlap, MapInfo Pro tries to place conflicting labels in other positions around the object the label is describing.
- **Allow overlapping text** - Select to allow labels to be drawn on top of each other. Some labels do not display because they overlap labels that have been given higher priority on the map.
- **Allow duplicate text** - Check to allow duplicate labels for different objects to display, for example, Portland, OR and Portland, ME. This option is also used with street maps to label street segments individually.
- **Label partial objects** - Check to label polylines and objects whose centroids are not visible in the Map window. This feature only applies to autotags. Also, when you customize a label, the location of the label will not change.

Label Visibility:

- Visibility **On** - Check to allow display of labels.
- Visibility **Off** - Check to suppress all labels for this layer including custom and/or edited labels.
- **Within zoom range** - Select to display labels within a specified zoom range, much the same way that you display map layers within a certain zoom range. When labeling a dense table of streets such as a StreetPro Display layer, only a few of the streets will be labeled when the map is zoomed out.
- When a layer is outside of its zoom range, the layer name is dimmed and there is an asterisk (*) beside the Visible On/Off check box. If the zoom range is set to **Within zoom range** and the map's

zoom level is out of the label's min/max zoom range, then the Automatic Labels do not display in the map.

- **Min Zoom** - Specify the minimum distance at which this layer's labels are visible.
- **Max Zoom** - Specify the maximum distance at which this layer's labels are visible.

Two Ways to Preview Your Changes

The Sample box in the **Layer Properties** dialog box, on the right side, shows you how various options affect the appearance of the layer and its labels. Note that in some cases, the images shown in the Sample box might not provide a good representation of how your finished map will look, especially if this layer has themes.

To see a more complete, more accurate preview of how your map would look with the selected options, click the **Preview** button at the bottom of the **Layer Properties** dialog box to redraw the Map window. After clicking **Preview**, if you do not want to keep the changes you made to the layer, click **Cancel** to revert the changes.

Choosing the Label Content

When you label your map automatically, or interactively using the Label tool, the content of the labels is determined by the data associated with the geographic object. You can obtain the labels from the columns in your table, or the derived result of an expression using the column information. If the column information or an expression does not suit your needs, you can edit the label content or type in new text. See [Labeling Interactively](#) for more information.

Text you create yourself using the **Label Tool** (on the **MAP** tab) is a text object and behaves like other objects you draw on your map such as squares and circles. Although labels and text objects behave somewhat differently, text objects are still useful for additional map annotation such as titles. For information on text objects, see [Working with Text on the Map](#).

Labeling with a Column

The content of labels is controlled in the Label with drop-down list in the **Layer Properties** dialog box. You can label an object with any column from its associated table. For example, you can label the STATES table with the state name, abbreviation, 1990 population, or any other field in the STATES table. Simply choose a column from the list, and the objects in that layer will be labeled with the information contained in that column.

Note: The **Layer Properties** dialog box only lets you set a label with expression on one layer at a time. After selecting multiple layers in the **Layer** list, the **Label with** list **Layer Properties** dialog box disables and shows a message that says **Mixed**.

Labeling with Expressions

You can label objects with an expression. The Expression dialog is accessible from the **Label Display** tab on the **Layer Properties** dialog box and from the **Label Content** group on the **LABELS** tab on the ribbon.

Select **Expression** from the drop-down list in the **Layer Properties** dialog box or from the **Label Using** drop-down list on the **Labels** tab. Create the expression in the **Expression** dialog box. You can type the expression directly or use the drop-down lists to create it. For example, you want to label the countries of Africa with their name and population density on two lines. Your table contains the country names and population figures for each country. To figure the population density, divide population by each country's area. You can let MapInfo Pro calculate the area of each country using the Area function in the **Expression** dialog box. To create the expression, double-click the Africa layer in the **Layers** window and select the **Label Display** tab. Select **Expression** from the **Label with** drop-down list. The **Expression** dialog box displays. Using the drop-down lists, create the following expression:

```
Country + Chr$(13) + POPULATION / Area(Object, "sq mi")
```

The Chr\$(13) function adds a carriage return to the first line. Using the Label tool, click a country. MapInfo Pro labels it with the result of the expression.

Creating Labels using Expressions

You can design your labels with just the right look and information you want for the object. You do this by writing an expression.

To create a label expression:

1. In the **Explorer** window, in the **Maps** list double-click a layer (other than the Cosmetic Layer). Click the **Label Display** tab in the **Layer Properties** dialog box.
2. Click **Expression**. The **Expression** dialog box opens.
3. Type an expression to state what you want the label to include. Use the column, operator, and function lists to assist you.
4. Verify the syntax of the expression with the **Verify** button.
5. Click **OK** to close all of the dialogs and apply your changes.

The label expression applies both to automatic labels (which appear when you click the Label icon next to the layer name in the **Layers** window) and labels that you place by hand, by clicking with the Label tool.

Note: Be sure to save the labels to a workspace before closing the Map window.

Examples of Map Label Expressions

This example produces labels that tell MapInfo Pro to display with the county name in proper form (that is, first letter uppercase and the rest lowercase).

```
Proper$(County)
```

This example produces labels that specify the county name be all capital letters.

```
UCase$(County)
```

This example produces labels that have two columns in it, County and Population.

```
Proper$(County) + Chr$(13) + Population
```

Use the Str\$ function to convert the population value into a character string so that the string concatenation operator () can operate on it. "Chr\$(13)" inserts a carriage return into the string, thus breaking it into two lines. The resulting label looks like this:

Cambria

47,934

This example produces labels that insert a colon into the label.

```
Proper$(County) + ":" + Chr$(13) + Population
```

The resulting label looks like:

Cambria:

47,934

This example produces labels that display the lowest address number and the highest address number, respectively, for street segments in a StreetPro table.

```
Minimum(FromLeft, FromRight)
```

```
Maximum(ToLeft, ToRight)
```

This example produces labels that contain the address range for a street segment. A space, a dash, and a space are inserted between the two numbers.

```
Minimum(FromLeft, FromRight) + " - " + Maximum(ToLeft, ToRight)
```

This example produces a two-line label with the street name on the first line and the address range on the second line.

```
Proper$(Street)+ ":" + Chr$(13) + Minimum(FromLeft, FromRight) + " - "  
+  
Maximum(ToLeft, ToRight)
```

The resulting label looks like this:

Van Antwerp Av:

131 - 154

Saving Labels to a Workspace

Both automatic and interactive labels are saved as part of a workspace.

To save your objects:

1. On the **HOME** tab, in the **File** group, on the **Save Workspace** list, click **Save Workspace As** to open the **Save Workspace** dialog box.

The **Save Workspace** dialog box allows you to save information about the tables and windows used in your current session.

2. Select the drive, folder, and file where you want the workspace saved.
3. Type a name for your workspace.
4. Click **Save**.

Packing a Table with Customized Labels

Note that packing a table that contains customized labels can corrupt the labels. For example, you delete one or more rows from your table and save the table. Then you create a map with customized labels and save the labels to a workspace. You pack the table to purge the deleted rows. Since the Pack command closes the Map window, you'll need to reload the workspace. When you do so, your labels are corrupted.

This problem occurs most often when the deleted rows are located near the top of the Browser. To avoid the problem, pack the table before you create the labels.

Using Auto Labeling

There are two types of labels, automatic labels and labels you place by clicking with the **Label Tool**. Automatic labels are labels that MapInfo Pro generates automatically, without you having to click objects on the map. When you turn on automatic labels for a layer, MapInfo Pro tries to label every object in that map layer. However, depending on your font size, your **Map** window, and your map data, you may find that not all items in the layer label automatically.

There are settings in the **Layer Properties** dialog box that let you set conditions for displaying labels, in what style they will display, and in what position for all the objects in the layer. Settings are also available from the **Labels** tab on the ribbon (visible when a layer is selected in the **Layers** windows).


See Also:


[Changing Label Priority](#)

Controlling Label Display

The **Automatic Labels** attribute in the **Explorer** window is off by default for all map layers.

To activate labels for a layer:

- Select one or more layers in the **Explorer** window and then click the **Automatic Labels**  icon. The map redraws with labels for your layer selections.

Note: The **Automatic Labels** attribute is turned off when the  icon is greyed out.

You can easily turn the display of automatic labels on or off in the **Explorer** window by clicking **Automatic Labels**. Any settings you have specified in the **Layer Properties** dialog box on the Label Display tab are deactivated. You can also click **Off** in the Visibility group on the Labeling Rules tab. Either way, when you go back to your map, the labels no longer display. These settings also apply to labels you have edited.

Making Changes to Layer Labels

To make changes to the labels of a selected layer:

1. Double-click a layer in the **Explorer** window. The **Layer Properties** dialog box opens. The Labels tab is visible on the ribbon.
2. From the **Layer Properties** dialog box, click the **Label Display** and **Labeling Rules** tabs to select the appropriate options for your new labels, or
3. Choose a command from the **LABELS** tab on the ribbon.

For a description of the options available, see [About Customizing Layer Properties](#).

4. Click **OK** to save your changes.

Changing Label Priority

If the map contains auto-labels for two or more layers, you may find that some features on the map do not have labels when overlaps are turned off. This is because the labels from the different layers are competing for limited space within the map, so a city might not be labeled because a road label is in the way for example. You can specify that a layer have a high priority when displaying its labels, by moving the layer name to the top of this list.

To change label priority for layers:

1. In the **Explorer** window, right-click on the name of a map and choose **Priority**.
2. In the **Adjust Labeling Priorities** dialog box, select and drag a layer name to a new position in the list, or use the up and down arrows to reorganize one or more layers.

To select multiple layers, press the **Shift** or **Ctrl** key while selecting layers

Layer names in grey do not have **Automatic Labels** turned on in the **Explorer** window. You can order their priority, but their labels do not display on the map until these layers have **Automatic Labels** turned on.

3. Click **OK**.

The map refreshes using the label priority you have set.

If you do not use the **Adjust Labeling Priorities** dialog box, then the layer order controls the label priorities; a layer lower in the **Explorer** window has a higher labeling priority. However, customizing label priority overrides the layer order in the **Explorer** window. After customizing layer priority, changing the order of layers in the **Explorer** window has no effect on label priority until you restore the default label priority.

Labels display following the order of records in the table. To change the order of priority for displaying labels, save a copy of the table, sorted in order of priority with the most important record first and use that table for labeling instead of the original. In a table sorted alphabetically by street (like the StreetPro Display layer) this often means that streets with names beginning with A, B, or C are almost the only labeled streets on your map. Labeling effectively gives a small side street like "Aberdeen Street" priority over "State Highway 177" or other major roads that might actually be useful in navigating or orienting a map. This will be true for any dense, StreetPro Display layer.

Restoring the Default Label Priority

By default, the bottom-most layers in your map have the highest labeling priority, because they draw first and are labeled first.

To restore the default order:

1. In the **Explorer** window, right-click on the name of a map and choose **Priority**.
2. In the **Adjust Labeling Priorities** dialog box, click **Default Order**.
3. Click **OK**.

The map refreshes using the default label priority order.

Generate More Labels Automatically by Using Fallbacks

When a polyline is very jagged (not smooth or gently curved) it is difficult to place characters along it to create a curved label. You can set an **Allow rotated as fallback** option that creates a straight label when a curved label cannot be created. It rotates the straight label to match a segment near to where the curved label would have been placed. MapInfo Pro does not prevent a rotated label from crossing a polyline. Setting this option displays more labels on your map.

To allow rotated labels as the fallback for curved labels for a layer:

1. Double-click the layer name in the **Explorer** window.
2. In the **Layer Properties** dialog box, select the **Labeling Rules** tab.
3. Select **Curved** as the orientation.
4. Select the **Allow rotated as fallback** check box. (This option is only available for layers with lines.)

This option is set on a per layer basis. By default, this option is set to off (the check box is not selected).

When MapInfo Pro cannot draw a curved label, and draws a rotated label instead (as a fallback), the overhang percent is ignored.

Custom-located curved labels, that are created using the **Label Tool** (on the **MAP** tab) or dragged to a new location, always use the fallback option even if you did not select the **Allow rotated as fallback** check box for the layer. If a curved label cannot be drawn at the custom location, then a rotated label is drawn instead. The label position property set for the layer applies to how the text is placed relative to the new anchor point (the location where you click on the map).

Changing the map zoom could make a label alternate between curved and rotated as the line segments becomes less curved and more jagged looking as you zoom out on a map. As you zoom out, the label uses the rotation angle of the longest segment under the original curved text. If **Allow rotated as fallback** is off, then no label displays.

Dragging to Reposition Labels

You can select and drag a label to move it, but this is not recommended because you are actually moving the label location on the map. If you drag a label a few pixels, the distance you move it is in the current map units, regardless of the zoom. For example, if you are displaying a map of the United States and drag New York state's label a few pixels, at that zoom, the label looks fine. However, if the Map Units distance is in miles and you zoom in on New York state, the label will display much farther away than at the previous zoom.

You can drag curved labels to reposition them along a line segment. For details, see [Using Curved Labels](#).


Using Curved Labels

You can improve the look of your arc and polyline labels by making these labels follow the curve of the line. Curved labels can display for any arc/polyline feature, such as streets, railroads, ferry lines, and rivers. This functionality is supported in the **Map** window and persists when you move the map to a layout, however you cannot create curved labels in a **Layout** window.

Setting the Curved Label Option

The curved label option gives you more control over the way your labels display.

To display labels along a curve:

1. Open the map containing a line layer with labels you want to change.
2. In the **Explorer** window, ensure that the **Automatic Labels**  icon is active for the layer you want to label.
3. Double-click the layer name in the **Explorer** window to open the **Layer Properties** dialog box.
4. On the **Labeling Rules** tab, click label visibility **On**.
5. Click **Curved** to display the layer's labels along the curve of the line. These labels are anti-aliased automatically to improve the display.

If you use **Label Position** to set the label's position, when you select:

- **Left**, the curved labels are left-justified starting at the beginning of the arc/polyline
- **Center**, the curved labels are centered on the midpoint of the arc/polyline
- **Right**, the curved labels are right-justified at the end of the arc/polyline

The length of the polyline effect how the label is positioned. The longer the polyline, the more predictably the label displays.

6. Click **OK** to save this option.

The map redraws with the change.

Understanding your Data and Curved Labels

When you select curved auto-labeling, MapInfo Pro attempts to create a curved label for every arc/polyline record in a map, just as it does for non-curved labels.

For example, in street maps, the street can be made of several polylines or one long polyline. The length and number of the polylines, the rules that govern whether a curved label can be created, and the labeling options you choose, all affect which curved labels are created and where they display.

Some polyline and arc segments in your layer data may not contain label name entries. When this occurs, MapInfo Pro cannot display labels for that segment.

What to Expect from Curved Labels

This feature is made up of complex algorithms that are designed to enhance the display of your polyline/arc features. There are several rules which determine whether MapInfo Pro can display a curved label.

- MapInfo Pro can only draw curved labels using TrueType fonts. If you select a non-TrueType font, MapInfo Pro substitutes a comparable TrueType font, so, the label you chose may display differently than you expect. Also, if you change a horizontal label using a non-TrueType to a curved label, the new label may display differently due to the font substitution.
- The overhang percent (on the Labeling Rules tab) dictates how much of the curved label must fit along the line. For example, if the overhang is set to 30%, then at least 70% of the length of the curved label must fit along the line. Otherwise, the label does not display.
- MapInfo Pro cannot draw curved labels for polylines that are very jagged, however, it depends on the curvature of the line.
- Labels that curve onto themselves are thrown away and do not display.
- Curved labels follow the same rules for overlap detection, duplicate text, and partial segment labeling as non-curved labels. Each of these rules effect how and when MapInfo Pro displays the labels
- You can create curved labels with the Label tool at any point along a polyline (arc).
- You can reposition the curved auto labels with the Label tool or by selecting and dragging to a new location along the same polyline (arc) object.
- Curved and non-curved labels persist for layers in the workspace.
- The Labeler utility does not support curved labels, so you cannot transfer curved labels to the Cosmetic layer.
- The curved labels functionality supports double byte and bidirectional text.
- You cannot underline curved labels.
- The Label edit tool positions or repositions curved labels based on the label's anchor position.
- When you use the Label edit tool to change the position of your curved label, your mouse click determines the new anchor position.
- When dragging a curved label to a new position along its polyline (arc), the closest point on the polyline (arc) to your mouse location determines the new anchor position. The curved label repositions at its new location based on the layer's Label Position setting.

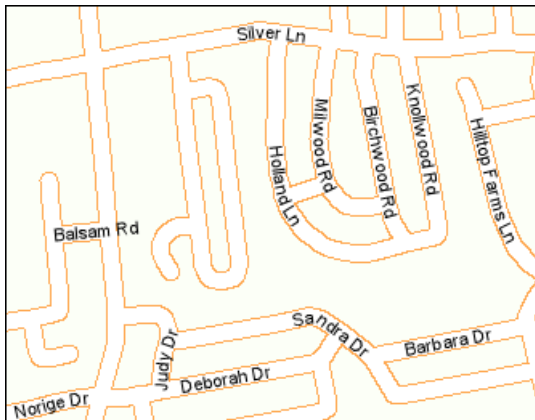
Finding Optimal Positions for Curved Labels

A curved label does not draw when a polyline bends too sharply at the location where the label is to be placed. You can specify that MapInfo Pro find the most suitable location along a polyline when this happens. MapInfo Pro draws the label at one of the best three positions that it finds. If the label cannot be drawn at one of these positions, then it falls back to the normal curved label location and then to a rotated label if **Allow rotated as fallback** is on.

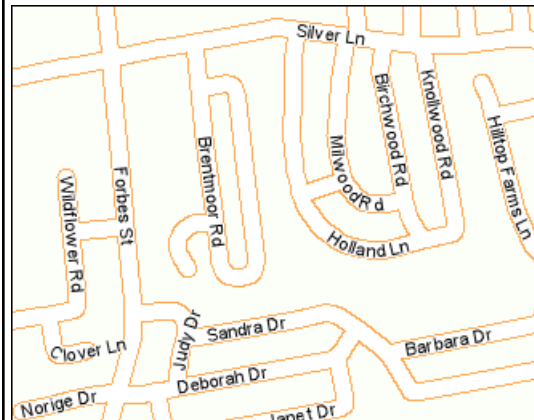
To specify that MapInfo Pro auto position curved labels along a polyline:

1. Double-click the layer name in the **Explorer** window to open the **Layer Properties** dialog box.
2. On the **Labeling Rules** tab, select **Curved** as the orientation.
3. Select the **Auto position along line** check box. Optionally, select the **Allow rotated as fallback** check box.

When MapInfo Pro auto positions a curved label, it gives priority to the most horizontal and to the smoothest sections of the polyline. The following shows a roads layer before and after selecting **Auto position along line**.




Original labels



Auto position along line

Using the Label Tool to Create Curved Labels

The **Label Tool**  (on the **MAP** tab, in the **Label** group) creates a curved label if it can. Otherwise it creates a rotated label. It uses the rotation angle of the segment under the mouse click to rotate the label. The placement of the label relative to the mouse click depends on which of the nine (9) placement positions is set in the **Label Style** dialog box (double-click on the label name to open this dialog).


The **Label Tool** places a label anywhere along the line, even if it hangs off the beginning of the line.

When zooming out on a map curved labels may convert to rotated labels. In some cases you may lose the label if it no longer fits along the line segment. If you want to keep a label when this happens, use the **Label Tool** to reposition the label. It then becomes a custom-located label and always displays on the map.

Dragging to Reposition Curved Labels

You can select a curved label on the map and drag it to a new location. It contours itself to the curve of the line segment at the new location. If the new location is too jagged for a curved label, then the label is rotated to the closest segment at the new location.

To drag a curved label to a new location, on the **MAP** tab, in the **Selection** group, click **Select** from the list. Select the label name on the map and drag it to a new location along the line segment. The line highlights while you drag it, to help you identify the line. The label's final location adjusts according to the position properties (such as position around the anchor point) set for the layer's labels. You can only drag one curved label at a time. If you have selected more than one, then you cannot drag anything.

Note: To see labels for a layer, enable the layer's **Automatic Labels**  icon in the **Explorer** window.

You cannot drag curved labels away from their line. When a curved label is abbreviated and dragged to a new location, its original label expression is not restored.

Curved Label Editing using the Label Edit Tool

The **Select** command positions or repositions curved labels based on the label's anchor position (on the **MAP** tab, in the **Selection** group, click **Select** from the list). Remember that the curvature of the polyline determines whether you can create a curved label successfully. Polylines with sharp angles would not produce good curved labels so we do not allow them.

To reposition a curved label, click on the polyline to select a new anchor position. When you do, the curved label position is set according to the vertical and horizontal aspects of the anchor position. For example, if you set the label's anchor position to Center Left, the curved label you place is centered vertically on the polyline and to the left of the mouse click. When you edit labels this way, they are saved with the workspace.

Auto Position Labels for Better Placement within Region Boundaries

There are new options to auto-position labels within regions. You can select to have MapInfo Pro reduce the font size to fit labels in regions and confine labels to within region boundaries.

By default, region labels are placed at a set position (such as to the right of the centroid). This draws labels across their region boundaries when zooming out on a map. You have the option to specify that each region label's position be calculated based on the shape of the polygon. To do this for a region layer, double-click on the layer name in the **Explorer** window and then select **Auto position label within region** under the **Labeling Rules** tab.

The following shows region labels before and after selecting **Auto position label within region** with **Allow font reduction for better fit** and **Confine labels to region boundary** options. You can see that label font size has been reduced for labels that otherwise would not fit within the boundaries of a region, and only labels that can be confined to within their region boundaries display (labels such as WESTERN SAHARA in the lower left corner of the map do not display). Clearing the **Confine labels to region boundary** check box can produce more region labels, but some of those labels may extend outside their boundary giving the map a cluttered look.



Original labels



Auto position label within region turned on

The **Allow font reduction for better fit** check box lets you specify a percent as the limit to which label font sizes will reduce to make labels fit within region boundaries. Labels will not reduce past this value. You can use the slider or select the value from the drop-down list. The default value is 50%.

The **Maximum # of font sizes** limits the number of font sizes to use when resizing labels for a region layer. The default value is four (4).

The **Confine labels to region boundary** check box prevents labels from extending outside of the region boundary. Selecting this option may produce fewer labels on the map, because the labels that display do not overlap neighboring regions.

If you choose **Auto position label within region**, MapInfo Pro ignores the **Label Position** setting for region labels. The **Label Position** setting still affects point or line labels in the same layer, and MapInfo Pro places these labels around their centroid.

Use Abbreviations when Labels do not Display

You can select to use an alternate abbreviation field expression for labels that cannot be drawn, because they overlap other labels or do not fit within a region. Labels may overlap and not draw when zooming out of a map. Using abbreviations ensures that your points, lines, and regions have

labels as you change the map zoom. You can either reference a column of short text or use a MapBasic expression to clip or shorten a column of label text.

The use of abbreviations gives you more control over how your map is labeled. Some examples would be using two letter codes for the region names within a country, route numbers for road names that cannot be drawn, or symbols for landmark names that cannot be drawn.

Using a Table Column to Create Abbreviations for Labels

You can choose to abbreviate labels when they do not fit on the map using a column of short text in the layer table. You will need to know the column name before you begin.

To use an abbreviation when a label name does not fit:

1. Select the layer name in the **Explorer** window.
2. On the **LABELS** tab, in the **Label Content** group, from the **Abbreviate with** drop-down list, select the column name that contains the abbreviations you want to use.

The map refreshes with this change.

You set this in the **Layer Properties** dialog box:

1. Double-click the layer name in the **Explorer** window to open the **Layer Properties** dialog box.
2. On the **Label Display** tab, select the **Allow abbreviated labels** check box.

This option is also available on the **LABELS** tab in the **Label Content** group by selecting a column from the **Abbreviate with** drop-down list.

3. Select the **Allow abbreviated labels** check box and then select the table field (column) that contains the abbreviations from the drop-down list. Abbreviations must be shorter than the labels selected for **Label with**, otherwise they will not be drawn.
4. Click **OK** to save the changes.

Using an Expression to Create Abbreviations for Labels

You can choose to abbreviate labels with an expression. This is useful if your table does not contain a column containing abbreviated text.

To create an expression for label abbreviations:

1. Double-click the layer name in the **Explorer** window.
2. From the **Label Display** tab in the **Layer Properties** dialog box, select the **Allow abbreviated labels** check box.
3. Alternatively, from the Label Content group on the **LABELS** tab, check the box near the Abbreviate with: drop-down list.
4. Click the **Expression** button on the **Layer Properties** dialog, or click **Expression** from the Abbreviate with drop-down list on the **LABELS** tab. From either location, the **Expression** dialog

box opens. Create an expression with abbreviated text. The following expression uses the first three letters of a label.

```
Left$(columnname, 3)
```

5. Click **OK** to save the changes.

The map refreshes with this change. (Depending on how densely labeled your map is, you might not see any abbreviated labels. Abbreviated labels only appear when there is not enough room to display an ordinary label.)

For more information about creating expressions, see [Labeling with Expressions](#).

Using an Expression to Create Multi Line Labels

You can create an expression to have labels fit within region boundaries by having them display on multiple lines (so that they wrap from one line to the next within a region boundary). To do this, you would follow the instructions under [Labeling with Expressions](#) and add a carriage return to the abbreviation expression.

As an example, you have a layer of capital cities that you want to label on the map, and you want to include the country name in the labels, such as "London, England". Your label expression would look like this:

```
Capital + ", " + Country
```

Where *Capital* and *Country* are columns in the layer table. This displays on the map as:

London, England

Madrid, Spain

Paris, France

However, some labels may be too long to fit within their regions and do not display as a result. To increase the number of region labels, you can specify an abbreviation expression that includes a carriage return in the middle.

```
Capital + ", " + Chr$(10) + Country
```

If the following label does not fit within its country boundary,

London, England

Then it displays as:

London,




England

Creating Callouts

When you are labeling Region objects, the **Layer Properties** dialog box provides you with options for automatically generating callout labels. You can also create callout labels manually, by dragging labels away from their geographic features.

For additional information about using callouts, see [Use Callouts for Labels that do not fit within Region Boundaries](#).

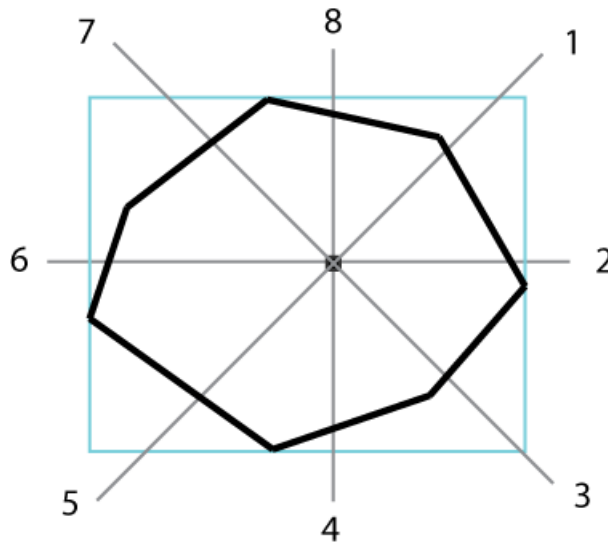
To create callouts:

1. In the **Explorer** window, double-click the layer to open the **Layer Properties** dialog box.
2. On the **Label Display** tab, set the **Label Lines** option to **Simple** (for plain callout lines) or **Arrow** (for callout lines that have an arrowhead at the end). Click on the line style button to open the **Line Style** dialog box if you want to change the look of the line.
3. Click **OK**.
4. Alternatively, choose the **Label Lines** command from the **Labels** tab on the ribbon and choose **Simple** or **Arrow**. Choose **Line Style** from the command list to open the **Line Style** dialog box.
5. Create labels for your map layer. You can either create automatic labels, by clicking the **Automatic Labels**  icon in the layer list, or place labels by hand by selecting the **Label Tool**  from the **MAP** tab and then clicking on objects in your map layer.
6. Click the **Select**  tool.
7. In the **Map** window, select a label and drag it away from its location. A callout line connects the label to the label's original location.

Note: Callout lines cannot be created with curved line labels, because curved line labels automatically snap back into position next to their lines.

Callout Placement

Callouts are placed in any of the following eight positions:



By default, the placement order starts at position one (1) and goes in a clockwise order through to position eight (8). You can change the starting position by modifying the Label Position located in the Label Placement section of the Labeling Rules properties, placement then continues clockwise until a position is found or all positions have been tried.

The center label position is the same as top-right or position one (1).

MapInfo Pro places a callout label for a region outside of the region's bounding box. If a region has a thin and jagged shape, such as a region representing a river, then its callout label might be located at a considerable distance from the region. If the callout line is too long, then drag the label closer to its region.

Use Callouts for Labels that do not fit within Region Boundaries

To add more labels to your map when labels do not fit within region boundaries, you can select to use callouts. This places the labels that do not fit inside their region boundary at a position outside of the boundary. A line is then drawn from the label to the best defined label position within the region boundary.

To use callouts with your region labels:

1. Double-click the layer name in the **Explorer** window.
2. In the **Layer Properties** dialog box, select the **Labeling Rules** tab.
3. Select the **Auto position label within region** check box.
4. Select the **Confine labels to region boundary** check box.
5. Select the **Place Outside if Necessary (callout)** check box.

The map redraws and adds labels with callouts to your map. The following example also has the **Allow font reduction for better fit** option turned on.



Auto position label within region turned on



Place Outside if Necessary turned On

Callouts are not drawn when:

- The callout line intersects with another callout line already drawn on the map.
- The callout line intersects with the region boundary for another label.
- The label intersects with a callout line already drawn on the map.
- The label intersects with a graphical object on the map in the same layer.

Label Styles

The **Text Style** dialog box gives you a number of choices for label and text object styles. You can also change the styles of multiple selected labels at a time.

To make style changes for all the labels, in the **Layer Properties** dialog box on the **Label Display** tab click the **Font** button to display the **Text Style** dialog box.

To change the styles of a selected label or labels, double-click to display the **Label Style** dialog box. Click the **Font** button to display the **Text Style** dialog box. If you change the styles of multiple labels at once, hold down the **Shift** key as you select each label.

Make the style changes you want. When you return to the map, the selected labels display with the style changes you specified. The available styles are explained in the next table.

Option	Description
Bold	Uses bold text to create the label.
Italic	Uses italic text to create the label.

Option	Description
Underline	Places a line underneath the text.
All Caps	TEXT DISPLAYS IN ALL CAPITAL LETTERS.
Shadow	Creates a shadow behind the text. (not shown)
Expanded	A space is placed between each character in the label or text object.

There are also three background options.

- Click **None** to have no background.
- Choose **Halo** to create a halo effect around the text. This puts the text into relief from whatever it covers (for example, part of a region, or a street, etc.).
- Click **Box** to create a background box behind the text.

When you choose either the **Box** or **Halo** backgrounds, the **Color** list is activated. Click it to display a palette of colors for the halo or the background. The color you choose corresponds to the button that is currently activated. The color displays in the box and in the Sample. Click **OK** to accept a color.

To quickly change the size and color of labels for a layer, double-click on the layer name in the **Layers** window. Under the Label Display tab in the **Layer Properties** dialog box, make your selections from the **Size** and **Color** lists.

Labeling Interactively

Although you will probably do most of your labeling automatically, you will need interactive labeling to edit and create individual labels.

It is very easy to edit individual labels, either those you have displayed automatically or those you have created interactively with the **Label Tool**. Using the **Select** command from the **MAP** or **SPATIAL** tab, double-click the label. The **Label Style** dialog box displays. The changes you make in **Label Style** dialog box apply only to the selected label. Changes you want to apply to all the labels must be done through **Label Display** and **Labeling Rules** tabs in the **Layer Properties** dialog box (from the **Layers** window double-click on a layer in the list).

The **Label Style** dialog box allows you to make changes to the text, position, and angle of the labels. You can also make changes to callouts, add, or delete them.


To change the label content, simply type the new label text into the **Text** box. The other controls in this dialog box work the same way as in the **Layer Properties** dialog box.

Moving a selected label is the same as moving other objects; simply drag them with the mouse. If you move a label that has a callout, the line will reappear automatically after you move the label.

You can also rotate the label manually about its anchor point. When you select the label, use the rotation edit handle that appears to the lower right of the label.

Saving Labels

Whenever you manually edit automatic labels (including deleting using the **Cut** command on the **SPATIAL** tab, or press the **Delete** key), change the settings on individual automatic labels, or create labels with the **Label Tool**, you will need to save your map to a workspace to have them display in your next session.

For example, label settings are deactivated by default. Click the **Automatic Labels**  icon in the **Layers** window to display automatic labels on your map and do not save the change when you close the table. The next time you display your map, the labels do not display because the settings go back to the defaults. As with the other **Layers** options, label settings are temporary unless you save a workspace.

Manually edited labels and labels created with the **Label Tool** behave differently. If you close a window or a table and you have label edits pending, MapInfo Pro will specifically prompt you to save the session to a workspace.

This also applies to labels you have deleted using the **Cut** command on the **SPATIAL** tab, or when you press the **Delete** key. You may not have any labels visible on your map, but because deleting a label is an editing operation, MapInfo Pro will ask you if you want to save the edits to a workspace.

- Click **Save** to save your edited labels to a Workspace file.
- Click **Discard** if you do not want to save any edited labels. The window-close or table-close operation will proceed.
- Click **Cancel** if you do not want to proceed with the Close operation. The table or window will not close, and your Map window will keep any edited labels.

For more information, see [Removing Labels](#).

Removing Labels

To replace labels already displaying with new ones, do not delete the old ones first. You will get unexpected results if you do this. For example, if you create labels with an expression and want to change the expression, do not delete the labels first. Simply change the expression in the **Label Display** tab of the **Layer Properties** dialog box. If you delete the labels first, you are deleting the

label for the object, not a piece of text. So, if you create labels with a different expression, they will not display because by deleting the old labels, you have edited the layer so that it does not display labels for these objects. On the **MAP** tab, in the **Label** group, click **Clear Custom** to revert back to the default settings.

Removing All Labels

The easiest way to remove all labels in a layer is to use the Label Visibility controls in the **Layer Properties** dialog box.

Click the **Off** button to turn the display of the labels off. It will disable the display of all the labels in that layer, both automatic and interactive.

Removing only Edited Labels

To remove only the edited labels or those you have created with the **Label** command:

1. On the **MAP** tab, in the **Label** group, click **Clear Custom** to remove the labels. You will be prompted to discard the custom labels and revert back to the default settings.

This operation clears all custom labels from every layer in the map.

2. Click **Discard**. Your labels will revert back to the automatic labels. If you do not want any labels to display, turn Visibility off.

Removing Individual Labels

To delete individual labels from a **Map** window, use the **Delete** key or on the **SPATIAL** tab, in the **Clipboard** group, click the **Cut** command. This is useful if you have a number of edited labels and you want to delete one and still keep the rest.

Note: Do not use the **Delete** key to delete more than a few labels from the map.

Clearing Custom Labels from Selected Layers

You can remove custom labels from the layer easily by selecting the layer name in the **Explorer** window, right-clicking and then selecting **Clear Custom Labels**. This resets any custom labels in the layers you have selected.

Adding an Adornment to Your Map

About Adornments

MapInfo Pro provides map adornments, such as scale bar, smart text, to place and anchor in a **Map** window. The scale or geographic position of the map does not affect the position or size of an adornment, so it remains stationary when zooming or panning the map. However, the properties and visual representation of an adornment, such as a map scale, may change as the map projection or scale changes.

Adornments are drawn as the topmost elements on a map, on top of any labels and on top of the cosmetic layer. Adornments may display with a border and a background. You can move adornments anywhere on the map by clicking and dragging them with the mouse cursor.

You can pre-set adornment properties, such as the default position and style, in the **Map Preferences** dialog box under the Adornments tab (on the **PRO** tab, click **Options**, and **Map Window**).

Note: To add a scalebar to your layout in a **Layout** window, see *Layout Scalebar AddIn* in the *Help System*. This tool adds a **Scalebar** command on the **LAYOUT** tab in the **Edit** group.

Adding a Scale Bar to Represent Map Scale

The map scale bar shows the scale of map representation relative to the portion of the Earth's surface it displays. The scale bar also has the option to show the cartographic scale of the map.

About Map Scale

A map represents a portion of the Earth's surface, so each map has a scale that indicates the relationship between a distance on the map and the distance on the ground. The scale is a ratio or representative fraction (RF). It can be expressed as 1/100,000 or 1:100,000. In this example, one centimeter on the map equals 100,000 centimeters (1 kilometer) on the earth. It also means that one inch on the map is equal to 100,000 inches on the land (8,333 feet, 4 inches or about 1.6 miles). Or even 1 paperclip on the map is equal to 100,000 paperclips on the ground. Common RFs include 1:63,360 (1 inch to 1 mile) and 1:1,000,000 (1 cm to 10 km).

In MapInfo Pro, a map scale that does not include distance units, such as 1:63,360 or 1:1,000,000, is called a **cartographic scale**.

Maps are often known as large scale or small scale. A large scale map shows greater detail and has a larger representative fraction (RF) of 1:50,000 or greater (for example, 1:10,000). A small scale map shows more of the earth's surface and has a small RF, such as 1:250,000 to 1:7,500,000. Maps between 1:50,000 to 1:250,000 are an intermediate scale. Maps of the world that fit on to a normal sheet of paper are very small scale, about 1 to 100 million.

The scale bar adjusts as you zoom and pan the map to accurately reflect the new map view.

Adding a Scale Bar to the Map

You must have your map open to add a scale bar to it.

To add a scale bar to your map:

1. On the **Map** tab, in the **Content** group, click **Add to Map**, and click **Scalebar** from the list to open the **Create Adornment** dialog box.
2. Select how to position the scale bar on the map, either:
 - **Select a default position** - Select to place adornment in a preset location: upper left corner, upper right corner, lower left corner, or lower right corner.
 - **Specify a custom position** - Select to place adornment in a specific location. Enter measurement values in to the **Move right** and **Move down** fields. Use positive numbers.
3. (Optional) Click **Next** to customize the scale bar.

The **Create Scale Bar** dialog box displays. Customize the scale bar using the following settings:

Bar Length

The two values are proportional: the first value is the distance on the paper map, the second value is what the first value represents as a distance on the Earth's surface. Specify the length of the scale bar to a maximum of 34 inches or 86.3 cm on the printed map.

Use Automatic Sizing

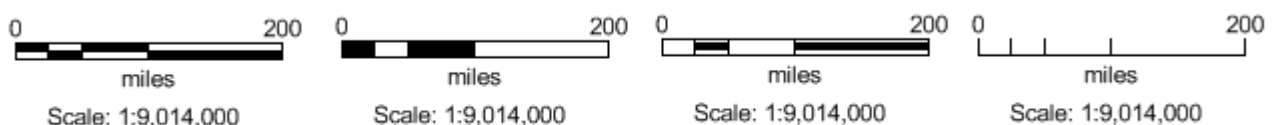
Check this check box to include a "nicer" scale value on a map. There is a description just below this check box that will explain how the current scale bar will be drawn into the map.

Add Cartographic Scale

Check this check box to include a representative fraction (RF) with the scale bar. In MapInfo Pro, a map scale that does not include distance units, such as 1:63,360 or 1:1,000,000, is called a **cartographic scale**. For more information, see [About Map Scale](#).

Type

Select a preset scale bar: **1** Check Bar, **2** Solid Bar, **3** Line Bar, or **4** Tick Bar.



Select to customize how the bar displays:

	Click to display the Region Style dialog box and select fill color for customizing the scale bar.
	Click to display the Line Style dialog box and select line options for customizing the scale bar.
	Click to display the Text Style dialog box and set the font style, such as type, size, and color, for customizing scale bar values.

Background

Click these buttons to set the background fill style and background border style.

4. Click **Finish**.

The scale bar displays on top of the cosmetic layer of the map. It remains in the same position even when panning or zooming the map.

Reposition the scale bar by clicking and dragging it to a new location on the map.

If zooming on the map, the scale bar will recalculate to reflect the new zoom level. Depending on the projection system that the map is in, such as Longitude / Latitude, panning the map may cause the scale bar to recalculate. To redraw the map scale using specific values, see [Changing Scale Bar Properties](#).

To save the scale bar with the map, save your workspace.

Removing a Scale Bar

To remove a scale bar from the **Map** window:

1. Right-click on the scale bar.
2. From the pop-up menu, select **Remove**.

Save the workspace to save this change to the map.

Changing Scale Bar Properties

To change scale bar properties either:

- Double-click the scale bar
- Right-click on the scale bar and from the pop-up menu, select **Properties**.

The **Scale Bar Properties** dialog box displays. Make any adjustments to the settings for the scale bar. For a detailed description of the scale bar properties, see [Create Scale Bar Dialog Box](#).

Adding a Cartographic Scale to the Scale Bar

In MapInfo Pro, a map scale that does not include distance units, such as 1:63,360 or 1:1,000,000, is called a **cartographic scale**. For more information, see [About Map Scale](#). A cartographic scale provides additional information to a scale bar, it displays below the scale bar.

To add a Cartographic scale to the scale bar:

1. Either:
 - Double-click the scale bar
 - Right-click on the scale bar and from the pop-up menu, select **Properties**.
2. Select the **Add Cartographic Scale** check box.

The scale bar redraws to include a cartographic scale.

Resetting the Cartographic Scale Value

MapInfo Pro displays the map scale one of two ways:

- A distance scale where one paper unit equals some number of map distance units, such as 1 inch = 200 miles.
- A cartographic scale, or ratio scale, where 1 paper unit on the map equals some number of the same unit on the ground, such as 1:20,000, which means 1 inch on the map equals 20,000 inches on the ground.

To change the value of the cartographic scale in your map:

1. Right-click on the **Map** window and choose **Change View** from the menu.
2. In the **Change View** dialog box, the **Cartographic Scale** field controls the type of scale MapInfo Pro uses.
 - Change the value of the cartographic scale. The map scale and the map zoom also change accordingly.
3. Click **OK** to exit the dialog box.

The value that the scale bar displays depends on the zoom of the map. As you zoom in to our out of the map, this value changes. When preparing to print the map, you may want to set the cartographic scale to display to a specific value, such as 1: 20,000.

See also, [Adding a Cartographic Scale to the Scale Bar](#).

Adding a Smart Text to your Map

Smart Text is a map adornment that displays a configurable text label over a map. This text could be a simple text expression or you can use a MapBasic expression to evaluate a value and display it as text on a map.

Adding a Smart Text Adornment to the Map

You must have your map open to add a smart text to it.

To add a smart text to your map:

1. On the **Map** tab, in the **Content** group, click **Add to Map**, and click **Smart Text Adornment** from the list to open the **Smart Text** dialog box.
2. In the **Smart Text** text-box, either enter a simple text expression or a MapBasic expression to evaluate a value and display it as text on the map.
3. From the **Position** drop-down, select how to position the smart text on the map from the available options.
4. Select the **Border** check-box if you want the smart text to have a border.
5. Click the **Font** button to open the **Text Style** dialog box. Select your text style options such as type, size, color, and effects for the smart text and click **OK**.
6. Click **OK** to add the smart text adornment to the map.

The smart text adornment displays on top of the cosmetic layer of the map. It remains in the same position even when panning or zooming the map.

You can reposition the smart text adornment by clicking and dragging it to a new location on the map.

Note: If you have multiple maps on a layout, you can create a smart text adornment for each map.

Removing a Smart Text Adornment

To remove a smart text adornment from the **Map** window:

1. Right-click on the smart text adornment.
2. From the pop-up menu, select **Remove**.

Save the workspace to save this change to the map.

Changing the Smart Text Adornment Properties

To change smart text adornment properties either:

- Double-click the smart text adornment.

- Right-click on the smart text adornment and from the pop-up menu, select **Properties**.

The **Smart Text** dialog box displays. Make any adjustments to the settings for the smart text. For a detailed description of the smart text adornment properties, see *Smart Text Dialog Box* in the MapInfo Pro *Help System*.

Note: Background of the adornment is based on the preference set in the Adornments tab under the Map preferences dialog. You can access this dialog from the Backstage by clicking **Options** and then clicking **Map Window** under the **Window** group.

Adding a Time Series to your Map

About Time Series

A MapInfo Pro Time Series enables you to visualize data and trends from a table or a map over a period of time. You can add a Time Series to a map in MapInfo Pro provided that map has a layer with the date, time, or the datetime attribute.

Creating a Time Series

Before you create a Time Series on a map in MapInfo Pro, make sure that the map has a layer with the date, time, or the datetime attribute.

Adding a Time Series to the Map

You must have your map open to add time series to it.

To add a time series:

1. On the **MAP** menu, in the **Content** group, click on **Add to Map**, and click **Time Series** from the list. The **Layer Time Properties** dialog box displays.

Using this dialog you can either set new time configurations for a layer in a map or edit existing time properties of the layer.

2. From the **Layer** drop-down, select a map layer. The Layer drop-down list contains all the layers in the map which support time series. By default, the layer which is selected in layer control is selected. In the case of only one layer in the map, that layer will be selected.

3. The **Configuration** drop-down lists all the possible time configurations which can be applied on the layer. Based on the selected configuration the column drop-downs would be enabled and populated to choose table fields which will be used as time begin/start expression.

Configuration	Columns
No Time configuration	Layer as not time configuration.
One date/time column	Single date/time/datetime field as the time start and end expression.
Separate date and time columns	Separate date and time field in the table is used as time start and end expression. In this case, date and time field value is combined to form a datetime value.
Start and end date/time columns	Separate date/time/datetime fields are used for creating start and end expression respectively. In this case field type for both start and end column should be the same.
Start and end date with separate time columns	Both start and end time expression is created using separate date and time columns.
One date/time column with a duration column	Start expression is a single date/time/datetime column and the end expression is created based on the start column and a duration column.
Separate date and time columns with a duration column	Start expression is created using separate date and time columns and the end expression is created using the start expression and a duration columns.

4. **Extents:** Based on the selected column type, extents of the date/time/datetime are calculated automatically.
- If you select the time type column then only the time extent text-box is displayed.
 - If you select the date type column then only the date extent text-box with date picker is displayed.
 - For datetime type column, both datepicker and time text box are displayed.
5. **Period:** This allows you to enter a positive interval count value with the time unit. This interval count is the number of time units to advance the start time of the next period from the start time of the previous period.

See Also:

[Configuring a Time Series](#)

Configuring a Time Series

You can configure a time series using the various options under the contextual **Time** tab under **Map**.

- **Time**

- **Enable:** Click to toggle between enabling and disabling a the time series on a man.
- **Map Options:** Click to display the Map Options dialog. Use this dialog to configure map time options like inclusive, exclusive, time formatting, setting playback speed, etc. For details see the Map Options dialog.
- **Layer Settings:** Specify Time Series based on a layer with time attributes. For details see [Creating a Time Series](#).
- **Add to Map:** Add time related adornments to the map. Available options are-
 - **Period Title** - Click to add current time period adornment to the map.
 - **Period Number** - Click to add current time period number adornment to the map.
 - **Period Record Counts** - Click to add current time period record count adornment to the map.
 - **Map Extents** - Click to add full map extents adornment to the map.
 - **Embed Theme Legend** - Click to embed a theme legend.

- **Period**

- **Span:** The length or interval of each time period. Use this to divide the full extent into time periods.
- **Step:** Determines the temporal distance from the start of one time period to the next. Use this to divide the full extent into time periods.
- **Select:** Select the current time period.

- **Adjust**

- **Remove Empty Periods:** Click to iterate through all time periods and remove time periods with no records. If the extents, span, step or snap are changed, empty time periods can be reintroduced.
- **Snap:** Select/de-select to turn time extent snapping On or Off. Selecting the check-box snaps the extent begin to the start of the nearest unit, and the extent end to the end of the nearest unit.
- **Use Slider Span:** Click to set the maps time span to the value of the time slider's custom span.

- **Playback:** Use the playback options to

- Play/Pause the time series.
- Move to Previous and Next time period.
- Drag the slider to a specific time period.
- Decrease and Increase the playback speed.
- Change playback direction and repeat or reverse the playback direction.

- **Full Extent:** Set the extents of the date/time/datetime.

- Select Time Layer(s) from the drop-down list.

- **Start:** Start of the range of temporal data in the layer(s).
- **End:** End of the range of temporal data in the layer(s).
- **Export:** Export each map time period to an image. You can also create an animated GIF or a video.

See Also:

[Creating a Time Series](#)

Editing Time Settings for a Layer

To edit the time settings for a layer:

1. On the **Explorer** window, right-click on a time layer and click **Layer Properties** to display the **Layer Properties** dialog box.
2. On the **Layer Display** tab, click the **Layer Time...** button to display the **Layer Time Properties** dialog.
3. Edit the time settings for the selected layer. See [Creating and Configuring a Time Series](#) for details.

Exporting a Time Series

Once a time series is added to a mapper, you can export the time series images using the **Export** button in the **Time** tab.

1. On the **Map** menu, click the **Export** button under the **Time** contextual tab to display the **Export Time Series** dialog.
2. The **Name** of the images comes from the mapper that is used for creation of time series. You can also update the name using the text box.
3. Select a **Suffix** for the exported time series name from the drop-down. You have two options:
 - a. **Period** - starting from 0 to n-1.
 - b. **Time Range** - tells the time as in the data.
4. **Location** is the directory where the time series images would be saved. The default value for this is the `Images` directory in **Preferences**.
5. From the **Format** drop-down, select the required image format.
6. Click the **Options** button to display the [Save Window As](#) dialog and modify the image options.
7. **Content:** Choose between a map or a layout for export. Select the Include map time slider check-box to export the time slider as well.
8. Select the **Open folder location when complete** if you want the destination folder of the saved images to open after the time series export.
9. Click **OK** to export the time series images.

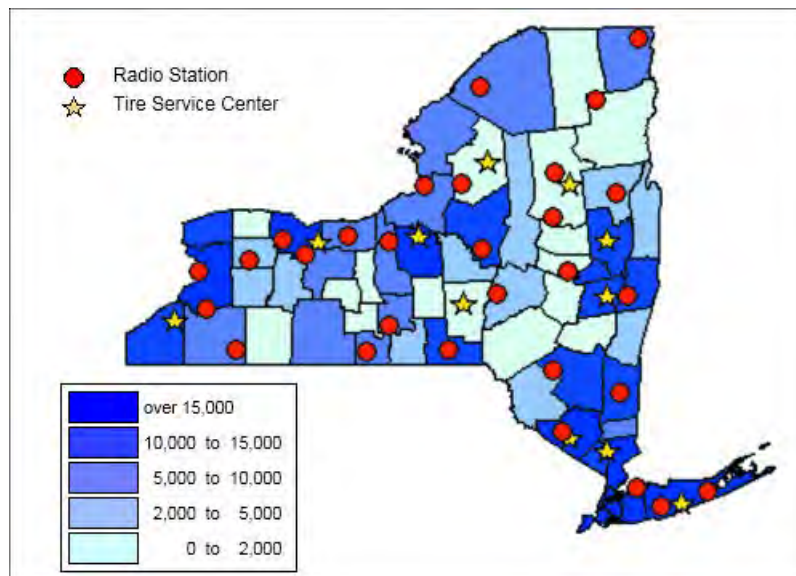
Creating a Legend for Your Map

What is a Legend?

A legend is the key to understanding what the symbols mean on a map. It takes the form of a list containing color-coded symbols and their descriptions. You will most often find it positioned near the edge of or in a corner of a printed map, and it is sometimes accompanied by a scale bar (see [Adding a Scale Bar to Represent Map Scale](#)). A map shows real-world boundaries, artifacts, and features and any data associated with these that you wish to show. It generalizes this information to make it easier to understand the information being shown.

After designing your map presentation, you will want to design a legend to help your readers understand what they are looking at. The following example shows a map with two legends: one for map symbols and one for the ranged theme.

This map layout includes a legend for the map symbols of points and stars, and a legend for the ranged theme of color-coded style swatches.



Legends in MapInfo Pro are displayed in a Legend Designer window. You can create a legend for an individual layer, giving it particular emphasis, or you can place legends for several layers in one Legend Designer window (see [About the Legend Designer Window](#)). You can add map legends to a map layout when you are preparing the presentation of your map for print or electronic distribution.

Creating a Map Legend

You can create a legend for the map layers in your **Map** window. The legend you create displays in a **Legend Designer** window where you customize the elements of the legend to enhance your map presentation. A **LEGEND** tab displays on the ribbon where you can access modify legend content and align legend frames. To learn about map legends and the **Legend Designer** window, see [What is a Legend?](#) and [About the Legend Designer Window](#).

Creating a legend that represents the styles in your map is done through the **Create Legend** wizard when you select the **Add Legend** option from the **MAP** tab or select the **Legend** window from the **HOME** tab. The wizard has three screens; the first screen selects the vector, raster, and thematic layers in the map to create legend styles for, the second and third screens provide customization options and are optional. You can also customize a legend afterwards from the **Legend Designer** window.

Note: There is a size limitation of 1600 rows for a legend frame, which ensures that it does not slow resizing the **Legend Designer** window. A message displays to warn you when a legend frame list is truncated to 1600 rows.

If you already have a **Legend Designer** window active, you can add more legends to it by choosing **Add Legend** from the **LEGEND** tab.

Thematic legends are automatically created when you create the theme on a map layer using the **Create Thematic Map** wizard. For more information see [Working with a Thematic Map Legend](#).

Customizing Your Map Legend

If after creating a map legend, you want to customize it by changing a map legend's titles, list text, and font styles, then see the sections under [Customizing the Contents of a Legend Frame](#).

- [Aligning Map Legends in a Legend Designer Window](#) to learn how to use the **Legend Designer** window grid and guidelines to help you reposition and align legend frames in the **Legend Designer** window. To better view the contents of the **Legend Designer** window when repositioning legend frames, see [Zooming the Legend Designer Window View](#).
- [Deleting Map Legends from a Legend Designer Window](#) to exclude map legends for map layers from the **Legend Designer** window. By default, legends for all the visible layers on your map are included in the **Legend Designer** window when you select to create a legend for a map, unless you select to exclude map layers during the creation process.
- [Adding Map Legends to a Legend Designer Window](#) to include map legends to the **Legend Designer** window for layers on your map.

More advanced users who are familiar with working with map legends, may want to review the sections under [Advanced Options when Creating Map Legends](#), to learn how to use table metadata and attributes when creating a legend, and how to work with special columns with a table join.

Create Legend: Choosing Layers (Step 1)

To create a map legend:

1. Make sure your **Map** window is active. On the **MAP** tab, in the **Contents** group, click **Add Legend**.
2. In the first screen of the **Create Legend – Choose Layers** dialog box, select the map layers to include in the legend.

All the layers in your **Map** window are included in the Legend Frames box by default. Use the **Remove** button to exclude layers from the legend.

The legend will have one frame for each layer in the Legend Frames box. The frames display in the order that they appear in the list. Use the **Up** and **Down** buttons to change the order.

3. Click **Finish** to leave the wizard create the Legend or **Next** to continue to specify legend properties, such as window title and orientation. Continue to [Create Legend: Setting Legend Default Properties \(Step 2\)](#).

The **Legend Designer** window opens with legend frames for each layer that you chose to include in the legend. Legend frames will display default settings for their titles and symbol style names will be the same as those on the map layer.

Legend Frame defaults are set in the **Legend** window preferences. To change the default settings, on the **PRO** tab, click **Options**, and **Legend Window**.

To change the properties of an individual legend frame, right-click on it in the **Legend** window. From the pop-up menu, select **Modify Legend Frame Properties** to display the **Legend Frame Properties** window.

See Also:

- [Changing Map Legend Titles and Font Style](#)
- [Setting your Legend Designer Window Preferences](#)
- *Creating a Thematic Map* in the *MapInfo Pro: Creating Thematic and Themed Maps Guide*
- *Working with a Thematic Map Legend* in the *MapInfo Pro: Creating Thematic and Themed Maps Guide*

Create Legend: Setting Legend Default Properties (Step 2)

This section continues from [Create Legend: Choosing Layers \(Step 1\)](#).

When creating a map legend, you have the option to specify a title and orientation for the **Legend Designer** window as well as default settings for the legend frames that display in the legend window. A legend frame is a grouping of information in the legend that is specific to a layer on the map. Each legend frame has a title, subtitle, and listing of symbols that represent that data for the layer on the map. You can specify display settings that apply to all legend frames, such as the font to use for the titles, subtitles, and text beside symbols. The Legend frame settings you make in Step 2 of the **Create Legend** wizard apply to all the map layers in the legend.

To define legend properties and legend frame defaults in step two of the **Create Legend** wizard:

- Set a new window title for the Legend Designer. In the **Window Title** box, type a unique name for the **Legend Designer** window to use instead of the default . The default **Legend Designer** window title is based on the name of the Map window and is "Legend Designer for <map window title>".
- Select the orientation of the **Legend Designer** window, by selecting either the **Landscape** or **Portrait** radial buttons.
- Specify a title and its font for the legend frame.

In the **Title** box, notice the # character. It is a placeholder for the name of the layer on which the frame is based. For instance, if you are creating a legend for the Australia layer, "# Legend" in the Title box will display as "Australia Legend" in the legend, where # is the name of the layer. The name of the layer will display in whatever position you put the # character. To create a title with the # character in it, precede it with the \' character. For example, "Northeast \#" displays as "Northeast #."

Click the **Style** button next to the **Title** box to display the **Text Style** dialog box. Here, specify the font, color, size, and type of emphasis of the text in your legend title.

- Specify a subtitle and its font for the legend frame.

In the **Subtitle** box, use the # and \' characters in the same manner as you did in the **Title** box.

Click the **Style** button next to the **Subtitle** box to change the style of the text.

- Specify the text that displays next to each symbol in the legend.

In the **Style Name** box, use the % character to include the symbol type: point, line, or region in the style name text. It acts as a placeholder for the type of symbol displayed and is used the same way as the # character. The # character can also be used in this box. Again, to create text with these characters in it, precede the characters with the \' character.

Click the **Style** button next to the **Style Name** to specify the font style for the text that displays next to each symbol in the legend,

Note: Although the # character can be used in all three text boxes in the legend frame properties, the % character can only be used in the **Style Name** box.

Click **Finish** to create the Legend. To specify unique attributes for legend frames, such as title, subtitle, and pattern for the style names, click **Next** and continue to [Create Legend: Setting Frame Properties \(Step 3\)](#).

See Also:

- [Setting your Legend Designer Window Preferences](#)

Create Legend: Setting Frame Properties (Step 3)

The section continues from [Create Legend: Setting Legend Default Properties \(Step 2\)](#).

When creating a map legend, you have the option to specify for each map layer's legend a unique title, subtitle, and the style for symbols and labels in the **Frame Properties** screen of the **Create Legend** wizard. The Legend Frames group on the left displays all the frames selected in the **Choose**

Layers screen of the wizard. Each frame corresponds to a map layer. Select a frame from the list (you can only select one frame at a time) to see the frame's default attribute settings in the boxes on the right. Notice that the defaults used are the settings from the previous screen of the wizard. The hash (#) character from the default settings is replaced with the name of the layer.

The **Title** and **Subtitle** properties are available for all layers. Other properties are made available depending on the layer format.

To select attributes for a legend frame, select it from the **Legend Frames** list and then review the following before clicking **Finish** to create the legend.

Select Titles

Type in a new title or subtitle, or leave these blank to use the defaults from the previous screen.

Filter Raster Color Samples to a Maximum Number of Entries

The **Filter** panel displays when creating a legend for a raster layer. This sets the number of legend rows in the raster legend. The default value is 100. You can select an existing value in the list or enter a new value between 1 and 1600. If the total number of rows for a raster legend is 100, but the maximum number of entries is set to 20, then only 20 colors display in the raster legend frame. If the number of colors is less than the filter amount, then all colors are included. To change the legend, you must re-create it with a new **Max Entries** value.

Select how to Display Legend Symbols

The legend styles are the symbols used in the legend to identify the map features. Each type of object: point, line, or region displays its own symbol in the legend. Point objects are represented by point symbols, line objects by lines, and region objects by polygons. There is also support for multipoint and collection objects in the cartographic legend feature. Multipoint objects display as a point symbol in the legend. A collection object displays a combination of symbols indicating the different object types it contains. You can display your legend symbols according to:

- Select **map catalog** to retrieve the default styles for the selected legend frame from the map catalog. This is the default option for live tables, but is disabled for other types of tables. Use this option when you are concerned with performance. Retrieving map styles from live tables on a remote database can take a long time, but retrieving a default style from the map catalog can be significantly faster. Remember that styles in the map catalog may not be as visually descriptive as the other options.
- Select **unique map styles** to retrieve all unique object styles for the table for a visually appealing legend. This option is selected by default when the legend frame is not a live access table. (For extremely large tables, this option can take longer than the first option.)
- Select **unique values in a column** to retrieve the styles associated with the values saved in a particular column in the table for a visually appealing legend. A legend symbol displays for each unique value in the selected column. This creates multiple symbols of the same type. If you are creating a legend based on the AUS_CAPS cities using the setups table and you select the column

PLACE_NAME, a symbol for each capital city will display. You can then label each symbol according to PLACE_NAME, or any other column, to have the column value display next to each symbol. (For extremely large tables, this option can take longer than the first option.)

Select how to Label Legend Symbols

You can label your legend symbols in the following ways:

- Keep the default selection of **<Style Name>** in the **Label styles with** drop-down list to use the style name indicated in step 2 of the **Create Legend** wizard (described under [Create Legend: Setting Legend Default Properties \(Step 2\)](#)).
- Select a column from the **Label styles with** drop-down list. This uses the information in the column for the style labels.

More Advanced Options

Provide more description using unique column values from your table (in a column). The column can be any column in the table, or it can be one that you create specifically for this purpose. You can then write your own feature descriptions for each item in the table. To perform a join to add a temporary column from another table that you can use for your feature descriptions, see [Creating a Legend with Joined Information](#).

To create a label based on a value derived from your table using an expression, see [Using an Expression to Customize Legend Label Text](#).

For more control over legend frame defaults for a map layer, see [Saving Legend Attributes to Metadata](#).

See Also:

- [Setting your Legend Designer Window Preferences](#)
- [Creating Legends from/for a Live Table](#)

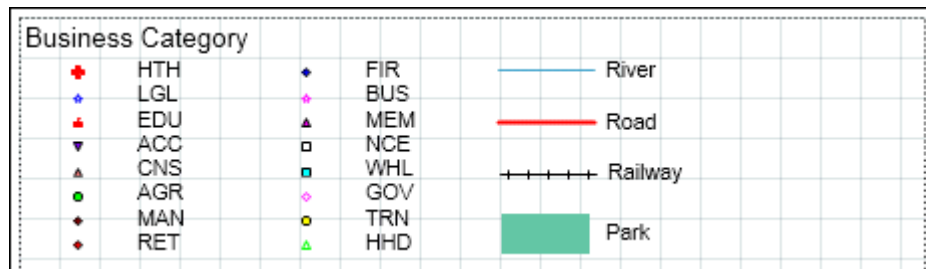
About the Legend Designer Window

The **Legend Designer** window displays the legend for each layer in your **Map** window. You can create an individual **Legend Designer** window for each layer in your map, or you can have several map legends in one **Legend Designer** window. When creating a map legend, you choose the map layers that you want to include.

Each legend within the **Legend Designer** window is enclosed in a frame. A legend frame is another way to refer to a particular layer's legend. The properties for each legend frame can be edited individually, such as the legend title and subtitle, row text, and font.

Each **Map** window can have one or more **Legend Designer** windows, which are not shared with any other **Map** window. The **Legend Designer** window gives you control over the design of the

legend for your map: it provides controls, in the form of a grid and guidelines, to accurately set the alignment of the contents of the legend; it offers a zoom feature, so you can see a more detailed view of the contents; it lets you add titles for each legend frame; and you can set the text and font styles in each legend frame.




Legend frames are added in a top down fashion (portrait option when creating a legend) or from left to right (landscape option when creating a legend). This organization is maintained when adding or removing legend frames, so that there are no spaces between the frames. Once you begin moving legend frames in the **Legend Designer** window, the automatic arrangement is no longer preserved and you must position frames appropriately to remove gaps between them.


LEGEND Tab Commands

The **LEGEND** tab provides a number of commands for modifying legends and aligning legend frames. It is available on the ribbon when you add a legend or a theme to a map. For details, see [LEGEND Tab](#).

Legend Designer Window Right-Click Context Menu Options

The **Legend Designer** window provides the following commands when you right-click on the canvas.

Add Frames	Opens the Add Frames wizard where you can select map layers that you want to add to the map legend on display in the Legend Designer window. You can also set unique attributes for the legend frame for each map layer that you add. For instructions, see Adding Map Legends to a Legend Designer Window .
Add Text Frame	Opens the Text Frame Properties dialog box where you can add text to display in the legend; this can be text for a title, subtitle, or description of the contents of the legend for example. You can include carriage returns in the text.
 Refresh	Opens the Refresh Legend dialog box where you can specify how you would like to redraw the contents of the Legend Designer window by refreshing styles. This can be useful after opening a workspace with a legend and you suspect the underlying map data has changed. For more information, see How a Layer Style Override Affects the Map Legend .

Delete Selected Frames	Removes all frames that you selected from the Legend Designer window. For instructions, see Deleting Map Legends from a Legend Designer Window .
 Modify Legend Frame Properties	If there is a legend selected in the Legend Designer window, then this option opens the Legend Frame Properties dialog box, which allows you to modify the legend frame. If the selected legend frame is a theme legend, then the Modify Theme button on the LEGEND tab enables. Therefore, if you want to modify the thematic properties of the layer, which may affect the legend, use the Modify Theme button on the LEGEND tab.

About Hidden Legends

Thematic legends may be shown or hidden in the **Customize Legend** dialog box, which is accessed from the **LEGEND** tab, in the **Content** group, by clicking **Modify Theme**.

Hidden legends are not persisted to workspaces. If a **Legend Designer** window has all its legends hidden it will not be saved to a workspace (WOR).

Setting Your Legend Designer Window Preferences

Using software preferences, you can control the default title settings for legend frames in the **Legend Designer** window and the default text style attributes, such as font and size. MapInfo Pro uses your preferences when there are no metadata keys in the table on which the legend frame is based. If metadata keys are present, then the metadata defaults override your preferences.

To set the **Legend Designer** window preferences:

1. On the **PRO** tab, click **Options**, and **Legend Window** to open the **Legend Window Preferences** dialog box.
2. In the **Legend Frame Defaults** group, set default titles and list names for Legend frames:
 - To set the **Title Pattern**, type the text that you want to display at the top of each legend frame in this box.

By default, the Title is "# Legend", where '#' is the name of the layer on which the frame is based. So, if the frame is based on the States layer, the default title would be "States Legend." You can change this pattern to "Legend of #" or simply "#." To have no default pattern, leave the box blank.

Note: When the # symbol is in the **Title**, **Subtitle**, or **Style Name** field, it is replaced with the layer name. When the % symbol is in the **Style Name**, it is only replaced with the object type. If you want to use the pound (#) symbol and not have it replaced, then put a backslash (\) character before it (\#). If you want to use the percent (%) symbol in

the **Style Name** and not have it replaced, then put a backslash (\) character before it (%).

- To set the **Subtitle Pattern**, type the subtitle text you want in this box. The entry in this box is blank by default, but you can set your own default title pattern for subtitles.
- To set the **Style Name Pattern**, type the text you want to display beside each symbol in this box. The default pattern is the '%' character. The **Style Name** is the text that describes each symbol in a legend frame. The % character is used as a placeholder for the type of object the legend symbol corresponds to: point, line, or region.

You can type in your own default **Style Name**, either using the % character or not. For example, in a legend frame based on the States layer, a **Style Name** that reads "% of #" will display as "Region of States" next to the symbol in the legend. The % character can only be used in the **Style Name** field.

3. In the **Legend Frame Sample Sizes** group, set the default sample sizes for legend frames:
 - **Paper Units** - Specifies the units when you measure the size of objects in a **Legend Designer** window. Choose a unit of measurement from the drop-down list. The default unit is points (pt), because it more accurately matches sample sizes to font sizes for legend text.
 - 1 inch (in) = 2.54 centimeters, 254 millimeters, 6 picas, 72 points
 - 1 point (pt) = 0.01389 inches, 0.03528 centimeters, 0.35278 millimeters, 0.08333 picas
 - 1pica = 0.16667 inches, 0.42333 centimeters, 4.23333 millimeters, 12 points
 - 1 centimeter (cm) = 0.39370 inches, 10 millimeters, 2.36220 picas, 28.34646 points
 - 1 millimeter (mm) = 0.1 centimeters, 0.03937 inches, 0.23622 picas, 2.83465 points
 - **Region Sample Width** - Sets the width of a region sample in legend lists. You can specify 8 to 144 points, 0.666667 to 12 picas, 0.111111 to 2 inches, 0.282222 to 5.08 millimeters, or 0.282222 to 5.08 centimeters. The default value is 32pt (points).
 - **Region Sample Height** - Sets the height of a region sample in legend lists. You can specify 8 to 144 points, 0.666667 to 12 picas, 0.111111 to 2 inches, 0.282222 to 5.08 millimeters, or 0.282222 to 5.08 centimeters. The default value is 14pt (points).
 - **Line Sample Width** - Sets the length of a line sample in legend lists. You can specify 12 to 144 points, 1 to 12 picas, 0.666667 to 2 inches, 4.23333 to 50.8 millimeters, or 4.23333 to 50.8 centimeters. The default value is 36pt (points).

These options apply when creating a map legend using the **Create Legend** wizard. The resulting legend displays in the **Legend Designer** window.

4. Select the **Automatically Increase Sample Size to Match Font** check box to have legend swatches (samples) resize to match the font size of the text. Legend swatches will then resize when you change the font size.
5. In the **Grid and Guidelines** group, set the grid and guidelines display defaults:

The **Legend Designer** window provides controls, in the form of a grid and guidelines, to accurately set the alignment of the contents of the legend. You can change the display and color defaults for these, which take effect the next time you open a **Legend Designer** window.

- **Display Grid by Default** - Select to show an equally spaced grid of lightly marked lines to align legend frames to.
 - **Snap to Grid Enabled by Default** - Select enable snapping to the grid of lightly marked lines within the Legend Designer canvas.
 - **Grid Color** - Select a color to display the grid of lightly marked lines within the Legend Designer canvas (the grid is for aligning legend frames). The default color is Light Slate Gray (RGB = 119, 136, 153).
 - **Guideline Color** - Select a color to display the guidelines within the Legend Designer canvas (guidelines are for aligning legend frames to a position of your choosing). The default color is Blue (RGB = 0, 0, 255).
6. Automatically save legends to workspaces, by checking the **Prompt Save Workspace Prior to Close** check box. Selecting this always saves legends to a workspace along with the rest of your work when closing MapInfo Pro.
 7. Click **OK** to close the dialog and save your settings.

How a Layer Style Override Affects the Map Legend

The style swatches in the **Legend Designer** window automatically update when a layer style override changes. This includes when toggling style overrides on and off in the **Layers** window, or when changing the current layer style override. However, the **Legend Designer** window does not automatically refresh when object styles for a map layer change when style override is set to off. In this case, you must refresh the legend to see the style changes.

To see the style change in the map legend:

1. Right-click in the **Legend Designer** window and choose **Refresh All**.
2. In the **Refresh Legend** dialog box, ensure that the **Refresh Styles** check box is checked.
3. Click **OK**.

Setting a Title and Orientation for the Legend Designer Window

By default, when you create a legend by selecting **Add Legend** on the **LEGEND** tab, the resulting **Legend Designer** window's title is "Legend Designer for" and the table names of the map layers you chose to include in the legend. (Deleting a map legend after does not remove its table name from the **Legend Designer** window title.) You can specify a window title at the time you create a legend with the **Create Legend** wizard.

To specify the title of a Legend Designer window:

1. On the **LEGEND** tab, in the **Content** group, click **Add Legend**.
2. In the **Create Legend Choose Layers** screen, select the map layers to include in your legend and then click **Next**.
3. In the **Create Legend Choose Layers** screen, in the **Window Title** text box, type the title that you want to display for your **Legend Designer** window.
4. Select the **Landscape** radial button to change the orientation of the **Legend Designer** window.
5. Click **Finish**, or **Next** to continue to the next screen and finish applying settings.

The **Legend Designer** window opens with your title. If you select **Landscape** for the orientation, then the **Legend Designer** window's width will be more than its height.

Adding Map Legends to a Legend Designer Window

The procedure for adding a legend frame to a Legend Designer window is the same as for creating the legend, except that you are just adding frames to it. Do the following:

1. On the **Legend Designer** window, right-click to display the shortcut menu and click **Add Frames**. The **Add Frames Choose Layers** screen displays.
2. The Legend Frames list displays the map layers in your Map window that are not currently included in your legend. To exclude a layer, click the layer you want to exclude and click the **Remove** button.
3. Click **Next**. The **Add Frames Frame Properties** screen displays.

Here, specify the legend window properties and legend frame defaults as you did in the **Create Legend** wizard. The legend frame defaults you specify here are used if there are no metadata keys in the table.

4. Click **Next**. The **Add Frames - Frame Properties** screen displays.

The default values that display for the frame title and subtitle are taken either from the defaults you specified in Step 2, or the table's metadata. As in the **Create Legend** wizard, you specify attributes for one frame at a time.

This screen works exactly the same way as choosing styles for the initial creation of the legend. You can select either a column, the Style Name Pattern (the default settings in Step 2), **Expression**, or **Join**.

5. In the **Title** box, type the title for the Legend frame.
6. Click the **Unique Map Styles** button.
7. In the Label styles with drop-down list, choose **Expression**. In the **Expression** dialog box, type or create an expression, such as the following for example:

"Albany and Rensselaer"

And click **OK**.

8. To save your frame settings to the table's metadata, click the **Save frame settings to Metadata** button. These settings become the new legend frame defaults.
9. Click **Finish**. Your legend redisplay with the added frame(s).

See Also:

[Working with a Thematic Map Legend](#)

Deleting Map Legends from a Legend Designer Window

To delete one or more frames from a Legend Designer window:

1. Select the frame to delete. To select multiple frames press the **Ctrl** key while selecting frames or click left-mouse button and drag to lasso more than one frame.
2. Right-click in the Legend Designer window and from the pop-up menu select **Delete Selected Frames**.

You can also press the **Delete** key on your keyboard after selecting one or more frames.

If there are no legend frames on the canvas after deleting, the Legend Designer window closes.

Aligning Map Legends in a Legend Designer Window

You can move and position legend frames in the **Legend Designer** window by snapping them to a background grid or guideline. Snapping is an effect where you move a legend frame near a guideline or a grid line and it aligns and attaches (snaps) to the line. This is useful for accurately positioning legend frames.

When working with the grid and guidelines, you may want to zoom into or out of the view in the **Legend Designer** window. For instructions on how to do this, see [Zooming the Legend Designer Window View](#).

Aligning Map Legends Using Grid Lines

You can easily align the position of legend frames in the **Legend Designer** window using grid lines, which display as dotted lines.

To use grid lines to align the position of legend frames:

1. Display grid lines, on the **LEGEND** tab, in the **Alignment** group, click **Grid Lines**.
2. On the **LEGEND** tab, in the **Alignment** group, click **Snap to Grid**.
3. Click and drag a legend to where you want to position it in the **Legend Designer** window. The upper left corner of the frame snaps to the upper left corner of the grid cell that contains it.

To help position legends, make the grid larger or smaller: use the values in **Grid Size** on the **LEGEND** tab, in the **Alignment** group.

To stop working with the grid, click **Grid Lines** to hide grid lines.

While using the left mouse to drag or resize an item, pressing and holding the **Alt** key temporarily disables all snap to guide behavior. Releasing the **Alt** key enables these behaviors.

Note: **Snap to Grid** does not apply when using the **Frame Properties** dialog to change a legend's position.

Using Arrow Keys to Move a Legend Frame

You can use the arrow keys to move and snap legend frames when **Snap to Grid** is turned on.

Pressing and holding the Control key (**Ctrl**) disables snap when using arrow keys. Pressing **Ctrl** with an arrow key, moves the selected frame one pixel at a time.

Aligning Map Legends Using Guidelines

Working with guidelines is similar to working with grid lines, except that you can discretely position a guideline for more control when aligning legend frames.

Adding Guidelines

To add a guideline to the **Legend Designer** window:

1. On the **LEGEND** tab, in the **Alignment** group, on the **Guide** list, click either **Add Vertical Guideline** or **Add Horizontal Guideline**.
2. Click on the guideline and drag it to where you want to position it in the window.

Clicking **Add Vertical Guideline** or **Add Horizontal Guideline** adds a guideline to the center of the **Legend Designer** window. If you click the button multiple times, you will have more than one guideline at the center position—it might not look that way until you start dragging them to a new position.

When you move a guideline a position value in device units displays in the **Legend Designer** window (on the guideline).

Aligning a Map Legend to Guidelines

Once you have added and positioned a guideline, you are ready to snap a legend frame to it:

1. Select one or more legend frames (frame borders display to indicate your selections).
2. Click on one of the alignment commands, on the **LEGEND** tab in the **Align** group, to snap the edge of the frame border to the nearest guideline. You may need to enlarge the **Legend Designer** window to move legends in this way.

Note: Moving a legend using the keyboard arrow keys will not snap them to guidelines.

While using the left mouse to drag or resize an item, pressing and holding the **Alt** key temporarily disables all snap to guide behavior. Releasing the **Alt** key enables these behaviors.

Hiding and Showing Guidelines

To hide or show guidelines, on the **LEGEND** tab, in the **Align** group, click **Disable Guidelines** or **Enable Guidelines**.

Removing Guidelines

To remove one guideline, right-click on it and then select **Remove Guideline**.

To remove all guidelines, on the **LEGEND** tab, in the **Align** group, click **Remove All Guidelines**.

Resetting the Legend Frames Layout

If after realigning legend frames you want to return to the default layout for frames:

1. Right-click in the **Legend Designer** window and select **Refresh All**.
2. In the **Refresh Legend** dialog box, ensure that the **Refresh Layout** check box is checked.
3. Optionally specify if you want the refresh to be for a **Portrait** or **Landscape** view.
4. Click **OK**.

Zooming the Legend Designer Window View

The **Legend Designer** window includes a **Zoom** slider control with several zoom level options from 25% to 800%.

- To zoom out and see more of the window contents, select a zoom level less than 100%.
- To zoom in and see more detail, select a zoom level greater than 100%.

To select a more specific zoom level, click on the + or - buttons to reach the desired zoom.

Exporting Legend Designer Window Contents to a Raster Image

To export the contents of a **Legend Designer** window to another application, on the **HOME** tab, in the **Output** group, click **Save**. The following formats are supported by the **Legend Designer**:

- Window Bitmap (*.bmp)
- JPEG File Interchange Format (*.jpg)

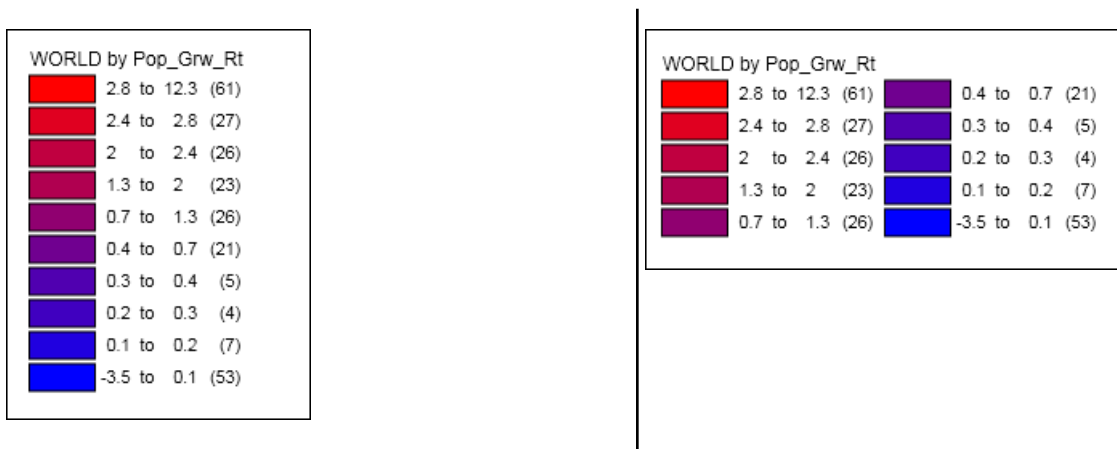
- Portable Network Graphics Format (*.png)
- Tagged image File Format (*.tif)
- TIFF CMYK (*.tif)
- TIFF CCITT Group 4 (*.tif)
- TIFF LZW (*.tif)
- Graphic Interchange Format (*.gif)

The zoom level is not taken into consideration when exporting. A **Legend Designer** window exports at its original 100% size despite what the current zoom level is for the window. The scroll position is considered, so the export image contains the legend frames that are visible in the window.

Customizing the Contents of a Legend Frame

Changing the Number of Columns in a Map Legend Frame

The contents of a legend frame display as a list, in a single column. To control the way your legend frame displays, you may want to show legend information in more than one column.



If you do not already have a legend for your map, follow the instructions under [Creating a Legend for your Map](#).

To change the number of columns in a frame legend:

1. In the Legend Designer window, double-click on the legend frame to add columns. This opens either the **Legend Frame Properties** dialog box or the **Modify Thematic Map** dialog box.
2. In the Number of Columns field, either type the number of columns you want in the legend frame or use the up and down arrows to select the number. You can enter a number of columns from 1 to the number of items in the legend frame.
3. Click **OK**.

The Legend Designer window refreshes to show the legend frame with columns.

See Also:

[Working with a Thematic Map Legend](#)

Resizing a Map Legend Frame

Legend frames are resizable to help you create the legend layout that you want. This may be useful when working with columns (see [Changing the Number of Columns in a Map Legend Frame](#)).

To resize a legend frame in the Legend Designer window, position the mouse over a corner or an edge of the legend frame to change the mouse cursor, and then click and drag the corner or the edge to a new position. The label text column will wrap (or unwrap), if necessary, to accommodate the changing frame width.

Thematic legends may be shared across different types of windows. Changing a thematic legend frame (to introduce columns), changes it in all the windows that include the thematic legend frame.

Changing Map Legend Titles and Font Style

By default, a legend frame includes a title. This is either the name of the layer, or it is a title of your choosing that was set when you added the layer legend using the **Create Legend** wizard (in the **Create Legend - Legend Default Properties** dialog box) or using the **Create Thematic Map** wizard (in the **Create Thematic Map - Step 3 of 3** dialog box).

When you modify the legend title, you modify only that instance of the legend frame. Changing the contents of a legend frame in one window, does not change it in any other open windows. This behavior is different from thematic map legend frames, which populate legend frame changes across all of the windows that contain it. To modify a single instance of a thematic map legend frame that appears in more than one window, you must recreate it using the **Create Thematic Map** wizard (on the **MAP** tab, in the **Content** group, click **Add Theme**) and modify the resulting new legend frame.

To modify a legend title, add a subtitle, and set the title text style:

1. Double-click on the legend frame.
2. In the **Legend Frame Properties** dialog box:
 - Delete or change a legend title: In the **Title** textbox, change the text or leave blank to have no title.
 - Add a subtitle: In the **Subtitle** textbox, add text or leave blank to have no subtitle.
 - Change the font style for a title: Click either the **Title Font** button or the **Subtitle Font** button, and then make your selections in the **Text Style** dialog box.
3. Click **OK** to apply your changes.

See Also:

[Working with a Thematic Map Legend](#)

Adding Text to your Legend

You can add a text frame to your legend, to customize the legend with a title, subtitle, or description of the contents of the legend for example. By default, each legend frame has an optional title and subtitle, but you may require a title for the legend itself, or you may want to add copyright text in your map legend.

To add a text frame to your legend:

1. Right-click on the Legend Designer window and select **Add Text Frame** from the pop-up menu (or right-click on the **Legend Designer** window and click **Add Text Frame**).
2. In the **Text Frame Properties** dialog box add the text to display in the legend; this can be text for a title, subtitle, or description of the contents of the legend for example. You can include carriage returns in the text.
3. Optionally, click **Font (Aa)** to open the **Text Style** dialog box and select the display style for the text. You can choose font, font size, and color effects (including halo and bold effects).
4. Click **OK** to add the text to the legend.

The Legend Designer window refreshes with the new text frame.

Removing a Legend or Text Frame from the Legend Designer Window

Select the legend or text frame to delete and then press the **Delete** key.

The Legend Designer window refreshes with the change.

Editing the Text in a Map Legend List

To edit legend text in the Legend Designer window:

1. Double-click on the legend, or right-click on it and select **Modify Legend Frame Properties** from the pop-up menu.
2. In the **Legend Frame Properties** dialog box, the Styles panel displays the style swatches and their text. Double-click on any text in this list to make quick edits. For more lengthy edits (such as for longer text strings), click on text in the list and then make your edits in the **Edit selected text here** textbox. In both the Labels List and the larger Edit textbox, longer label text strings will wrap to fit inside the visible region.
3. Click **OK** to apply your changes.

See Also:

Working with a Thematic Map Legend

Changing the Font Style for a Map Legend List

To change the text style (and override the default style) in the Legend Designer window:

1. Double-click on the legend, or right-click on it and select **Modify Legend Frame Properties** from the pop-up menu.
2. In the **Legend Frame Properties** dialog box, click the **Set Font for Labels** button (Aa).
3. In the **Text Style** dialog box, select from the **Font** and **Text Color** drop-down lists and from the many other options (options in grey are unavailable). After making your selections, click **OK**.
4. In the **Legend Frame Properties** dialog box, click **OK** to apply the text style settings.

The legend list now displays in the new font style. For more about changing legend text and font styles, see [Changing Map Legend Titles and Font Style](#).

See Also:

[Working with a Thematic Map Legend](#)



Changing the Sort Order of the Labels in a Map Legend

You can change the sort order of the labels in a map legend to display their values in ascending or descending order.


About ascending sort: For thematic legends, an ascending sort means the rows display in a top to bottom manner that makes sense for the particular theme type; for example, a Ranged theme frame that displays the rows from lowest to the highest range. For a Pie or Bar theme, an ascending sort means the categories are listed in the order selected by you. For an Individual Value legend, the label sort order is based on the original order of the items when the theme was created. This also means that changing a text label for Individual Value themes does not affect the sort order.

About descending sort: For thematic legends, a descending sort means the rows are displayed in a bottom to top manner that makes sense for the particular theme type. For an Individual Value legend, the label sort order is based on the order of the items when the theme was initially created; for example, an Individual Value legend theme would display rows alphabetized from Z to A. However, changing a text label for Individual Value themes does not affect the original sort order. For Graduated Symbol legend, a descending sort means the values are listed from largest to smallest.

To change the sort order of labels in a map legend in a Legend Designer window:

1. Double-click on the legend, or right-click on it and select **Modify Legend Frame Properties** from the pop-up menu.
2. In the **Legend Frame Properties** dialog box, click **Sort Labels in Ascending Order**  or **Sort Labels in Descending Order** .
3. Click **OK**.

The Legend Designer window refreshes with your changes.

To return to the default sort order, double-click on the legend and then click **Clear Sort** . This button only displays for map legends, not thematic legends. Map legends have a default sort order, which **Clear Sort** restores.



Changing the Position of One or More Labels in a Map Legend

You can change the position of one or more labels in an Individual Value theme legend or in a map legend. You would do this to more accurately convey information about your map data.


To change the position of a label in a map legend in a Legend Designer window:

1. Double-click on the legend, or right-click on it and select **Modify Legend Frame Properties** from the pop-up menu.
2. In the **Legend Frame Properties** dialog box, in the **Labels** list, select one or more items that you want to move up or down in the list.

Only those items you select will reposition in the list. You may need to uncheck items that you do not want to move.

3. Click **Move Selection Up**  or **Move Selection Down**  to reposition your selection in the list.
4. Ensure that the items you want to display in the Legend Designer window are selected in the **Labels** list. Unchecked items will not display in the Legend Designer window.
5. Click **OK**.

The Legend Designer window refreshes with your changes.


To return to the default sort order, double-click on the legend and then click **Clear Sort** . This button only displays for map legends, not thematic legends. Map legends have a default sort order, which **Clear Sort** restores.

Show Record Counts beside Labels in a Map Legend

You can display a record count beside each label in a map legend. This is useful for showing how your data spreads across the values of the map theme.

Record counts only display for Ranged, Graduated, and Individual value themes. Map legends and other thematic types do not support record count.

To add record counts beside labels in a map legend in a Legend Designer window:

1. Double-click on the legend, or right-click on it and select **Modify Legend Frame Properties** from the pop-up menu.
2. In the **Legend Frame Properties** dialog box, click **Show Record Count** .
3. Click **OK**.

The Legend Designer window refreshes to show a record count beside each label.

Resizing Legend Frame Swatches

You can change the swatch size for lines and regions after creating a legend. These changes apply to individual legend frames, and may vary between different frames.

To change the swatch size:

1. Double-click on the legend, or right-click on it and select **Modify Legend Frame Properties** from the pop-up menu.
2. In the **Legend Frame Properties** dialog box, select the units you want to use from the **Paper Units** drop-down list.
3. Edit one or more of the following values:
 - **Line Sample Width** - Enter a value for the width of a line segment in the map frame of a Legend Designer window. You can specify 12 to 144 points, 1 to 12 picas, 0.666667 to 2 inches, 4.23333 to 50.8 millimeters, or 4.23333 to 50.8 centimeters. The default value is 36pt (points).
 - **Region Sample Width** - Enter a value for the width of a swatch in the map frame of the Legend Designer window. You can specify 8 to 144 points, 0.666667 to 12 picas, 0.111111 to 2 inches, 0.282222 to 5.08 millimeters, or 0.282222 to 5.08 centimeters. The default value is 32pt (points).
 - **Region Sample Height** - Enter a value for the height of a swatch in the map frame of the Legend Designer window. You can specify 8 to 144 points, 0.666667 to 12 picas, 0.111111 to 2 inches, 0.282222 to 5.08 millimeters, or 0.282222 to 5.08 centimeters. The default value is 14pt (points).
4. Click **OK**.

To reset the default value as a preference, see [Setting your Legend Designer Window Preferences](#)).

Setting Legend Frame Swatches to Auto-Resize to the Label Font

You can have swatch sizes for lines and regions auto resize with font size changes. When setting the font size for labels in the **Legend Frame Properties** dialog box, you can select to auto increase sample (swatch) size to match the font size setting.

To auto increase the sample size to match the font size:

1. Double-click on the legend, or right-click on it and select **Modify Legend Frame Properties** from the pop-up menu.
2. In the **Legend Frame Properties** dialog box, click **Aa** button in the Labels pane and set a new font size for labels.
3. Select the **Auto Increase Sample Size to Match Font** check box.
4. Click **OK**.

The Legend Designer window refreshes and the sample swatches resize to match the font size of the labels. This setting, on an individual legend frame, overrides the Legend Designer window preference set by selecting on the **PRO** tab, in the **Options** group, click **Legend Window**.

Improvements to Legend Swatches

Multiple changes have been made to improve legends swatches. This includes various types of swatches (custom symbol, rectangular fills, etc.). Changes also include appearance on-screen, as well as when printing or exporting.

Custom Symbol Legend Swatches

Many of the raster images that are used as custom symbols (in the CUSTSYMB directory) are now drawn in a different way that improves the appearance of the images. This is especially noticeable when an image is drawn at a smaller size than the original image. This should look better on-screen (in Layout or Legend windows), as well as when printed or exported.

Extra Border around Rectangle Fill Swatches when Printed

Previously, printing a Layout containing Legend swatches for fills and lines frequently resulted in blurry edge. Now the edges will be crisp.

Wrong Colors In Legend Swatches when Printed

Previously, sometimes the color of the legend sample did not look correct. This was due to smoothing. Now the smoothing has been turned off so the sample should look crisp and have the correct color when printed.

Viewing PDF Files containing Legend Frames in Adobe Acrobat

If you print a layout with legend frames, to PDF, you may need to adjust your Acrobat settings. This is especially relevant when using a custom symbol with Show Background turned on, or a fill swatch.

If you see a thin gray line around the edge of the legend swatch, you may need to turn off Image Smoothing in Acrobat. To do that, in Acrobat go to `Edit > Preferences > Page Display > Rendering > Smooth Images` (uncheck).

Advanced Options when Creating Map Legends

You can create custom labels for a map legend using an expression that references several columns of text in a map layer table. For a description of how to do this, see [Using an Expression to Customize Legend Label Text](#).

The attributes for each legend frame, such as the title and label styles, can be derived from the additional sources. These are:

- **Joined tables** Select to join tables "on-the-fly", to obtain legend feature descriptions from another table while you are creating a legend, see [Creating a Legend with Joined Information](#).

- Map table metadata Save default settings that are unique to a map layer as metadata in its table, see [Saving Legend Attributes to Metadata](#).

Using an Expression to Customize Legend Label Text

You can create custom labels for a map legend to control the contents of the legend list.

To create a label based on a value derived from your table, you use an expression containing string functions to fine tune your labels. For an overview of how to work with and formulate expressions, see [Creating Expressions](#).

To create customized labels for a legend frame:

1. Choose **Add Legend** from the **MAP** tab or **LEGEND** tab.
2. In the Create Legend Choose Layers screen, make your settings and proceed through to the Frame Properties screen.
3. In the Create Legend Frame Properties screen, from the **Label styles with** drop-down list, select **Expression**.
4. In the **Expression** dialog box, type the expression you want to create or use the drop-down lists. (An example follows these instructions.)

Put quotation marks around text in a label expression. For multiline labels, use CHR\$(10) to reference several columns of text.

The results of the expression are the labels for your legend symbols. Note that an expression can be multi-line.

Example: Your thematic map shows countries categorization by malaria control status. You want to create a map legend listing countries in the Pacific by name and population. You must first select the countries located in the Pacific and then create the map legend. In Step 1 of the **Create Legend** wizard, choose your map selection as the map layer to display in the legend. In Step 3, select to use an **Expression** from the **Label styles with** drop down list. You then create the expression:

```
Country + " (" + Str$(Population) + ") "
```

Where Country is the column containing country names, Str\$(Population) converts the values in the Population column to strings for display, which will display in brackets "(" and ")". The resulting labels in the legend frame list will look like this:

Papua New Guinea (6858266)

Solomon Islands (538148)

Vanuatu (239651)

See Also:

[Labeling with Expressions](#)

Creating a Legend with Joined Information

When creating a legend, you can select to perform a join to add a temporary column from another table that you can use for your feature descriptions in a legend frame. You can use this column for your feature descriptions. Again, this column can be any column value, or one that you create. This column is saved automatically in the workspace.

Creating a legend using joined information is useful if you have a large table of many records that fall into a small number of categories. Instead of repeating the category descriptions over all the records, a code is assigned to each category and stored for each record instead of a description. A different table stores the code and its description. You can use the category description in the legend, not the code, once a join between two tables exists. You can do this by using the description column for legend labels. (It is also possible to create this kind of look-up table in a table's metadata.)

Join option is only available when there are at least two tables open in MapInfo Pro.

To create the legend using joined information:

1. Make the Map window active.
2. From the **MAP** tab, select **Add Legend** and make your selections in Step 1 and Step 2 screens. For details, refer to [Creating a Legend for your Map](#).
3. In the **Create Legend Frame Properties** screen, from the **Label styles with** drop-down list, choose **Join**.
4. In the **Update Column** dialog box, from the **Get Value From Table** drop-down list, choose the table you want to join to and then click **Join**.
5. In the **Specify Join** dialog box, specify the matching columns in the tables to join and then click **OK**.
6. In the **Update Column** dialog box, select one of the following from the **Calculate** drop-down list:
 - **Count** to display a count for legend labels.
 - **Value** and then select the column name or expression to use for legend labels from the next drop-down list. If you select expression, then in the **Expression** dialog box type the expression you want to create or use the drop-down lists.
7. Click **OK** in the dialogs to return to the Frame Properties screen.
8. Click **Finish** to display the legend.

Note: If the temporary column name is saved to legend metadata, but the temporary column is not saved in the workspace (for example you close tables and the join), you'll get an error when you re-create the legend from metadata. You must either redo the join to get the temporary column, or choose a different label expression for the legend text.

For an example of creating a theme using a join, see [Updating Columns using Thematic Mapping](#).

See Also:

[Geographic and Descriptive Joins](#)

Saving Legend Attributes to Metadata

The **Create Legend** wizard lets you save default settings that are unique to a map layer. The **Create Legend** wizard uses legend frame defaults for title, subtitle, and symbol, which are set as Legend Designer window preferences (on the **PRO** tab, click **Options**, and **Legend Window**). You can override these settings for a map layer in the Create Legend - Frame Properties screen where you have the option to specify unique attributes for title, subtitle, label style, and label values. You can save these unique attributes as metadata keys to the table, so that they become defaults for the map layer. The next time you create a legend that includes the map layer, its metadata keys are read and applied to the map layer's legend.

When there are no metadata keys in the underlying table, which can be different for each layer, then the legend frame defaults that are set as preferences for the Legend Designer window are used.

To save unique attribute settings to a table's metadata:

1. Make the Map window active.
2. From the **MAP** tab, select **Add Legend** and make your selections in each screen as described under [Creating a Map Legend](#) until you get to the step 3.
3. In the **Create Legend Frame Properties** screen, select a map layer from the **Legend Frames** list and then apply settings for the map layer as described under [Create Legend: Setting Frame Properties](#).
4. Click the **Save frame settings to Metadata** button. This saves the attribute settings you made for the map layer to its table. Your settings become the new metadata defaults for the map layer's legend frame.
5. Repeat Steps 3 and 4 for each map layer that you wish to save unique attributes for.
6. Click **Finish** to create the legend in a Legend Designer window.

The legend frames for those map layers that you selected to apply unique attributes for display with those attributes. The next time you generate a legend with these map layers, their legend frames will display with the attributes saved as metadata. The following example shows the use of metadata keys.

The metadata keys are:

```
"\Legend" = ""
"\Legend\Title" = "a string value"
"\Legend\Subtitle" = "a string value"
"\Legend\Column" = "a column identifier"
```

For example:

```
"\Legend" = ""
"\Legend\Title" = "Legend"
"\Legend\Subtitle" = ""
"\Legend\Column" = "object"
"\Legend\StylesFrom" = "MapStyles"
"\Legend\Label" = "Ucase$(type) "
```

If there is no metadata for `\legend\column`, the default is:

```
Styles from = unique map styles (e.g., the object column)
```

If there is no metadata for `\legend\label`, the default in the is:

```
Label styles with = <Style Name>
```

The current value of **Style Name** from Create Legend Legend Default Properties is used to generate legend text, based upon legend preferences. If there is no metadata for `\legend\title` or `\legend\subtitle`, then the default will be based on the **Title** and **Subtitle** text defined in legend preferences.

Legend Text from Pass-Through Metadata Keys

For data that has feature codes, but no feature description, there is additional metadata support, called Pass-Through Keys. The keys map column values to descriptive text used in the legend.

Table metadata contains pass-through text for legends if the following criteria are met:

1. The metadata label expression is a simple column reference.
2. A pass-through prefix key exists in the metadata that is the result of appending the column reference to the top-level `"\legend"` key.
3. For example, given the following legend label expression key:

```
"\legend\label" = "CFCC"
```

The following pass-through prefix key must also exist in metadata:

```
"\legend\CFCC"
```

The prefix key may exist as a separate line in metadata:

```
"\legend\CFCC" = ""
```

If the above two criteria are met, then the legend creation code looks for legend text in additional 'pass-through' metadata keys that are the result of appending evaluated label expressions to the prefix key. The values for each key replace the original expression value:

```
"\legend\CFCC\F32" = "Church"
```

```
"\legend\CFCC\F34" = "Hospital"
```

```
"\legend\CFCC\value_n" = "legend text used in place of CFCC value_n"
```

This results in a legend with the descriptive text "Church", "Hospital" etc., rather than "F32", or "F34".

See Also:

[Working with a Thematic Map Legend](#)

MIF Import/Export Information

Metadata Pass-through Key Limitations

Once a Legend Frame that uses pass-through metadata keys for text is created, changes to the pass-through key values do not display in a Legend Refresh. They will display the next time the Legend Frame is recreated.

Legend Attribute Considerations

For Theme Layers

If you select a theme layer, the title and subtitle currently set for the thematic legend display. You can change the title and subtitle text, but the other controls are not available. Changing the theme legend's title and subtitle affects all occurrences of the thematic legend. In addition, fonts specified in Step 2 of the **Create Legend** wizard are not applied to thematic legends.

For Display Style Overrides

If you have Style Override activated in a layer (double-click the layer in the **Layers** or **Explorer** window and check the **Style Override** check box on the **Layer Display** tab), the column and label fields will be ignored when the legend is created. Step 3 of the **Create Legend** wizard will indicate whether Display Style Override has been activated for the selected legend frame. If the Style Overrides are turned off for a map layer and the legend is refreshed, it will be refreshed according to the column and label originally set.

MapInfo Pro contains metadata keys for labels for layers that have Display Style Override activated, but they must be put in manually.

We support the following metadata keys when Display Style override is active. If these keys exist in the .TAB file, their values are used for the legend text.

```
\legend\allpoints = some string value  
\legend\alllines = some string value  
\legend\allregions = some string value
```

Creating a Legend for Your Raster Overlay

About Creating Raster Legends

You can create legends for raster overlays. On the **MAP** tab, in the **Content** group, click **Add To Map** and then **Legend**. If a raster layer supports creating legends it displays in the list in the Create Legend wizard. When creating the raster legend for the first time, MapInfo Pro decides how to display it based on the type returned in the legend XML.

- Continuous, the legend contains a color bar and a min and max label, the legend sorts in descending order by default with the maximum value on top. If there are fewer than 20 values in the continuous data, the legend displays as a list of discrete colors and values rather than a color bar.
- Classified, the legend contains a list of colors and classification labels. When changes are made to the raster using Advanced Raster tools that affect the display, the raster legend automatically updates.

About Continuous Raster Legends

A Continuous raster legend displays like a color bar. The larger the filter value, the more the color bar looks like a smooth gradient of colors. The initial bar size is based on a default value, but can be changed. The default filter is 100 colors evenly distributed along the bar height. The default size is 0.25 inches by 2.0 inches in a vertical orientation. You can change the size and orientation in the Legend Frame Properties dialog (right-click on the legend frame and select **Modify Legend Frame Properties**). The continuous raster legend uses the title or label row font sizes from settings in the Legend Preferences dialog.

MapInfo Pro rounds the values of a continuous raster to produce nicer looking values in the legend. The rounding is done per value, so the precision between the minimum and maximum values may not be the same. The values in the legend may not be exactly the same as the values in the XML file. To show different values, you can customize the labels in the Legend Frame Properties dialog (right-click on the legend frame and select **Modify Legend Frame Properties**).

About Classified Raster Legends

Classified raster legends look like an Individual Value thematic legend, which is a discrete list or rows separated by a gap. The classified raster legend region swatch sizes, title, and label row font sizes are set in the Legend Frame Properties dialog (right-click on the legend frame and select **Modify Legend Frame Properties**).

Adding a Raster Legend

When creating the raster legend for the first time, MapInfo Pro decides how to display it based on the type returned in the legend XML as a Continuous raster legend or a Classified raster legend.

To create a legend for a raster or for a raster overlay:

1. On the **MAP** tab, in the **Content** group, click **Add To Map** and then **Legend**.
2. In the **Create Legend** wizard select the raster layer, or layers, that you want to create a legend for.
3. Click **Next** to control the look of the legend, or click **Finish** to create the legend using the default settings.

When creating a raster legend, some controls are hidden in the last step of the Create Legend wizard (on the Frame Properties screen). A Filter combo box on the screen lets you select or enter the number of rows from 1 to 1600 to see in the legend. If the total number of rows for a raster legend is 100 and you enter a value of 20, then only 20 colors display in the raster legend frame. The default value is 100.

Sorting Raster Legend Values

Continuous raster legends sort in descending order (high values on the top and low values at the bottom) by default. Classified raster legends display in whatever order the raster handler provides.

The sort order for all raster legends can be changed to ascending, descending, or to the original sort order. To do this:

1. Right-click on the legend frame and select **Modify Legend Frame Properties**.
2. In the **Legend Frame Properties** dialog, change the sort order by clicking the **Sort Labels in Ascending Order**, **Sort Labels in Descending Order**, or **Clear all Label Ordering** button.

Enhanced Rendering

Enabling Enhanced Rendering

Enhanced rendering in MapInfo Pro allows you to create translucent labels, themes, and layers, as well as apply anti-aliasing to smooth the jagged edges of text, labels, lines, curves, region borders and raster images. We also provide a way of drawing selections and two export formats as a result of using enhanced rendering support.

Enhanced rendering is possible through Microsoft's GDI+, an operating system level capability that provides two-dimensional vector graphics, imaging, and typography handling. GDI+ improves on standard Windows Graphics Device Interface (GDI) by adding new features and optimizing existing features.

To take advantage of enhanced rendering in MapInfo Pro, you must turn on the capability. If you do not turn on enhanced rendering, rendering is performed using the standard Windows Graphics Device Interface (GDI).

Enhanced rendering does not mean that translucency and anti-aliasing are automatically applied. Translucency and anti-alias settings must also be applied to generate the best looking maps. You will, however, automatically have the improved selection drawing style (see [Enhancing Selection Drawing Style](#)). Translucency and Anti-Aliasing are discussed under [Applying Translucency](#) and [Anti-Aliasing](#), respectively.

Enhanced rendering is supported for **Map**, **Browser**, and **Layout** windows. Enhanced rendering is not available for other types of windows, such as the **Legend Designer**.

To enable enhanced rendering, set it in the **Options** dialog for the **Map** (on the **PRO** tab, click **Options**, and **Map Options**), **Browser**, **Layout**, or **Layout** windows, or through a MapBasic statement. It is controlled on a per window basis.

Legends are drawn in the same mode as the associated **Map** window. So, if a map is in enhanced rendering mode, its legend is as well. There are no enhanced rendering options in the **Legend Options** dialog.

Like the **Map** and **Browser** windows, enhanced rendering for **Layout** and **Layout** windows is enabled in its **Options** dialog. This means that any annotations added to the layout, such as titles or watermarks will be drawn using enhanced rendering. If you add **Map** and **Browser** windows that already are enabled for enhanced rendering, enhanced rendering will be forced on for the **Layout** window. Enhanced rendering for the **Map** and **Browser** windows have no affect on the **Layout** window, and vice versa.

There is also a style preference to determine the initial enhanced rendering state for newly created windows. See [Enabling Enhanced Rendering for New Windows](#).

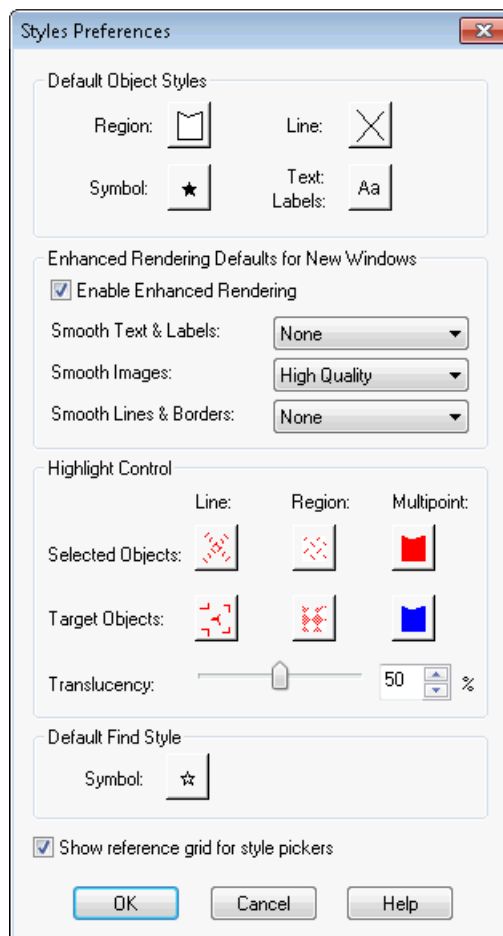
Enabling Enhanced Rendering for New Windows

MapInfo Pro provides a Style preference to determine the default state of enhanced rendering for newly created Map, Browser, Layout, or Layout windows. Each window can be changed independently at a later time. This preference is disabled by default to maintain backwards compatibility with earlier versions of MapInfo Pro.

Note: These preferences control the state of new windows, not existing windows. This means if you are opening old workspaces, they will open with enhanced rendering disabled, regardless of how the Style preference is set.

To set enhanced rendering as a default style preference:

1. On the **PRO** tab, click **Options**, and **Styles** to open the **Styles Preferences** dialog box.
2. Select the **Enable Enhanced Rendering** check box and make your selections from the drop-down lists.



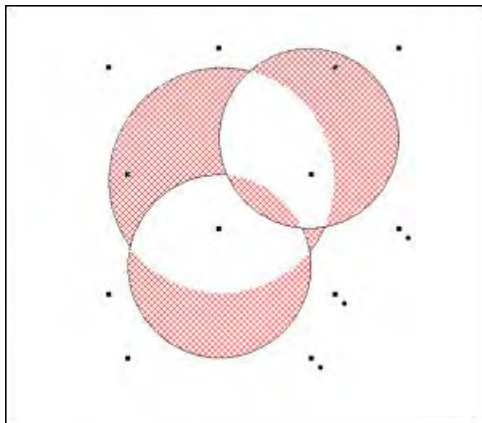
For more information, see [Setting your Style Preferences](#).

Enhancing Selection Drawing Style

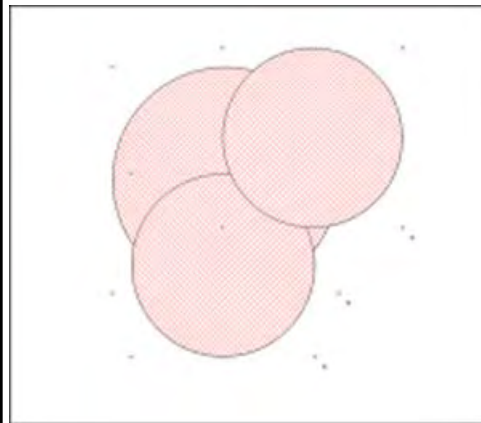
MapInfo Pro offers a selection drawing style that uses translucency through enhanced rendering. This requires that the window is enabled for enhanced rendering, see [Enabling Enhanced Rendering for New Windows](#). This style method is useful when you need to select map objects, such as points or regions, where they overlap or appear to draw on top of one another when you zoom out.

To control the translucency setting for the selection style, go to the **Styles Preferences** dialog box. The slider is located in the Highlight Control group for that dialog box. For more information, see [Setting your Style Preferences](#).

If enhanced rendering is turned off, selections are drawn using an older selection method. This method, under certain situations, causes overlapping objects to appear unselected.



Enhanced Rendering Turned Off



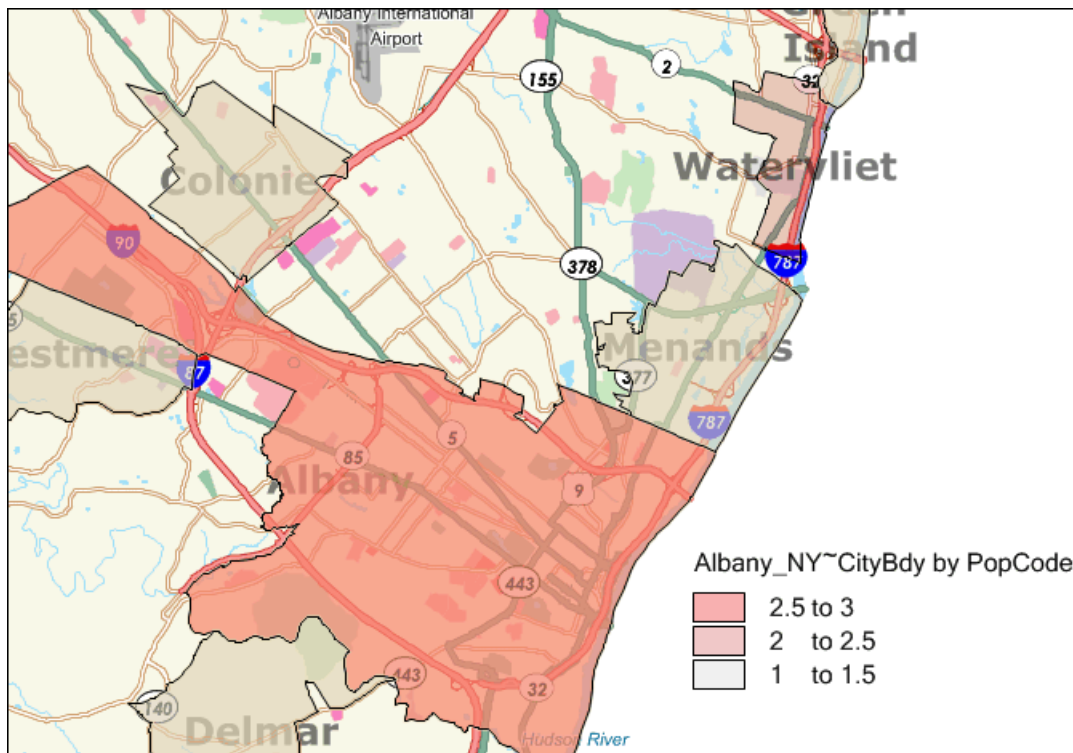
Enhanced Rendering Turned On

Note: A particular selection style may not look ideal in either mode. You will have experiment with the settings.

Applying Translucency

One key capability of enhanced rendering is the ability to apply translucency to a map layer so that the layer underneath is partially visible. This feature can be a very powerful analytical tool. For example, translucency on a ranged theme provides two levels of information in a single view-the

distribution of data that matches some criteria, and the view below the ranged theme that offers a reference map to that data.



MapInfo Pro supports translucency for a wide variety of layer types, including vector objects, labels, themes, raster and grid images, and annotations (cosmetic layer and graphic objects added to layouts).

Translucency is controlled on a per layer basis. Each layer has its own translucency setting. Translucency for map layers and themes is set in the **Layer** window using a slider control on the **Layer Properties** dialog. Translucency for labels is set in the **Layer Properties** dialog. All objects in the same layer are drawn at the same translucency level. Labels, themes and map objects in the same layer have independent translucency settings. You can have multiple translucent layers in a **Map** window, each with its own translucency value.

In order to use translucency in a **Map** or **Layout** window, you must enable enhanced rendering in the appropriate window's **Options** dialog. Enhanced rendering can also be set as a Style preference for new windows you create. For more information, see [Setting your Style Preferences](#).

Keep in mind, when translucency is on (value > 0 percent), enhanced rendering is automatically enabled. However, the reverse is not true. If translucency is turned off (value = 0 percent), enhanced rendering will not be turned off. You can turn it off manually, if desired, by clearing the Enable Enhanced Rendering check box in the **Options** dialog.

Note: There is a shortcut to enabling enhanced rendering if you are already in the **Layer Properties** dialog box. You can enable it by setting a translucency value of greater than 0. This saves you from returning to the **Map** or **Layout Options** dialog to enable it.

Translucency is also available for the Cosmetic Layer. Set translucency for the Cosmetic Layer just like you would for another layer type, in **Layers** window's **Layer Properties** dialog box. The translucency setting will be applied to the entire Cosmetic Layer.

Note: If you open a workspace that does not have enhanced rendering enabled and you wish to use the translucency and anti-aliasing features, you must enable it on a per window basis using the **Options** dialog box for the **Map**, **Browser**, **Layout**, or **Layout** window.

Translucent Raster and Grid Images

Images can be drawn translucently with or without enhanced rendering enabled. The advantage of using enhanced rendering is seen when a translucent raster or grid image is printed. Enhanced rendering enabled forces MapInfo Pro to print to offscreen bitmaps, which typically yields better looking results than if printed without enhanced rendering.

For raster images, there is no change to how you set translucency through the user interface or via MapBasic commands. Set the translucency in the **Adjust Image Styles** dialog box (On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.; in the **Layers** window, double-click the layer name; in the **Layer Properties** dialog box, check the **Style Override** check box and click the **Style** button).

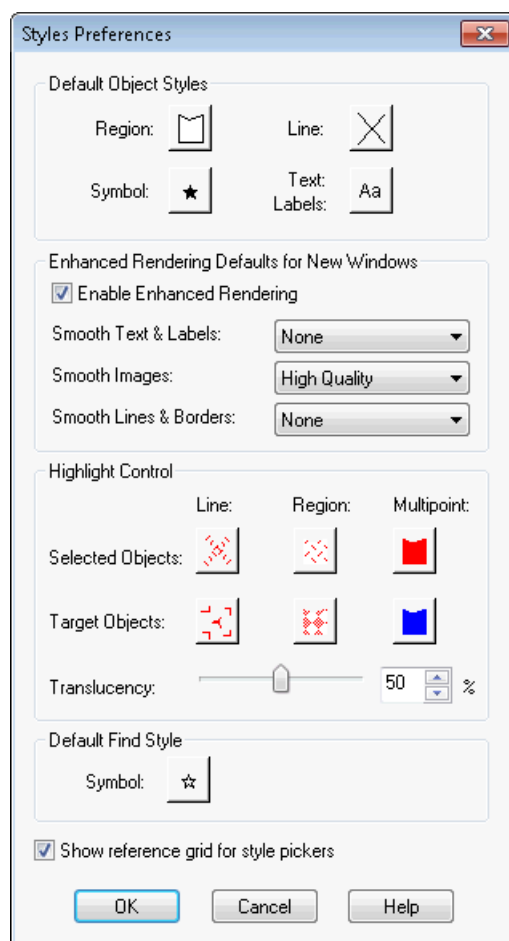
Raster display options can also be controlled on a per table basis so that the image will open using those particular settings by default. These are found on the **TABLE** tab, in the **Maintenance** group, by clicking **Raster**, and **Adjust Image Styles**.

For grid images, the translucency slider is an option in the **Grid Appearance** dialog. This dialog is reachable from the **Styles** button in the **Create Thematic Map - Step 3 of 3** or the **Modify Thematic Map** dialog boxes.

Anti-Aliasing

One aspect of enhanced rendering is the ability to employ an anti-aliasing process that removes the jagged edges of text, labels, images, and vector lines and borders. Enabling enhanced rendering does not automatically enable anti-aliasing (smoothing options are set to None by default). You must set it in Style Preferences for the default state of newly created windows, or in the **Options** dialogs for individual **Map**, **Browser**, **Layout**, and **Layout** windows.

To open the **Styles Preferences** dialog box, on the **PRO** tab, click **Options**, and **Styles**.



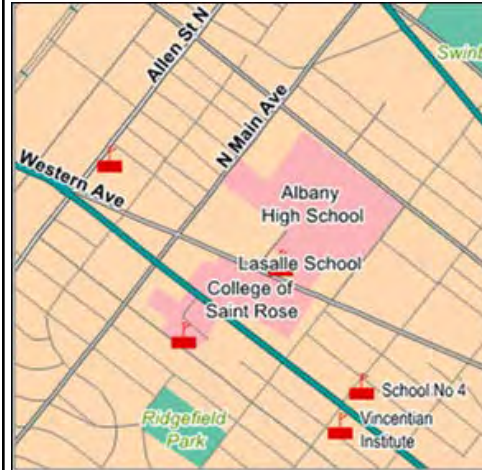
To remove the appearance of jagged characters in horizontal and rotated labels and on custom text objects in the window, select the **Enable Enhanced Rendering** check box and choose **Anti-Alias** from the **Smooth Text & Labels** drop-down list. Smoothed text and labels look better on your map, but because these objects require more rendering, it may take longer to display your map. (For more information, see [Setting your Style Preferences](#).)

If you wish to smooth raster and grid images in your window, you can set the quality of the resolution. Low Quality indicates there will be some image smoothing, but not at the expense of rendering performance. High Quality means that you want the highest amount of smoothing MapInfo Pro can provide. This will cause your map to draw more slowly than the Low Quality option.

The third anti-alias setting applies to lines and borders. The following illustration shows the before and after affects of anti-aliasing applied to the roads and labels in the Map window.



Enhanced Rendering Off



Enhanced Rendering On, with smoothing options

Note: If you open a workspace that does not have enhanced rendering enabled and you wish to use the translucency and anti-aliasing features, you must enable it on a per window basis using the **Options** dialog box for the **Map**, **Browser**, **Layout**, or **Layout** window.

EMF+ and EMF+Dual Export Formats

In order to take full advantage of enhanced rendering, MapInfo Pro provides EMF+ and EMF+Dual image export formats. These are enhanced metafile vector image formats that support Windows GDI+ (Graphics Device Interface). Use these to save translucent maps instead of exporting to the older metafile formats, such as EMF and WMF. Older formats do not support translucency very well, which display images using translucency with a dithered, or speckled, appearance.

Choose EMF+ if you expect to bring your maps into an application that supports EMF+, such as Microsoft Office. Choose EMF+Dual (a combination of EMF and EMF+) if your maps may be used in applications that may or may not support EMF+, such as Microsoft's Office 2007.

Note: EMF+Dual format will produce a larger file than EMF+. But it provides better compatibility with older application that do not support EMF+.

To save to an EMF file:

1. On the **HOME** tab, in the **File** group, click **Save**.
2. In the **Save Window to File** dialog box, from the **Save as type** list, select either **EMF + Metafile (*.emf)** or **EMF + Dual Metafile (*.emf)**.

Internet Connectivity and MapInfo Pro

MapInfo Pro contains options that bring the Internet into your mapping sessions and bring your maps to the Internet. Using active objects and the **HotLink** command, you can launch Internet URLs or files directly from objects or labels on your map. For example, you can link a location on your map to a Web site for more information or to an image file that shows more details about the location.

What Are Active Objects?

Active objects are map objects that are associated with files or URLs. The file can be a bitmap, a MapInfo Pro workspace or table, a MapBasic program, or any type of executable file whose extension is associated with an application installed on your system.



The active object in this map (red triangle) is linked to a webcam web site that displays an erupting volcano.

Creating Active Objects

When a map object is linked to a URL or file, the object becomes an active object. Clicking on an active object with the **HotLink** command will launch the associated URL or file. To use active objects in your map, you must create a column in your table to store the file link information.

To link objects to a URL or file:

1. Open a MapInfo Pro table that contains map objects, (for example, a MapInfo Pro table with points that represent universities in the United States).
2. Create a character field where you can enter a URL or file for the desired object:
3. On the **TABLE** tab, in the **Maintenance** group, click **Table Structure** to open the **View/modify Table Structure** dialog box.
4. Choose **Add Field** and add a character field. You can name the field as you choose. Make sure the field is wide enough to accommodate the longest URL or file name string.
5. Click **OK**.
6. Open a new **Browser** window (on the **HOME** tab, in the **Windows** group, click **New Document**, and click **Browser** from the list), and in the new field enter a URL or file string to be associated with that row's map object.
7. Add the table to a new or existing Map window. Make this Map window the active window.
8. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
9. Select the layer whose Hotlink options you want to set and click the **Hotlink Options** command. The **HotLink Options** dialog box opens.

Note: The **HotLink** command is disabled when a thematic, grid, raster or cosmetic layer is highlighted.

10. Click **Add**.
11. Click the **Filename Expression** drop-down list and choose the field created in step 2.

If the location of the files associated with the map objects is relative to the location of the table in which the map objects are stored, then select the **File locations are relative to table location** check box.

12. Choose **Labels**, **Objects** or **Labels & Objects**. Your choice determines how the objects in the layer are activated (the URL or file launched).
13. Select the **Save options to table metadata** check box to restore these HotLink options automatically the next time you use the same table in a Map or Browser window.
14. Click **OK**.

Using the HotLink Command in a Map Window

The **HotLink** command allows you to launch a URL or file associated with an active object by clicking on the object or its label. The **HotLink** command is available for Map windows containing at least one active layer. A layer is active if it is selectable or editable and its HotLink options have been set (in particular the Filename Expression).

To launch a URL or filename using the **HotLink** command:

1. On the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Hotlink**. When the cursor is positioned over an active object, the cursor changes.

Note: The link associated with the active object displays in the Status Bar.

2. Click the object or label to launch the associated URL or file. If multiple objects exist under the point where you click, a pop-up window appears containing a list of the selectable objects. Choose the object whose link you want to activate.

Adding URL Information to Your Table

You can create active objects for your existing table by adding URL-specific data to your table.

To add URL information to an existing table:

1. On the **Table** tab, in the **Maintenance** group, click **Table**, and **Modify Structure** to open the **View/Modify Table Structure** dialog box.
2. Choose **Add Field**. Add a character field to contain the active object text. Make the length of the field long enough for the active object text, and name the field.
3. Click **OK** to complete the field addition.
4. Open the table in a **Browser** window (on the **HOME** tab, in the **Windows** group, click **New Document**, and click **Browser** from the list).
5. Enter the appropriate file link text in the new field for each row in the table.

Now that your table contains the active objects, you need to set the HotLink options for the table.

Example-Putting States URLs on a Map

In this example, we demonstrate how to add active objects to a map for each region in the map. In the United States, each state has a web site that provides a wide range of information about the specific state. In this example, we place these state URLs on a map that might be used on a national web site. You can modify this process based on your own needs.

Note: An example of the `USA.TAB` file with active objects in it is in the sample data you can install from the MapInfo Pro DVD.

To create an active object for each region on a map:

1. Display the map containing the active objects as a map.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the layers, to open the **Layers** window. Select the layer that contains the active objects.

This enables the **HotLink Options** command.

3. On the **MAP** tab, in the **Options** group, click **HotLink Options** to open the **HotLink Options** dialog box.
4. Choose the **Filename Expression** from the drop-down list and do one of the following:
 - Find the field name that holds the link information
 - Use an expression that concatenates two or more fields to define the file link. For example, in a map of the United States, you can use this expression:

```
http://www." + State_Name + ".com
```

Note: To add the table path to the filename before launching it, check the file locations are relative to table location.

5. (Optional) Choose the **Alias Expression** from the drop-down list and do one of the following:
 - Find the field name that holds the link alias information
 - Use an expression that concatenates two or more fields to define the alias.
6. In the **Activate on** group, choose the active object location for the launch when the user clicks the object with the **HotLink** command (located on the **MAP** tab, in the **Options** group, **Map Tools** dropdown). Choose:
 - **Labels** - to launch the active object when you click the **HotLink** command on an object's label.
 - **Objects** - to launch the active object when you click the **HotLink** command on an object.
 - **Labels & Objects** - to launch the active object when you click the **HotLink** command on either an object or its label.
7. Check the **Save options to metadata** box to save the HotLink options to the table's metadata.
8. Click **OK**.

Adding the Path to the Filename

If you want MapInfo Pro to add the table path to filenames before launching them, check the File locations are relative to table location box. This is useful if you are distributing tables containing HotLinks to files located in the same directory. Regardless of where the data is installed, the HotLinks will work. If the box is not checked, MapInfo Pro launches the file without modifying the name.

Note: Active objects that are URLs are not modified before they are launched, regardless of whether the box is checked.

Saving HotLink Options to Metadata

Check the **Save options to table metadata** box to save the HotLink options to the table's metadata. Every time you open the table, the HotLink options will be restored. This check box is not available if the table is read only or if metadata operations are not supported on the table type, for example, Street Works tables. If you do not check the box, the HotLink settings will be lost when you close the table, unless you save your session to a workspace.

The settings are added to the .TAB file in the Metadata area. The syntax for the HotLink settings is:

```
"\ActiveObject" = ""
"\ActiveObject\Expr" = (where the field or expression is stored)
"\ActiveObject\Mode" = (type of object from which to launch active object)
```

Entries can be one of the following:

```
"HOTLINK_MODE_OBJ"
"HOTLINK_MODE_LABEL"
"HOTLINK_MODE_BOTH"
"\ActiveObject\Relative" = (relative to path)
```

Entries can be one of the following:

```
"TRUE"
"FALSE"
```

Using the HotLink Command in Browser Windows

If you have saved the HotLink options to the table's metadata, then you can also use the **HotLink** command in the **Browser** window. Just click the **HotLink** command to activate it (located on the **MAP** tab, in the **Analyze** group), move the cursor to the field you have set up for your active objects, and click any of the links.

Note: The **HotLink** command is available in a **Browser** window only when the HotLink settings are saved to the table's metadata. Saving your session to a workspace without saving the HotLink settings to metadata does not work because there are no user interface settings for using the **HotLink** command in a **Browser**.

When you open a new **Browser** window, MapInfo Pro reads the table's metadata to determine if the HotLink filename expression matches any of the **Browser**'s field expressions. If so, the text in that field is underlined, to indicate an active object. The **HotLink** command will be available for that **Browser** window and you can select links from it.

If the HotLink filename expression is not a table column name, you can create a HotLink field in the **Pick Fields** dialog box, using the HotLink filename expression as the field expression. You cannot edit data in a **Browser** window while the **HotLink** command is active, but you can select rows and move or resize **Browser** fields.

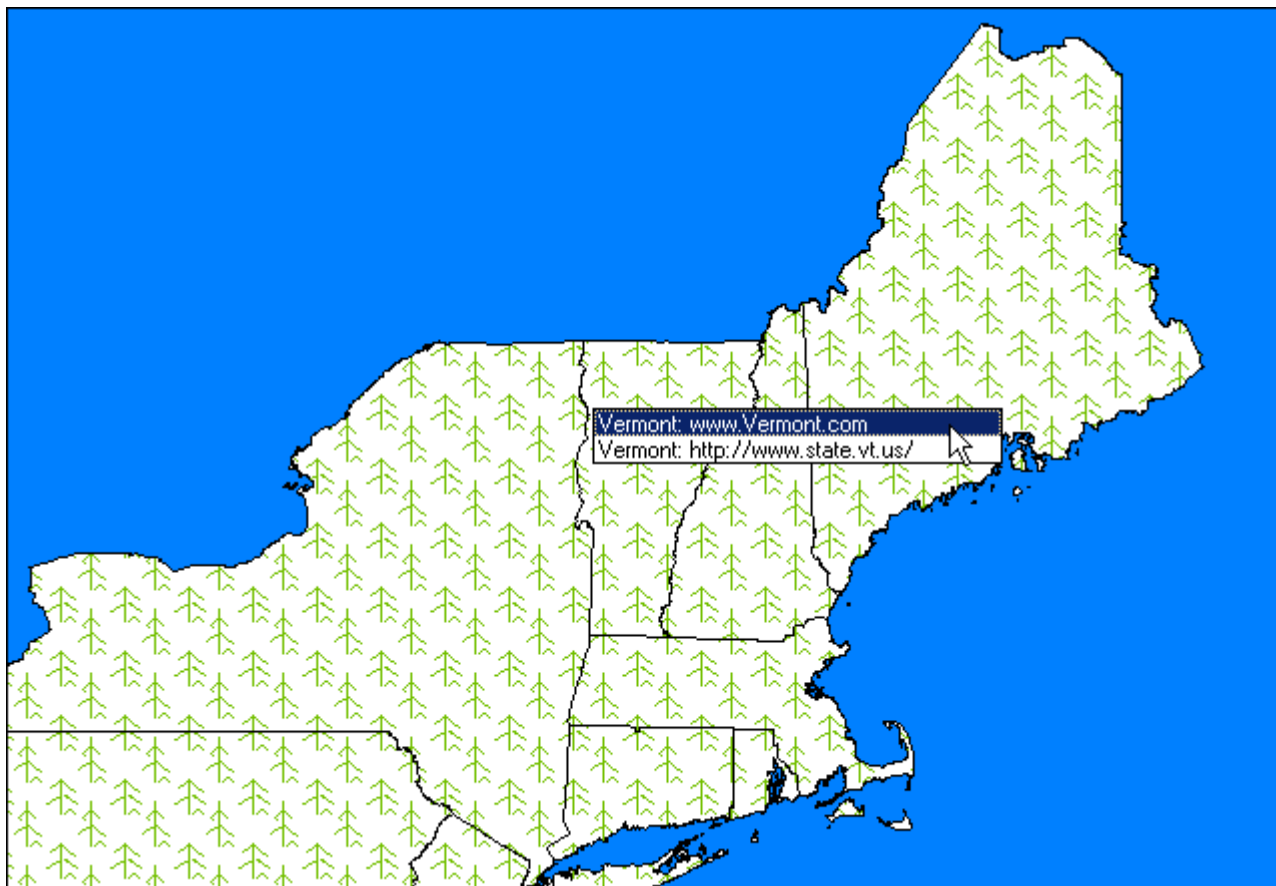
Creating Multiple HotLinks in a Map

Many users have asked us to allow more than one HotLink definition per map object. When a user clicks a map object with multiple HotLinks, a list of options are displayed, which allows your user to access different types of content for a single map object.

For example:

- Your Web site
- Product or Service Documents
- Applications
- Flash Demonstrations
- Anything you can open with a mouse click or double-click

For example, you could offer your customers access to your web site, product information, and a tutorial all from the same map object.



Adding More than One Hotlink

To create more than one hotlink for a layer:

1. Make the **Map** window active.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
3. Click the layer you want to add the hotlink to and on the **MAP** tab, in the **Options** group, click **HotLink Options** to open the **HotLink Options** dialog box.

The first time you open this dialog box, there may be no column entries to display.

Note: The check box beside the **Filename Expression** indicates that the HotLink is active. To disable the HotLink, clear the check box beside the Filename Expression.

4. To edit a HotLink definition, select the definition in the list and use the fields and buttons in the **Properties of selected hotlink definition** section to set the values.

Note: To edit a HotLink option, make another selection in this dialog box and click **OK**.

Filename Expression: Use this drop-down list to select a field in the selected layer's table. You can also select the **Expression** option to create an expression. We have created an example expression in the first column. This option defaults to the first field in the table.

Alias Expression: Use this drop-down list to select a field in the selected layer's table. You can also select the **Expression** option to create an expression. This option defaults to the first field in the table. If no alias expression is defined, then the file name or URL is used.

Note: The alias only shows in the dialog that displays after clicking on the map with the **HotLink** command, from this dialog you can select the **HotLink** command to launch.

File locations are relative to table location: Use this check box to indicate whether the HotLink data you are specifying is in the relative path of the open .TAB file. This check box is cleared by default.

Activate HotLink on: Use these buttons to indicate which map feature the user can click to activate a HotLink. Options include **Labels**, **Objects**, or **Labels & Objects**. The **Labels** option is selected by default.

Note: When you select the same activation option for two different Filename Expressions, a list of options displays for the user.

Save options to table metadata: Use this option to save the HotLink options you select in this dialog box to the metadata of the .TAB file. This option is cleared by default.

Accessing Multiple HotLinks

To access these multiple HotLinks:

1. Open the map.
2. On the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Hotlink**.
3. Click an area on the map with multiple HotLinks to see the list.

Removing a HotLink from a Map

There are two ways to remove a HotLink from a map. The **Map** window that contains the HotLinks you want to remove must be open to remove the HotLinks.

To remove a HotLink from a map permanently:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
2. Select the layer that contains the HotLink you want to remove permanently.
3. On the **MAP** tab, in the **Options** group, click **HotLink Options** to open the **HotLink Options** dialog box.
4. Highlight the HotLink you want to remove.
5. Click **Remove**. There is no confirmation prompt for this action.
6. Click **OK** to save this change.

To disable a HotLink temporarily:

1. Follow **step 1** through **step 3** in the previous instructions to display the **HotLink Options** dialog box.
2. Clear the check box beside the **Filename Expression** column of the HotLink you want to disable.
3. Click **OK** to save this change.

Changing the Display Order of HotLinks in a List


If you have multiple HotLinks for a particular map feature, you may want to prioritize the order in which the HotLinks display.

To reorder the list of HotLink entries for a particular layer:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
2. Select the layer that contains the HotLink you want to remove permanently.
3. On the **MAP** tab, in the **Options** group, click **HotLink Options** to open the **HotLink Options** dialog box.
4. Highlight the HotLink you want to move and use the **Up** and **Down** buttons to position the HotLink in the proper order.
5. Click **OK** to save this change.

Multiple HotLink Notes

The following multiple HotLink behavior may not be obvious:

- If a HotLink definition has a Filename Expression value of none (that is, it is an empty string) the **Hotlink Options** dialog box displays the Filename Expression as <undefined>.
- When you hover the  cursor over a map feature that contains a HotLink, MapInfo Pro displays a message in the Status bar describing the content of the HotLink. When there is more than one HotLink for that map feature or the activation attributes overlap, the phrase, **Multiple active objects under cursor** is displayed in the Status bar.

HTML Landing Pages

Using the **HTML Image Map** tool, you can convert a MapInfo Pro map into an HTML image map. Visitors to your Web page can click any region on the HTML image map to link to other HTML pages specific to that region.

The **Landing Pages** option allows you to click any region in the HTML image map and link to an HTML landing page specific to that region. You can put whatever content you want into the landing pages, including column information from your table. The user interface enables you to select the columns you want to use and customize the text.

Selecting Columns for a Landing Page

You can select which columns you want to display on the landing page. Check the **Populate landing pages with record content** box to activate the **Columns** button. Click **Columns** to open the **Choose Columns** dialog box. You can add individual columns or all the columns from your table. By default all the columns in the table are selected and appear in the Columns on landing page list.

To remove a column from the landing page content, click a column to highlight it and click **Remove**. The column name appears in the Columns not on landing page list.

Using Column Name Aliases

You can use column aliases from your table's metadata as the basis of the content of your landing pages.

To bring your column alias metadata into the **Choose Columns** dialog box, click **Load from metadata**. The column aliases display in the **Column name alias** list. Now you can edit the column aliases so that the content of the landing page is what you want.

To edit a column name alias, click an alias from the **Column name alias** list to highlight it, and then click **Edit**. You can make any text changes you want; it is completely customizable.

Additional buttons in the dialog box, **Upper Case**, **Proper Case**, and **Remove `_'**, allow you specify the case of the column text, or remove underscores from column name aliases.

Note: These buttons will change *all* the column name aliases in the list.

In addition, you can save your edits back to the table's metadata. Click **Save to metadata** when you have finished editing the column aliases.

ToolTips

When you hover your cursor over a region or polygon in your HTML image map, a ToolTip displays. The ToolTip information comes from the column you selected in the dialog box.

Backwards Compatibility

The tools described in this section are available for backwards compatibility with maps created before the **Layout Designer** window was introduced in MapInfo Pro. You can still use the older north arrow and scale bar tools to maintain the look and feel of your older maps. When creating new maps, we recommend that you use the North arrow and scale bar features provided in the **Layout Designer** window. For details, see [Adding a Scale Bar to Represent Map Scale](#).

Layout Scalebar AddIn

The Scale Bar tool lets you add a map scale to your layout in a **Layout** window. A map scale is used to reference distances on the map.




Note: To add a scale bar to your map in a **Map** window, see [Adding an Adornment to Your Map](#), which describes how to use the **Scalebar** command located on the **MAP** tab in the **Options** group.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids Guide*.

Before You Begin


Before you can work with this tool, you must ensure that it is running. For instructions, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids Guide*.

When it is running, this tool adds a **Scalebar** command  to the **LAYOUT** tab (in the **Edit** group). Click this command to open the **Create Scalebar** dialog box, where you can select properties and display styles for the new scale bar. You can preview your selections in the dialog before adding the scale bar to your layout.

You will need to have a **Layout** window open in MapInfo Pro and have a map on the layout. For instructions on how to do this, see *Adding a Map to a Layout* in the *MapInfo Pro: Preparing Maps for Publishing* Guide.

Creating a Simple Scale Bar

To add a simple map scale to your layout in a **Layout** window:

1. On the **LAYOUT** tab, in the **Edit** group, click **Scalebar**  to open the **Create Scalebar** dialog box.
2. From the **Link to Map** list, select the map to create a scale bar for.


You can have multiple maps on a layout and you can create a scale bar for each map.

3. Click **OK** to add a scale bar to the layout using all of the default settings.

Double-clicking on the scale bar in the layout opens the **Create Scalebar** dialog box where you can then edit the scale bar properties or display style.

Creating a Scale Bar with Specific Properties

To add a map scale with specific properties to your layout:

1. On the **LAYOUT** tab, in the **Edit** group, click **Scalebar**  to open the **Create Scalebar** dialog box.
2. From the **Link to Map** list, select the map to create a scale bar for.

You can have multiple maps on a layout and you can create a scale bar for each map.

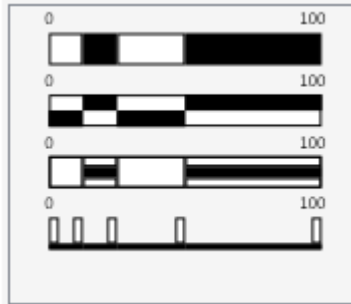
3. Set the scale bar length. The two values are proportional: the first value is the distance on the paper map, the second value is what the first value represents as a distance on the Earth's surface. Specify the length of the scale bar to a maximum of 34 inches or 86.3 cm on the printed map.
4. Set the scale bar height. This is the distance on the paper map to use for the height of the scale bar.
5. Select the **Use Automatic Scaling** check box to include a "nicer" scale value on a map. There is a description just below this check box that explains how the current scale bar will be drawn into the map.
6. Select the **Add Cartographic Scale** check box to include a representative fraction (RF) with the scale bar. In MapInfo Pro, a map scale that does not include distance units, such as 1:63,360 or 1:1,000,000, is called a **cartographic scale**.
7. Click **OK** to add the scale bar to the layout.

Changing the Display Style for a Scale Bar

You can set the display style for a scale bar when you are creating it in the **Create Scalebar** dialog box or after it is already on the map.

To change the display style of an existing scale bar:

1. Double-click on the scale bar in the layout to open the **Create Scalebar** dialog box.
2. Select a preset scale bar: Check Bar, Solid Bar, Line Bar, or Tick Bar.



3. Click on the **Select Scalebar Font and Font Style** button to set the font type, style, and color. Use the slider under the preview panel to adjust the font size.
4. Click on the **Select Scalebar Color One** to open the **Select Color** dialog and set the fill color. Click on the color wheel to select a color and use the slider to adjust the transparency of the fill color. For more precision choosing a color, enter RGB (Red, Green, Blue) values or a hexadecimal value in the fields provided. You can also enter a transparency value in the field labeled A (Alpha component); use zero (0) for fully transparent and 255 for fully opaque.
5. Click on the **Select Scalebar Color Two** to open the **Select Color** dialog and set the fill color.
6. Click on the **Select Scalebar Boarder Color** to open the **Select Color** dialog and set the boarder color.
7. Click **OK** to apply your style changes.

North Arrow Tool

Use this tool to add a North Arrow to a **Map** in various styles, and, optionally, add a Magnetic Declination Arrow. Use the North Arrow tool to designate in which corner to position the North Arrow, or use the North Arrow button on the Tools Toolbar to draw a rectangle and place the North Arrow at the specified location.

Use the North Arrow tool to add North Arrows of various styles and optionally add a Magnetic Declination arrow. A North Arrow can be added to a **Map** window.

To use the North Arrow tool in a **Map**:

1. You must first load the North Arrow tool from the Tools Manager.
Follow the directions in [Working with MapInfo Pro Tools](#).
2. Click on a **Map** window to make it the active window and run the **North Arrow** tool to display the **North Arrow (version 1.03)** window. See [Running a Tool](#) for details.

3. You can select various North Arrow styles. The foreground and background pens and brushes can also be specified. The insertion corner can be specified by picking NorthWest, NorthEast, SouthEast or SouthWest. The size is specified as a percentage of the window size.

If the active window is a Map, You can also specify whether the arrow should point to the north. The **Magnetic Declination** button allow the user to set the Magnetic Declination parameters.

4. Click the **Magnetic Declination** button. The **Magnetic Declination** dialog box displays.

If the **Display Magnetic Declination** check box is selected, the magnetic declination arrow is drawn in addition to the north arrow. The angle can be specified in the Magnetic Declination field. The arrow style can be specified.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

8 - Creating Thematic Maps

This section explains how to create thematic maps in MapInfo Pro. Thematics are display themes that give you a way to visually analyze your data.

In this section

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About Thematic Mapping

Introduction

Thematic mapping is a powerful way to analyze and visualize your data by enhancing your map with a display theme. Themes assign specific data values in your table with shades of color, fill patterns, symbols, bar or pie charts, or grids. Themes clearly reveal patterns and trends that are almost impossible to otherwise detect in the data.

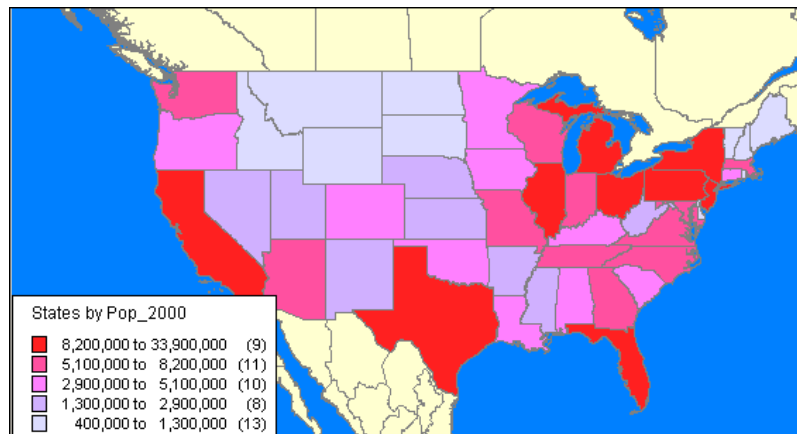
MapInfo Pro lets you create thematic maps using the following methods:

- ranges of values: applies a fill color to each range of values, such as for showing population density by region
- graduated symbols: applies a symbol size to each range of values, such as low, medium, or high shipping volume for each store location
- dot density: shows a dot for each data instance to show spatial patterns, such physical assaults on a crime map
- individual values: applies a color to individual values to create a matrix, such as for a precipitation map
- bar and pie charts: shows data comparisons for each record, such as sales by gender within each market area
- continuous grids: shows continuous change of your data across an area

There are also several variations on and options within these methods, such as bivariate thematic mapping and inflection point, that give you even more ways to analyze your data. More than 40 thematic templates ship with MapInfo Pro.

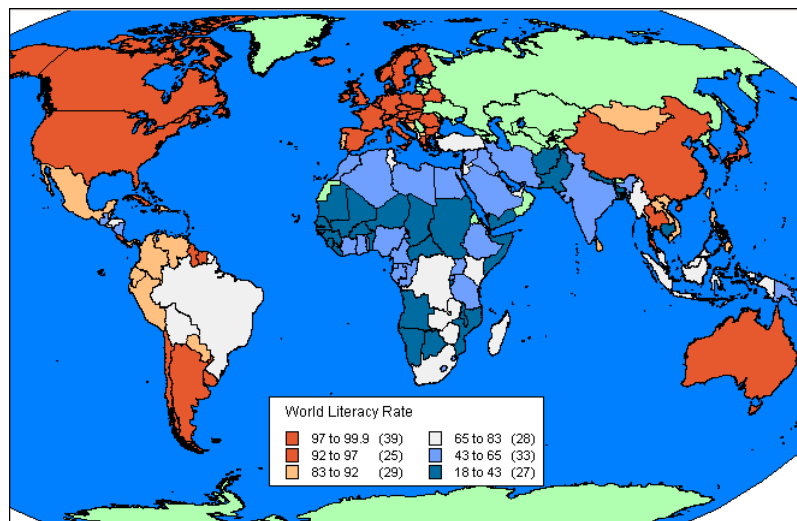
Each theme has its own purpose and unique attributes. For example, using a Ranges of Values theme, you could thematically shade a map according to population density. The data is shown sequentially using graduated color where the darkest color represents the most densely populated regions and the palest color represents the least densely populated regions. The variation in the color indicates intensity (the progression of the data), so you can easily see the distribution of the population.

Figure: Population density shown sequentially with the color red



Some themes show diverging data, where data ranges are shown above and below a middle value.

Figure: World literacy shown as divergent ranges above and below a value (there is no data available for countries shaded green)

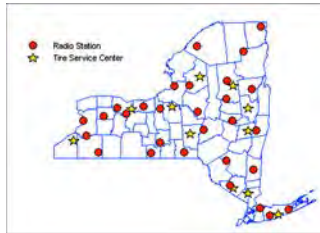


You are not limited to representing numeric values with thematic mapping. Nominal values also may be shaded thematically. For example, you have a table of underground cables. Those cables that have not been serviced in the past six months are labeled priority status. Using an Individual Values theme, you can shade the cables according to their repair status. All records with the same value will be shaded the same.

Whatever you need your map to say, whether it is to convey information, calculate distances between health care providers and their patients, or get a count of the number of customers that live within a given radius of an outlet location, MapInfo Pro can help you do that. By making selections from your table, you can extract information from sets and subsets of your data or see patterns and distributions, getting answers to such questions as: Which of my customers bought more than \$5000 of equipment? Which of my customers is located within a 200 mile radius of my warehouse? Which of my customers bought more than \$5000 of equipment and is located within a 200 mile radius of my warehouse?

Can You Give Me an Example?

Imagine that your job is to purchase advertising time from radio stations to market your product, a statewide tire service. You have demographic information for your state by county, and radio stations have supplied you with their own demographics and transmission ranges. You also have a list of your tire service center locations.

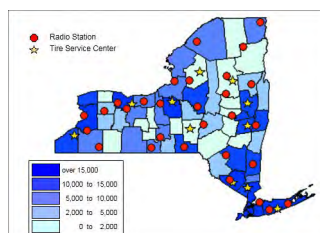


Using MapInfo Pro, you can quickly and easily bring this information into focus and make informed decisions about which radio stations to use to advertise your tire service.

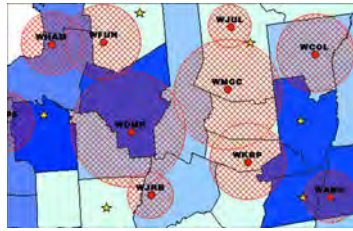
In this example, you need to display the service centers on a map in relation to the radio stations, looking for the stations that reach the areas where your centers are located.

To begin building your map, you would open the MapInfo Pro tables you will need to give your map context: the state, county, and street maps. On this background you create the service center table and geocode it by matching the street addresses of the service centers to the street locations in your StreetPro map. A few more keystrokes add the tire centers to the map, and your data suddenly leaps into view. Blue stars tell you at a glance the distribution of your tire centers across the state. You use the same method to put the red circles representing the radio stations on the map.

Using your file of county demographics, you ask MapInfo Pro to shade the counties where most of your target market (males 35 and older) lives.



Consulting your list of radio transmission ranges, select the Buffer command and create a buffer circle around each radio station, the circle representing each station's broadcast area. Just by looking you can tell which broadcast areas include the highest concentration of tire service centers or you can ask MapInfo Pro to give you an exact count of the number of tire centers within each area. Tell MapInfo Pro to shade the buffer circles in order according to the number of service centers that fall within each circle. Shade the circles with the most service centers red.



With the radius of each station's transmission range marked, you can see which stations broadcast in areas where your target market is (the shaded counties). But how well do these stations penetrate that market? Which stations will reach the people who are most likely to use your service centers?

Join the demographic information supplied by each station to the broadcast area shown on your map. Click any point within that area and see all the demographic information: the age and income distributions of the station's listeners, and the times of day when particular age and income groups are tuned in, for example.

Even better, ask MapInfo Pro to cross-check the radio stations that reach your best customers with the areas where that population is highest. Fill the broadcast areas of those stations with crosshatching.

Look at the map and choose the stations that reach your best customers in the areas where you have the most locations. Your best bets are green-shaded circles in crosshatched areas. Now you know *where* your target customers are. Click the **Info** command on these areas to see the time of day your target market is listening. Now you know *when* to purchase air time.

You can save this map and use it for future planning. For example, it can help you spot a good location for a new tire center or coordinate radio advertising with direct marketing. Do you want to increase advertising in key areas of the state?

Use the MapInfo Pro **LAYOUT** tab to prepare a visually exciting and informative presentation that features this map along with tables.

As you become better acquainted with MapInfo Pro, you will find that its applications are limited only by your imagination.

Working with Thematic Layers

When you create a thematic map in MapInfo Pro, the thematic shading is added to your map as a separate layer. It is drawn on top of the layer, from which it gets the raw data. Separating a thematic layer from its base layer provides you with several important options:

- Graduated symbol thematic maps do not require that your base layer contain point objects. Instead, graduated symbol objects are built regardless of the map object type. Therefore, even if your base layer contains region or line objects, you will still be able to create a graduated symbols map.
- You can have multiple thematic layers per base layer. In some cases, you do not have to add another base layer to the map to create another thematic layer. You can display more than one thematic layer at a time, as well as perform bivariate thematic mapping.

- You can turn the display on and off for a given thematic layer via the **Layers** or **Explorer** windows. The layer it is based on can continue to display. You can also set individual zoom layers on thematic maps.

Planning Your Thematic Map

Before you create a thematic map, it is important to know about the elements that make up a thematic map and how to put them together. This section will discuss thematic variables, where you can obtain your data, using data from the same table or another table, and the arrangement and display of thematic layers.

What is a Thematic Variable

The data that you display on your thematic map is called the thematic variable. Depending on the type of thematic analysis you are performing, your map can show one or more thematic variables. Ranges of values, grid shading, graduated symbols, dot density, and individual values maps all examine one variable. With bar or pie charts, you can display more than one thematic variable at a time.

A thematic variable can also be an expression. Choose Expression from the field list in place of a data field to construct a statement that derives information from the data in your table(s). Although an expression can be made up of more than one variable (for example, POP_1990 - POP_1980), for purposes of thematic mapping, a complete expression is equivalent to one thematic variable. For more information, see [Querying Your Data in MapInfo Pro](#), and [Using Expressions in a Thematic Map](#).

You can also create bivariate thematic maps, where one map object, such as a symbol, represents two different pieces of data. The symbol color, for example, can represent one thematic variable, and the symbol size can represent another.

Where to Obtain the Data

Before you begin your thematic map, you need to decide what information you want to display and locate where that information resides. It can either be in the table on which you are basing the map, or it can be in another table.

If the data is in the same table on which you are basing the map, choose the desired field directly in the **Field** list box in the **Create Thematic Map - Step 2 of 3** wizard panel.

If the data is in another table, you must first bring the data into the table on which you are basing the thematic map. This requires creating a temporary column using **Update Column**.

Each situation is described in the next few sections.

Using Data from the Same Table

If you are using data from the same table, choose the table and field on which you want to base your thematic map in the **Create Thematic Map - Step 2 of 3** wizard panel.

For example, you have a table of parking meters that contains the location of the parking meter and the last time the parking meter was emptied. Using Individual Values you want to shade the parking meter symbols according to the last time each meter was emptied. MapInfo Pro will assign a color to each time. In the **Create Thematic Map - Step 2 of 3** wizard panel, choose the parking meter table as your table, and choose the field that contains the time each meter was emptied.

Using Data from a Different Table

The Join feature within the **Create Thematic Map - Step 2 of 3** wizard panel enables you to use data from other open tables to create a thematic map. Choose **Join** in the **Field** list box to display the **Update Column** dialog box where you can create a temporary column in the base table.

The temporary column can contain data taken directly from the other table, or you can aggregate the data to create derived information for the temporary column.

For example, you have two tables: a table of county boundaries and a table of police stations. You want to shade the table of county boundaries according to the number of police stations in each county.

To do this, all the information you want to use must be in the county table. Therefore, you must add police station data to this table.

Using Update Column, you create a temporary column in the county boundaries table that will store the police station information. To create this column, the two tables must have a link so that MapInfo Pro can access the data that goes into the temporary column. The link can either be a matching field (like county name), or you can make the link geographically (police stations contained within counties).

An example later in this chapter explains more about Update Column.

Creating a Thematic Map

Step 1 - Choosing a Thematic Template

Templates allow you to make a thematic map based on values and settings. In our default types, you can alter these settings and/or save them as a new template you can use again. When you first create a thematic map, you select a template that you can modify to suit your requirements. You cannot create a theme without using an existing theme template.

In the **Create Thematic Map - Step 1 of 3** dialog box:

- **Template Sort by Name** - Displays available templates in alphabetical order according to their name.
- **Template Sort by Time** - Displays available templates according to the time they were created or last modified.
- **Preview Legend Sample** (Template Type) - Displays a sample legend for the template type.
- **Use Customized Legend Text** - Displays customized text for the legend. If enabled, the template has custom titles or range labels. Check to use the custom text.
- **Cancel** Button - Cancels the options dialog box and returns to the map.
- **Next** Button - Continue to next step.

There are over 40 templates to choose from and they are grouped by theme type:

- **Range Template** - Displays your data according to the ranges you set. Ranges are shaded with colors and/or patterns. Choose from templates displayed as shaded lines, points or regions. Ranged thematic maps allow you to illustrate data values across points, lines and regions. They are used to show a relationship between the data values and geographical area (e.g. sales figures, household income) or to present ratio information such as population density (population divided by area). Ratio information can be shown in other types of thematic maps when you choose Expression in Step 2.

For more information, see [About Ranged Maps](#).

- **Bar Chart Template** - Displays a bar chart of your thematic variables for each record in your table. Use bar charts to analyze multiple variables per record on the map. Make comparisons between the size of the bars in each chart to obtain information about a record in the table set, or compare one bar in all the bar charts to draw conclusions about a variable across all of the records, or compare the height of the bar charts to obtain information about the entire table. To indicate a negative value in a bar chart, bars extend in the direction opposite to the charts orientation. Negative values do not display in stacked bar charts.

For more information, see [About Bar Chart Maps](#).

- **Pie Chart Template** - Displays a pie chart of your thematic variables for each record in your table. Pie charts are multi-variable. Use pie charts on the map to analyze more than one variable at a time. You can compare the size of the pie wedges in each chart to obtain information about a record in the table, or compare one pie wedge in all of the pie charts to draw conclusions about a variable across all the records, or compare the diameter of the pie charts to obtain information about the entire data set.

For more information, see [About Pie Chart Maps](#).

- **Graduated Template** - Displays a symbol for each record in your table, the size of which is directly proportional to your data values. A graduated symbol map shows data points with specific numerical values. It is useful for illustrating quantitative information, such as high-to-low rankings. The size of the symbols is proportional to the data values of the points. Points that have larger data values appear larger, and points that have smaller data values appear smaller.

For more information, see [About Graduated Symbols Map](#).

- **Dot Density Template** - Displays the data values as dots on your map, where each dot is equal to a number, and the total number of dots in a region is proportional to the data value for that region. A dot density map allows you to examine raw counts of data (e.g. population). Each dot represents a number of units. That number, multiplied by the total number of dots in the region, equals the data value for that region.

For more information, see [About Dot Density Maps](#).

- **Individual Values Template** - Shades records according to individual data values. Individual value templates are multi-variable. Choose from shaded lines, points or regions. A thematic map that draws map objects according to individual values is useful when you want to emphasize categorical differences in the data rather than show quantitative information (e.g. types of stores in a given area, zoning classifications in a given area etc.).

For more information, see [About Individual Values Maps](#).

- **Grid Template** - Grid mapping displays data as continuous color gradations across the map. This type of thematic is produced by an interpolation of point data from the source table. A grid file is generated from the data interpolation and displayed as a raster image in a Map window.

For more information, see [About Grid Surface Maps](#).

Step 2 - Choosing Thematic Values

Choose the map layer on which you want to base the map, and the field or expression from which you want to obtain the data values (thematic variable).

A thematic variable can be the data value that is associated with the graphic objects (regions, lines, and points) displayed in your map, such as the values in a column like Pop_1990, Buy_Power, or Median Age.

You can also obtain your thematic variable from another table using the **Update Column** command (located on the **TABLE** tab in the **Editgroup**). **Update Column** creates a temporary column in your base table where you can aggregate or calculate information about your data.

You can also use an expression for your thematic variable. For example, you could use the following expression to display population density:

```
Pop_1990/Area(obj, "sq mi")
```

You can access the **Expression** dialog box in **Create Thematic Map - Step 2 of 3** dialog box. See the Help topics, *Using Expressions in a Thematic Map* and *Creating Expressions* for more information.

Your map may have more than one variable, depending on the thematic method you choose. Pie and Bar chart maps contain more than one variable; the other five types of thematic maps contain one variable. Depending on your choice of a one-variable or multi-variable thematic map, one of two **Create Thematic Map - Step 2 of 3** wizard panels displays.

- **One-Variable Thematic Maps**
- **Multi-Variable Thematic Maps**

One-Variable Thematic Maps

Ranged, graduated symbol, dot density, individual value, and grid thematic maps examine one variable. The **Create Thematic Map - Step 2 of 3** wizard panel that displays for these kinds of maps asks you to choose only a table and one field or expression.

1. Choose a table from the **Table** drop-down list. The drop-down list displays the tables that are mapped in the active Map window.
2. Choose the table on which you want to base the map.

If you have objects selected in the Map window, the Selection from TABLE item also displays in the list. This enables you to create a thematic map based on the selected items without having to map the selection. You can also base your thematic map on a mapped query table.

3. Choose a field from the **Field** drop-down list.

The drop-down list displays all the numeric fields in the table you selected from the **Table** list. Choose the field or expression that contains the data values.

4. Select the **Ignore Zeroes or Blanks** check box to ignore zero values and blank values in the table.

Because you are creating a thematic map based on one field in a table, any zero or blank values in that field will cause the whole record to be ignored. If you are creating a grid map, you can choose a table of regions to clip the grid against.

5. Click **Next** to go on to **Step 3 - Customizing Your Thematic Map**.

Multi-Variable Thematic Maps

Pie and Bar Chart thematic maps allow you to analyze more than one variable at a time. In the **Create Thematic Map - Step 2 of 3** wizard panel, you choose the fields or expressions you want to use as the variables, and list them in an order that best suits your analysis.

Start by choosing a Pie Chart or Bar chart in the **Create Thematic Map - Step 1 of 3** dialog box.

1. In the **Create Thematic Map - Step 2 of 3** dialog box, choose the table on which you want to base the map from the **Table** drop-down list.

The drop-down list displays the tables that are mapped in the active Map window.

If you have objects selected in the Map window, the Selection from TABLE item also displays in the list. This enables you to create a thematic map based on the selected items without having to map the selection.

Fields from TABLE displays all the numeric fields in the table you selected from the Table list.

2. Choose the field, or create an expression that contains the data values.

Fields for Pie/Bar Chart indicates the fields or expressions you have chosen for your pie or bar chart thematic map. The order of the variables in the **Field for the Pie/Bar Chart** list is the order in which the variables appear in the legend.

- For bar chart thematic maps, the order in which the variables display in the legend is the order in which the bars display from left to right on the map.
- For pie chart maps, the first variable in the legend corresponds to the pie wedge that begins at the angle specified in the **Customize Pie Style** dialog box.

3. Click **Styles** in the **Create Thematic Map - Step 3 of 3** wizard panel.

The **Customize Pie Style** dialog box opens:

- Click **Up** to move the selected field or expression up one place in the **Fields for Pie/Bar Chart** list. **Up** is unavailable when the selected item is the first item in the list.
- Click **Down** to move the selected field or expression down one place in the **Fields for Pie/Bar Chart** list. **Down** is unavailable when the selected item is the last item in the list.
- Click the **Right Arrow** button to move the selected field in the **Fields from TABLE** list to the **Fields for Pie/Bar Chart** list.
- Click the **Left Arrow** button to move the selected field in the **Fields for Pie/Bar Chart** list to the **Fields from TABLE** list.

4. Click **Next** to go on to Step 3.

Step 3 - Customizing Your Thematic Map

The last step allows you to customize your thematic map, or create the map based on the default settings. You can also preview the map's legend before you display the map and change the legend's label order.

On the **Create Thematic Map - Step 3 of 3** screen, the **Preview** field lists the value groups that this theme will display on your map. This is a sample legend of the thematic map you are creating. You can customize what displays using the following fields and buttons:

- **Customize** - The buttons in the Customize group change the default settings of particular aspects of your thematic map. For more information, see [Customizing a Thematic Map Legend](#)). The options are:
 - **Ranges** - Customizes settings on a ranged map. This option is available for ranged and grid maps.
 - **Styles** - Customizes style attributes such as color and size. This option is available for ranged, pie, bar, and individual value maps.
 - **Legend** - Customizes your map legend. This option is available for all types of thematic maps.
- **Number of Columns** - Use this field to indicate the number of columns in which you want the map legend entries to display.

- **Legend Label Order** - Determines the order in which range and value labels (for ranged and individual values maps) and field labels (for all other thematic maps) appear in the map legend. If you are creating a ranged map, the order you specify is also shown in the **Customize Range Styles** dialog box. Use these entries to indicate whether the map legend entries should display in **Ascending** or **Descending** or alphabetical order. Click **Custom** to select a custom label order and to enable the **Order** button.
- **Order** - Use this button to display the **Customize Legend Label Order** dialog box. Here you can click an entry in the list and use the **Move Up** and **Move Down** buttons to properly position the label entries until they are in the order you want. Click **OK** to save the custom order.
- **Associate Theme with Table** - The options you select in this group determine the default theme display for the current map.
- **Save As Default Theme View** - Use this check box to save this theme to the map's metadata so that the theme you have chosen displays each time you open the map.

Note: To ensure that this feature works, you must set the **Automatically Open Default Theme** option in the **Map Window Preferences** dialog box.

- **Remove Default Theme View** - Use this check box to remove the saved default theme from the map's metadata.
- **Template** - The buttons in the Templates group enable you to specify a name for a template, save the thematic map as a template, and when modifying an existing theme merge the thematic map with another template.
- **Save As** - Displays the **Save Theme to a Template** dialog box. Type a unique name or select an existing name and overwrite it. If you overwrite an existing template, you are prompted to confirm this action.
- **Merge** - The **Merge** button is enabled only when you are modifying an existing theme, not when you are creating a thematic map.

When you click **OK** a thematic map is created based on either the default or customized settings.

Customizing a Thematic Map Legend

At any time after creating a thematic map legend, you can customize the legend title, add a subtitle, set the font style for text in the legend and edit the labels for the value ranges.

To modify an existing thematic map legend:

1. Double-click on the thematic map's legend frame in the **Legend Designer** window.
2. From the **LEGEND** tab, click on **Modify Theme** to open the **Modify Theme Map** dialog box, then click the **Legend** button.
3. Clicking **Legend** opens the **Customize Legend** dialog box where you can customize the thematic map's legend title, subtitle, fonts, or range labels. In the **Customize Legend** dialog box, apply changes for any of the following:
 - **Title** - Type the title for your thematic map's legend. Leave this blank, if you do not want a title.

- **Title Font** - Click the **Title Font** button to choose the font for the title of your thematic map's legend.
- **Subtitle** - Type the desired subtitle for your map, if any.
- **Subtitle Font** - Click the **Subtitle Font** button to choose the font for the subtitle of your thematic map's legend.
- **Restore Default Title and Labels** button - Click to restore the default title and labels.
- **Font** - Click the **Font** button to access the **Text Style** dialog box where you can specify text style attributes for your range labels.
- **Edit selected range here** - Make changes to the selected range label in this box.

Changing the range values in the thematic map's legend does not change the range values in a ranged or individual values map. To do so, go to the **Customize Ranges** dialog box by either clicking **Modify Thematic** on the **LEGEND** tab, or double-clicking on a thematic map's legend frame in the **Legend Designer** window. Either method displays the **Modify Thematic Layer** dialog box, where you can access the **Ranges** button and modify your ranges.

- **Show this Range** - Check to have the selected range appear in the thematic map's legend.
- **Show Record Count** - Check to include a count of the number of values included in the range. This displays as a number in brackets, such as (34) for 34 values in the range.

Saving a Theme to a Map Window

To save a thematic map to a Map window's table, you must select the **Automatically Open Default Theme** check box in the **Map Window Preferences** dialog box.

To save a theme to a map so it opens displaying that theme every time:

1. Create the thematic map using the range or individual value template (on the **MAP** tab, in the **Content** group, click **Add Theme**).
2. In the **Create Thematic Map - Step 3 of 3** wizard panel, select the **Save Theme As Default View** check box.

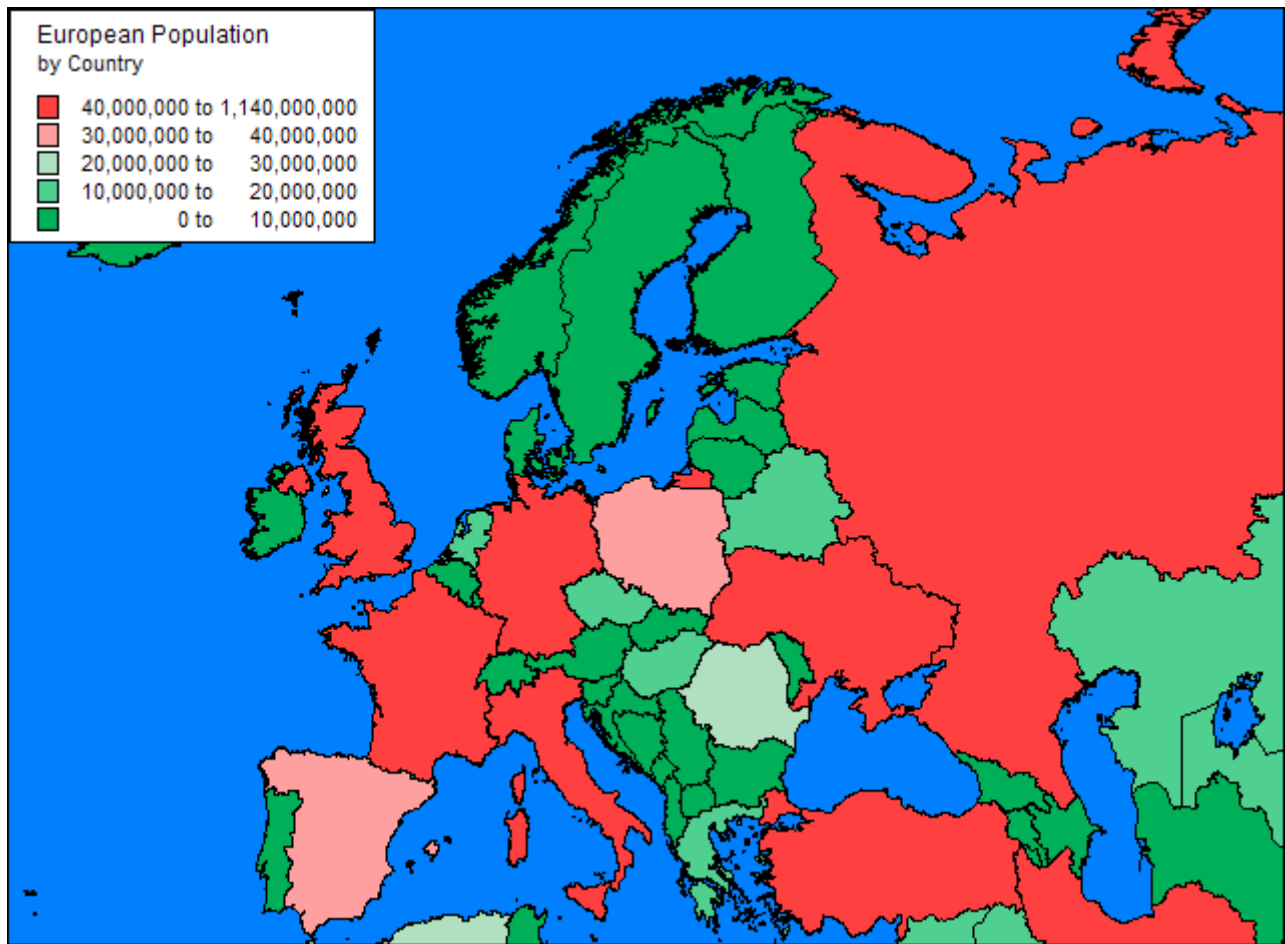
This saves the theme you have created to the metadata.

If the table you are creating a theme for is read-only, the default theme feature is disabled.

To remove the default view from the .TAB file, return to the **Create Thematic Map - Step 3 of 3** wizard panel and select the **Remove Default Theme View** check box.

Note: These thematic options also display on the **Modify Thematic Map** dialog box.

3. Click **OK**.
4. Close the .TAB file and reopen it to display it with the theme automatically.



European Population by Country

For more information about , [Saving Your Thematic Settings](#).

Thematic Maps as Layers

If you have created a thematic map, it will be listed as a separate layer in the **Layers** or **Explorer** window.

If a theme layer uses a range of values, then the ranges display under the theme layer name. Each range item includes a display check box, a color or pattern swatch, and text describing the range (such as "0 - 25"). To turn off the display for a range, clear its display check box. To make multiple selections in the list, press **Ctrl+Click** or select a range by pressing **Shift+Click**.

Note: A Grid thematic layer is a read-only layer and cannot be edited.

To modify the attributes of a thematic Map:

1. Double-click the thematic layer in the **Explorer** window.
2. In the **Modify Thematic Layer** dialog box, change the thematic settings, style, or map legends.

Note: The availability of certain dialog boxes depends on the type of thematic map you are altering.

3. Click **OK** to redraw the map with your changes.

For a full discussion of altering thematic maps, see [Modifying a Thematic Map](#).

Ordering Thematic Layers

To display thematic layers properly, they must be in a specific order. This is especially important when you want to display more than one thematic layer at a time. For example, you would want pie or bar charts for an area map to display on top of regions that are shaded in order to see them.

The following lists the order of map layers from top to bottom as they display in the map layers list in the **Explorer** window (note that map layers are drawn from the bottom up):

1. Pies, Bars, or Graduated Symbol thematic layer.
2. Dot Density thematic layer.
3. Ranged thematic layer - where Color or Size Attributes are applied.
4. Ranged (or Individual Value) thematic layer - where All Attributes are applied.
5. Major layer or base layer.
6. Grid thematic layer.

When you create a new thematic layer, MapInfo Pro automatically inserts it into its proper place.

See Also:

- [Reordering Thematic Layers](#)
- *Changing how a Layer Displays on the Map* in the *MapInfo Pro: Getting Started* Guide

Reordering Thematic Layers

Thematic layers always display directly above their main layer in the Layer list for the map that is shown in the **Explorer** window. To distinguish the thematic layers from the main layer, the thematic layer is indented.

Thematic layers always stay with their main layer. Dragging a main layer will automatically drag its thematic layer with it, even if it is not selected. When selecting a main layer and a thematic layer that was created from a different main layer, the thematic layer's main layer must also be selected to reorder it. For instance, Layer Main1 has two thematic layers, Theme1a and Theme1b. Layer Main2 has one thematic layer, Theme2a. If Layer Main1 and Theme2a are selected for reordering, Layer Main2 must also be selected.

You can move the main (base) layer without moving the grid theme; once the grid is created it is separate from the main layer.

Dragging a thematic, however, will only drag itself. Thematic layers that are based on the same main layer can be reordered among themselves, according to the draw order ranking. Theme layers can only be inserted amongst other theme layers that are of the same draw order ranking. Draw order ranking is determined as follows:

- Pie and Bar charts and Graduated Symbol thematic layers hold the highest draw order ranking. They will always be the top thematic layer.
- Dot Density holds the next draw order ranking. These themes will always fall below Pie and Bar charts and Graduated Symbol themes.
- Ranged and Individual Value thematic layers hold the lowest draw order ranking. They will always be below Pie and Bar charts, Graduated Symbol, and Dot Density thematic layers.

See Also:

- [Ordering Thematic Layers](#)
- *Reordering Map Layers* in the *MapInfo Pro: Getting Started* Guide

Displaying Thematic Layers

You can turn the display on and off for thematic layers the same way you can for other map layers. All the display settings in the **Explorer** window are also applicable to thematic layers, so you can set a zoom level for each thematic layer. You can also access the **Modify Thematic Map** dialog box by double-clicking a Thematic layer.

Thematic layers are always drawn after their base layer. Therefore, they appear above their base layer in the **Explorer** window, and are indented to distinguish them from other map layers. Thematic layers display in the **Explorer** window with this naming convention:

```
<Thematic type> with/by <variable-list>
```

The type of thematic map is noted first, followed by the list of variables used to create the map. For example, a pie thematic layer that uses commuting data is listed this way:

```
Pies with ComAlone, ComCarpool...
```

The variable list is truncated if there is not enough room to display each variable used in your thematic analysis.

Working with a Thematic Map Legend

Theme legends are created automatically when you create a thematic map. They provide a key of the colors, symbols, and styles used in the map. MapInfo Pro offers many types of themes for creating a thematic map, such as range, bar chart, pie chart, graduated, dot density, individual values, and grid themes. For a description of the various theme templates and how to create a thematic map, see [Creating a Thematic Map](#).

By default, a theme legend displays in an existing **Legend Designer** window if one exists. Otherwise, it displays in a new **Legend Designer** window. You have the option of working with this **Legend Designer** window or you can add the map legend to an existing or new **Legend Designer** window. When a **Legend Designer** window is active, the **LEGEND** tab displays on the ribbon.

- Creating a thematic map also creates a legend for the map, which displays in a **Legend Designer** window. To create a thematic map legend for an already existing thematic map, follow the instructions under [Adding Map Legends to a Legend Designer Window](#).
- To create a new **Legend Designer** window that includes the thematic legend as well as legends for other layers on the map, follow the instructions under [Creating a Legend for your Map](#) and make sure to include the thematic layer in the **Create Legend Choose Layers** screen (all map layers, including thematic layers, are included by default).

To display a simple Legend window with a thematic legend, on the **HOME** tab in the **Windows** group, click **New Document**, and click **Legend** from the list, after having created a thematic map.

See also the following topics in the *MapInfo Pro: Managing the Look of Your Map* Guide:

- *About the Legend Designer Window*
- *Resizing a Map Legend Frame*
- *Aligning Map Legends in a Legend Designer Window*
- *Changing the Number of Columns in a Map Legend Frame*
- *Zooming the Legend Designer Window View*

Selecting a Custom Sort Order for Individual Value Thematic Legends

This feature is only available for Individual Value thematic legends.

To customize the legend label order of an Individual Value thematic legend:

1. Create or modify your Individual Value thematic map using the Thematic Wizard.
2. In the **Modify Thematic Map** dialog box or the **Create Thematic Map - Step 3 of 3** dialog box, choose the **Custom** radio button in the **Legend Label Order** box.
3. Click **Order**.

The **Customize Legend Label Order** dialog box opens.

4. Select an entry in the **Legend Label List** that you want to move and then use the **Move Up** or **Move Down** buttons to place it in the desired order.
5. Click **OK** to close the **Customize Legend Label Order** dialog box.
6. Click **OK**.

The new thematic map and the new legend display.

Adding Embedded Theme Legend to a Map

If you have a Theme Legend present, you can add it as an embedded Legend into a map window.

1. On the **Map** tab, in the **Content** group, click **Add to Map**, and click **Embed Theme Legend** from the list to add the theme legend to the map..

Note: Only Theme Legend windows can be embedded into mappers.

Changing the Display Parameters of a Thematic Map

Modifying a Thematic Map

Once you create your theme, it is likely that you will want to change something about it, such as change ranges, what they look like, their text, and their sort order. You can make these changes and more in the **Modify Thematic Map** dialog box. To open this dialog:

- In the **Layers** or **Explorer** window double-click on the thematic layer to open the **Modify Thematic Map** dialog box.
- In the **Legend Designer** window, activate the thematic map's legend with a single click and choose **Modify Theme** from the **Content** group on the **LEGEND** tab. (A double-click opens the **Legend Frame Properties** dialog box.)

Note: For Grid themes, open the **Modify Thematic Map** dialog box from the **Legend Designer** window.

You can also make changes from the **THEME** tab, which has commands that directly update the most commonly used theme settings and styles. For details, see [THEME tab](#).

Changing the Current Theme Template

A quick way to change a number of theme settings at once is to change the template of the current theme. To merge a template into your current map:

1. Open the **Modify Thematic Map** dialog box by double-clicking on the theme in the **Layers** or **Explorer** window.
2. Click **Merge** in the **Templates** group.

The Merge a Template into the **Current Theme** dialog box displays with a list of the same type templates as your theme (all range of values templates, for example.)

The Merge feature is only available after creating a thematic map.

3. Choose the new template.
4. Click **OK** to return to the **Modify Thematic Map** dialog box.
5. Click **OK** to display the map with the new thematic template.

The settings in this template will be applied to your theme.

Setting the Zoom Range for a Thematic Layer

To set the zoom range within which the thematic layer displays on the map, in the **Layers** or **Explorer** window right-click on the thematic layer and select **Layer Properties** to open the **Layer Properties** dialog box.

Changing the Thematic Range in the Legend Designer Window

If you created a legend for your map and it includes the thematic range (the **Legend Designer** window includes a frame showing the thematic range), then double-clicking on the thematic frame lets you make changes to it. In the **Legend Frame Properties** dialog box you can change what displays in the legend. Making changes to the legend does not change the map.

Saving Your Thematic Settings

MapInfo Pro provides a way to save your themes and the templates from which you created them.

Saving Thematic Map Layers

To save your thematic maps, on the **HOME** tab, click **Save Workspace**. A workspace is a listing of all the tables and settings used in a map. When you open the workspace, MapInfo Pro opens the tables and re-creates the thematic map. If you close a table or **Map** window without saving your session to a workspace, MapInfo Pro displays the **Save Map Objects** dialog box and prompts you to do so. The dialog box indicates what types of objects will be lost (for example, thematic layers, label layers) if you do not save your session to a workspace. You can turn off the warning prompt in **Map Window** preferences on the **PRO** tab, by clicking **Options**, and **Map Window**.

Saving Thematic Templates

Every thematic map begins with a template from which you can then customize for your particular needs. These settings can be saved for future use. In the **Create Thematic Map - Step 3 of 3** wizard panel, choose **Save As** in the **Template** group box. The **Save Theme to a Template** dialog box displays. To save your new settings to the existing template, choose **OK**. To retain both the new and the original template, type a different name into the Name field. To recover any template that ships with MapInfo Pro, copy it from the \THMTMPLT directory on the product DVD. Templates have the extension .THM. In MapInfo Pro files are stored on a per-user basis.

For individual value themes you can also save the actual categories in a theme template. For example, if you choose to build an individual value theme on a table to show land usage, you can assign a different region style to each type of land usage (commercial, forest, residential, farm land etc.). You may then want to take those same assignments and apply them to another table. You can do this by storing the category in a template, it will be associated appropriately when the template is applied to the second table.

To save individual categories in a theme template when creating a new thematic map or for an existing thematic map, from the **Modify Thematic Map** dialog box choose **Save As** and specify a template Name. Select the **Save Individual Value Categories** check box and choose **OK**. A template is saved that can be used to apply the stored individual categories to a second table. When you choose on the **MAP** tab, in the **Content** group, **Add Theme**. The template's name will appear in the **Template Name** field of the **Create Thematic Map - Step 1 of 3** wizard panel.

Important Notes for Creating and Merging Theme Templates

When you are creating and merging theme templates, MapInfo Pro saves the custom label order only when the option to **Save Individual Value categories** is selected in the **Save Theme to a Template** dialog box. This implies that when you create a theme based on a template, MapInfo Pro applies the custom label order only when the thematic expression creates the same categories as those in the template.

When you are merging theme templates, the custom label order from the source template is applied to the current theme only when the option to **Merge Individual categories** is selected in the **Merge a Template to a Theme** dialog box and the template and current theme have the same number of categories.

Adding Multiple Layers to a Map

To add multiple layers:

1. In the Layers or Explorer windows, click the Add button. The **Add Layer** dialog box opens, showing a list of all tables currently open in MapInfo Pro.
2. Do one of the following:
 - To add a contiguous block of layers, select the first layer, hold down the **Shift** key, select the last layer.
 - To add multiple layers that are out of sequence, hold down the **Ctrl** key, select the layers.

To deselect layers, hold down the **Ctrl** key, click on the layers.
3. Click **OK**.

Selected layers are added to the Layers list. Each layer is ordered automatically according to the type of layer it is. For instance, layers with points are placed above layers with lines, which are placed above layers with regions.

Modifying Thematic Border Styles using Color Palettes

You can change the border style and color attributes of **Ranged** and **Individual** thematic maps by specifying the desired values for each individual bin from the respective **Customize Styles** dialog box. However, there is a faster way to change the border style attributes of all bins together to a fixed value for **Range** and **Individual** value themes. You can edit the `Colorbrewer.xml` file that is located in the MapInfo Pro installation directory. The `DefaultStyleAttributes` node in `ColorBrewer.xml` file controls the border style attributes.

```
<DefaultStyleAttributes>
  <Region>
    <BorderWidth IsApplied="false" Width="1" IsPixels="true"/>
    <BorderStyle IsApplied="false" StyleNumber="2"/>
    <BorderColor IsApplied="false" R="0" G="0" B="0" />
  </Region>
</DefaultStyleAttributes>
```

Use the three nodes, `BorderWidth`, `BorderStyle` and `BorderColor`, for styling borders in your themes. Each of these three nodes has an attribute `IsApplied`. Set this attribute to `true` to apply this style to all the bins when the Color Palette option is used in a theme.

Table 9:

Border Style Node	Description
BorderWidth	The <code>Width</code> attribute accepts value in pixels as well as in points. To specify the <code>Width</code> value in points, set the <code>IsPixels</code> attribute to <code>false</code> . The pixel width can range from 1 to 7 and point width can go up to 203.7
BorderStyle	The style pattern value can be specified in the <code>StyleNumber</code> attribute. It takes an integer value from 1 to 118.
BorderColor	RGB values of the color can be provided in the <code>R</code> , <code>G</code> and <code>B</code> nodes.

Note: This XML file is read only once when MapInfo Pro is launched. So any change in the XML file, requires a restart of the existing instance of MapInfo Pro to see the effect of the XML file updates. By default, this option is disabled in Mapinfo Pro and the `IsApplied` attribute set to `false` for all the three border style nodes.

Working with Thematic Map Data

Updating Columns using Thematic Mapping

You can use data from another table to construct your thematic map using **Update Column**. **Update Column** creates a temporary column in your base table and automatically inserts data into it for your map. This data can be a field taken directly from another table, or aggregated from other data.

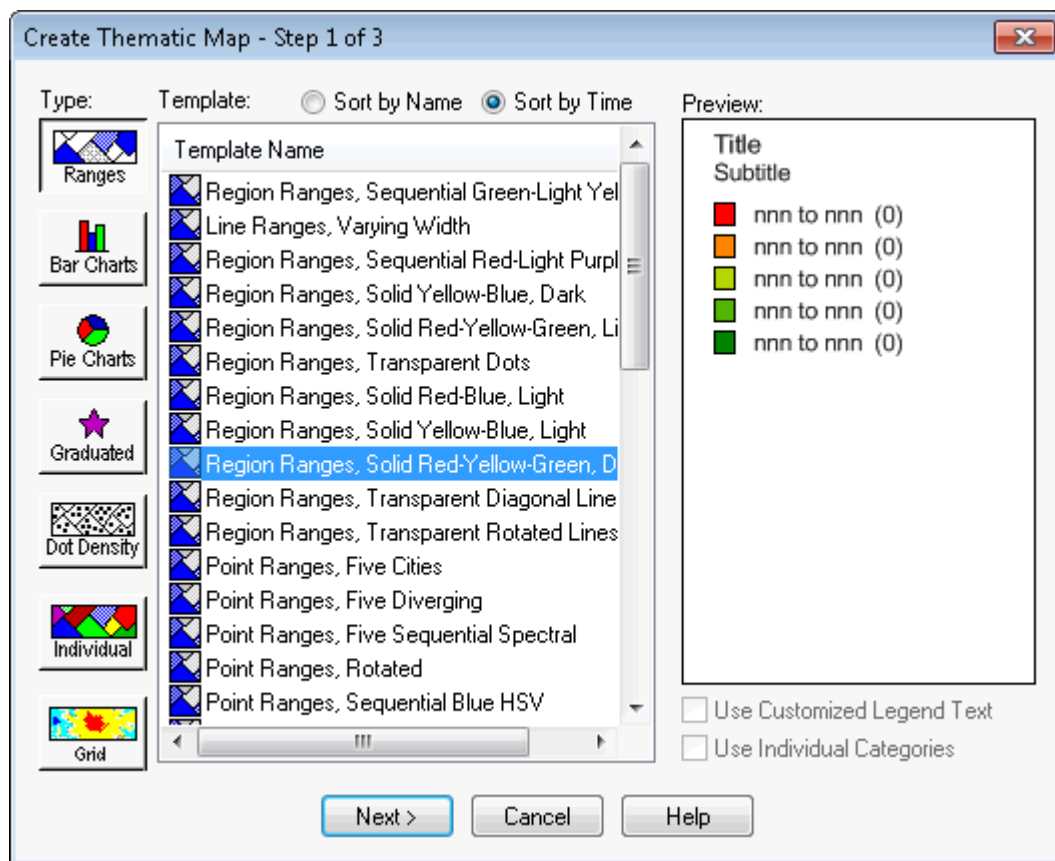
For example, you have a table of U.S. state boundaries and a table of U.S. city point locations. Using ranges of values you want to shade the USA table according to the percentage of each state's population living in urban areas. For MapInfo Pro to calculate this percentage, the population for the cities must be in the STATES table.

The following example uses a region table USA.tab and a point table USCTY153.TAB that are included in the MapInfo Pro introductory data set. Run the installer from the MapInfo Pro DVD to install it.

To create a temporary column using Update Column:

1. Open the base table (USA.TAB) and the city table (USCTY153.TAB).
2. On the **MAP** tab, choose **Add Theme**.

The **Create Thematic Map - Step 1 of 3** wizard panel opens.



3. Click **Ranges** and select a template name from the list.

This is the style of the thematic map you are creating.

4. Click **Next**.

The **Create Thematic Map - Step 2 of 3** wizard panel opens.

5. Click **USA**, this is the table you want to shade.
6. In the **Field** drop-down list, select **Join**.

The **Update Column for Thematic** dialog box opens.

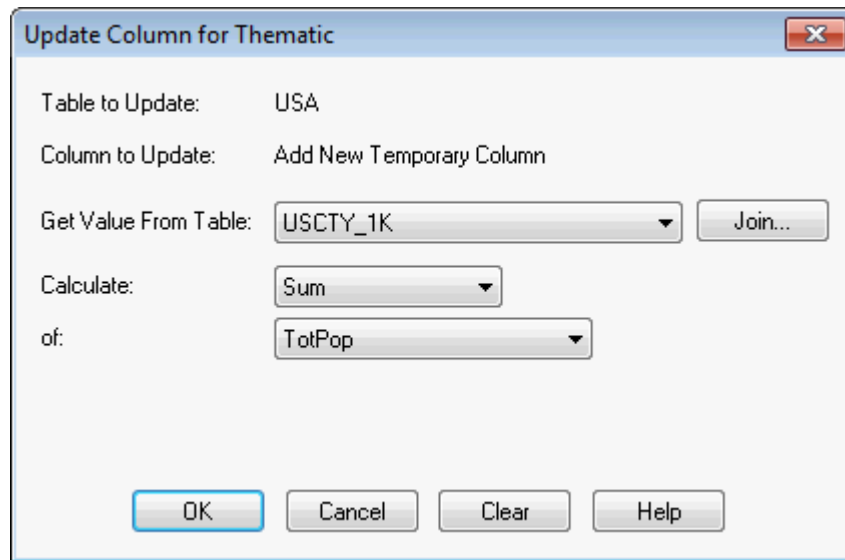


Table to Update is already set to USA and Column to Update is automatically set to **Add new temporary column**.

7. In the **Get Value From Table** box, select **USCTY153**.

If that is the only other table open, MapInfo Pro automatically displays its title in the list box.

Note: When you create a temporary column for a thematic map, the field must be a numeric field. This is true for all thematic maps except individual values.

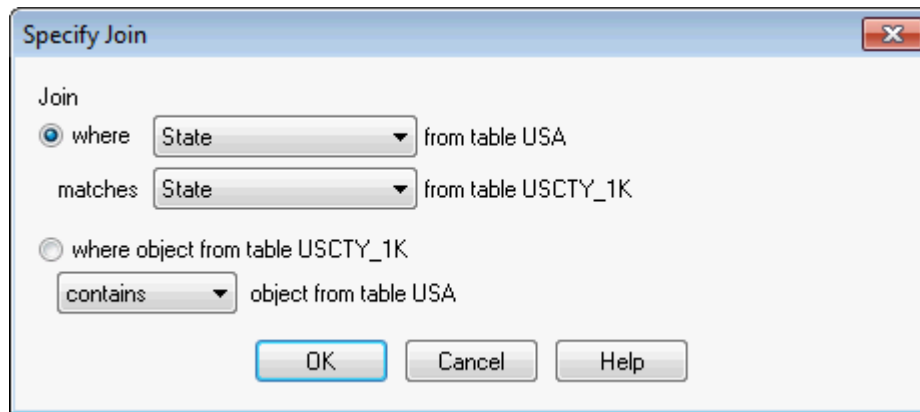
Since in our example, we are looking for the percentage of the population living in urban areas in the United States, we need to calculate the total of the USCTY153 population; that is, we must calculate the total of the population of each city in a each state. We need to put that sum into the temporary column.

8. In the **Calculate** box, choose **Sum**.
9. In the **of** box, choose **Tot_pop**.

To put the data from the USCTY153 table into the temporary column of the USA table, there must be a link between the two tables that MapInfo Pro can use to access the data. MapInfo Pro can often make this link automatically. In this example, both our tables have a **State** field.

10. Click **Join**.

The **Specify Join** dialog box opens.



When you choose **Join** in the **Update Column for Thematic** dialog box, you can see that MapInfo Pro has already set up the **Specify Join** dialog box with the STATE fields from both tables. If the join were not calculated automatically it would be necessary to specify the matching fields or geographic join.

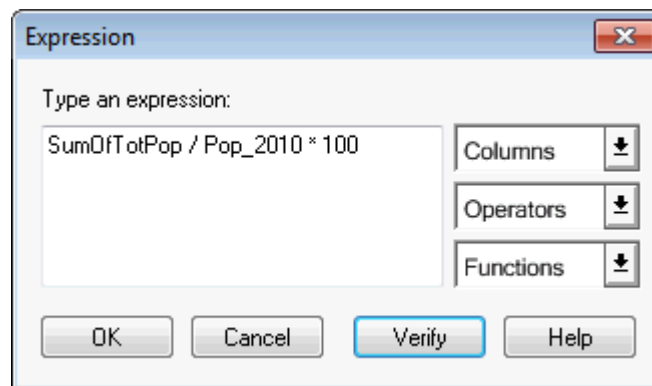
11. Choose **OK**.

MapInfo Pro calculates the sum and returns you to the **Thematic - Step 2 of 3** dialog box. The **Field** list box displays the temporary column you created: SumOfTot_pop.

However, before we create the map, we still need to calculate the percentage of the total population of each state that is urban. That information does not exist as a field in the table, so you must build an expression to generate it.

12. In the Field drop-down list, select **Expression**.

The **Expression** dialog box displays.



The expression SumOfTot_pop/Pop_1990 * 100 will give you the answer as a percent.

13. In the expression box, type:

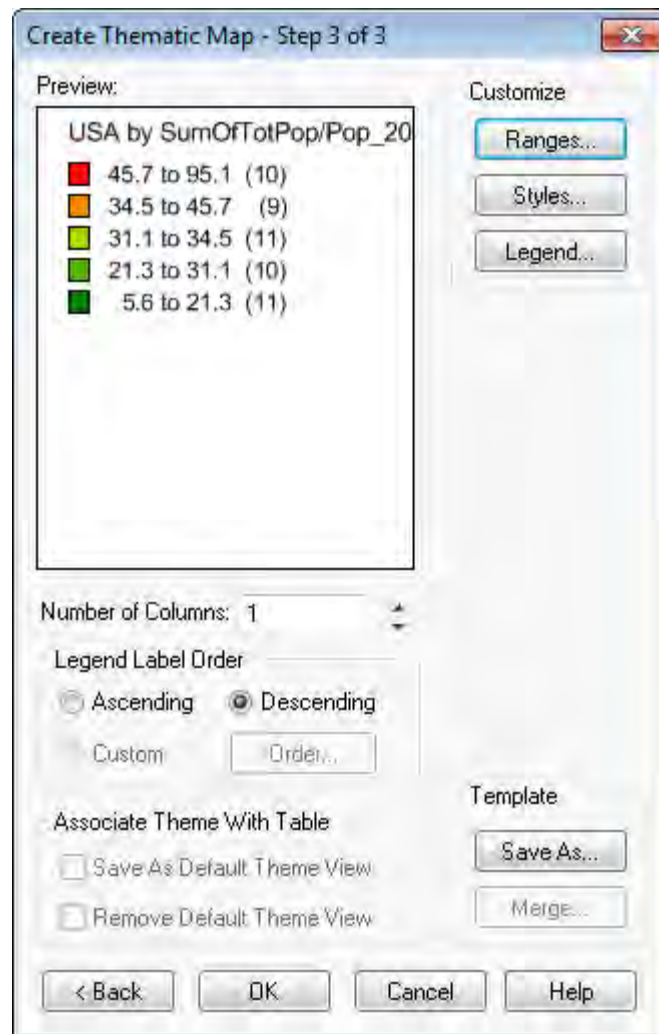
```
SumOfTot_pop/Pop_1990*100
```

14. Click **Verify** to ensure that your syntax is correct, and then choose **OK**.

The **Create Thematic - Step 2 of 3** dialog box shows the expression you created.

15. Click **Next**.

The **Create Thematic Map - Step 3 of 3** wizard panel opens.

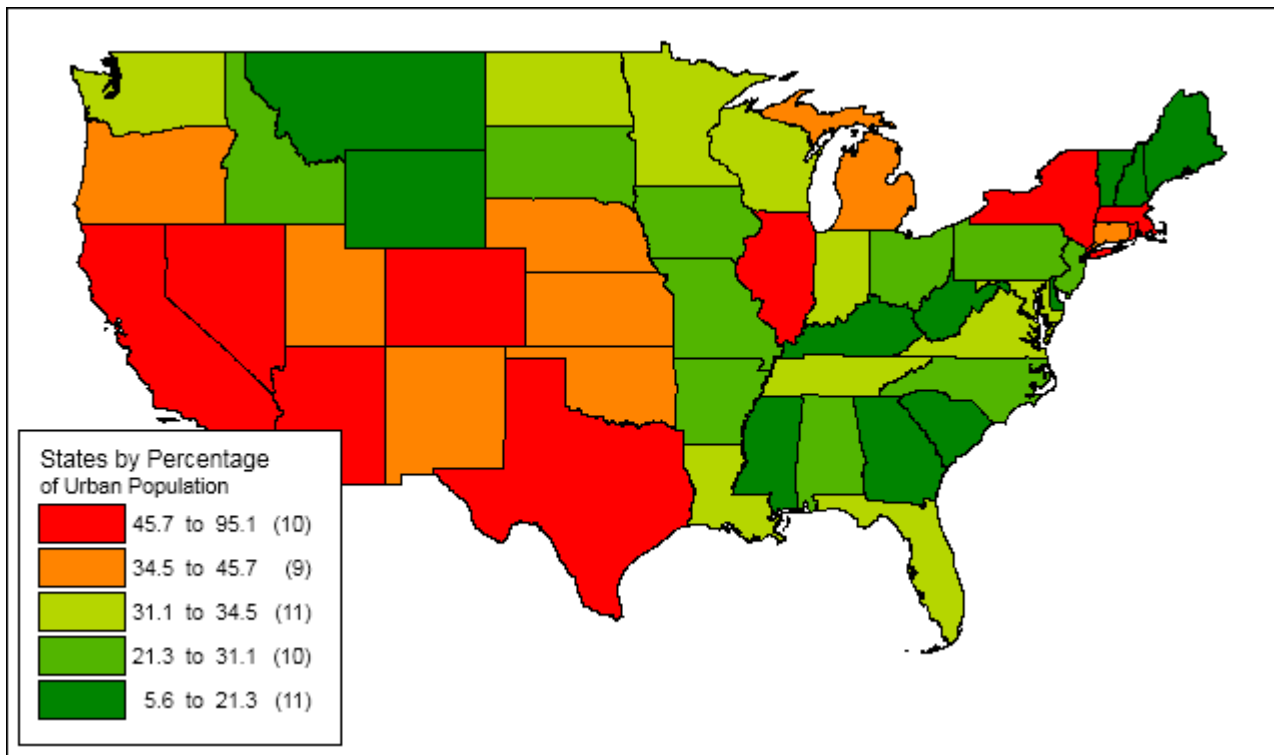


16. Click **Ranges** and choose either **Equal Count** or **Equal Ranges** to customize the ranges, whichever gives you the best representation of your data.

Use Round By to round to a decimal place or whole number. Customize the styles to best illustrate your analysis by clicking the **Styles** button. Customize your map legend by clicking the **Legend** button.

17. Click **OK**

The Map window redraws with your thematic.



For details about using point or line objects to represent thematic variables, see [About Bivariate Thematic Mapping](#).

Using Expressions in a Thematic Map

The **Expression** dialog box builds expressions and uses them as the thematic variable(s) in your map. You can use more than one expression per bar or pie thematic map. Instead of choosing a field to represent the thematic variable in Step 2 of creating a thematic map, choose **Expression** to access the **Expression** dialog box.

To access the **Expression** dialog box in a one-variable thematic map:

1. In the Create Thematic Map - Step 1 of 3 wizard panel, choose **Expression** from the **Field** drop-down list.
2. In the **Expression** dialog box, create the desired expression.
3. Click **OK**.

The **Create Thematic Map - Step 2 of 3** wizard panel opens. The expression is added to the **Field** drop-down list.

4. Repeat the above steps to create as many expressions as necessary.
5. Click **Next**.

The **Create Thematic Map - Step 3 of 3** wizard panel opens.

To access the **Expression** dialog box in a multi-variable thematic map:

1. Choose **Expression** from the **Table** drop-down list.
2. In the **Expression** dialog box, create the desired expression.
3. Click **OK**.
4. Repeat the above steps to create as many expressions as necessary.

The **Create Thematic Map - Step 2 of 3** wizard panel opens. The expression is added to the **Fields for Pie/Bar Chart** list.

Using Automatic Joining

Whenever you specify a source table that is different from the target table in the **Update Column** dialog box, MapInfo Pro tries to determine how to join them. A join is first tried on the basis of tabular data. When that fails, a geographic join is attempted. When that fails, MapInfo Pro indicates that the autojoin failed.

The autojoin strategy works as follows:

- The tabular data in the two tables is compared. When matching data values are found, MapInfo Pro assumes that it has found matching fields and uses those as the basis of the join. When MapInfo Pro fails to produce a match this way, then:
- A graphic/geographic match is attempted. MapInfo Pro attempts either to locate source objects within target objects, or to locate target objects within source objects.

When a match is not produced, then:

- MapInfo Pro reports that the autojoin failed. In this case you should click **Join** and use the settings in the **Specify Join** dialog box to specify how to make the join.

Adding Temporary Columns

Use **Update Column** to add temporary columns to a table by using data from another table.

To add a temporary column:

1. Open at least two tables.
2. on the **TABLE** tab, in the **Edit** group, click **Update Column** to open the **Update Column** dialog box.
3. In the **Table to Update** list, choose the table to add the temporary column to.
4. In the **Get Value from Table** list, choose the table that MapInfo Pro will retrieve the update information from.
5. To add a temporary column, select the **Add new temporary column** option from the **Column to Update** list.

If necessary, specify the information MapInfo Pro will need to associate the data (join) in the two tables by using their common tabular or graphic data.

6. Choose how to produce the column data by specifying how to calculate the information based on columns and expressions from the **Calculate** and **of** lists.
7. Select the **Browse Results** check box to display the table with its new temporary column in browser format.
8. Click **OK**.

The temporary column is added based on the specified information.

When you make changes to the data table, the new temporary column is automatically updated.

To save the table with its new temporary columns, on the **TABLE** tab, in the **Content** group, on the **Save** list, click **Save Table**. If the temporary columns are added to a table in a workspace, the changes are automatically saved when you save the workspace.

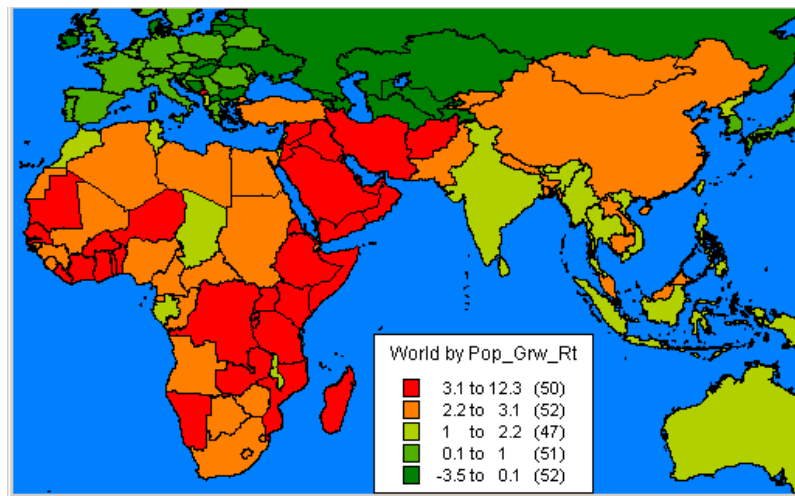
Working with Range of Value Themes

About Ranged Maps

When you create a ranged thematic map, MapInfo Pro groups all records into ranges and assigns each record's object the color, symbol, or line for its corresponding range. For example, if you wanted to visualize the population of the world by growth rate, you would shade countries according to their reported growth rate amounts.

With the Ranged map feature, MapInfo Pro groups the growth rate amounts into ranges. For example, in the next table, all countries that had growth rates between zero and one percent are grouped into one range. Countries that had growth rates between one and 2.2 are grouped in a separate range. Countries that have rates between 2.2 and 3.1 are in a third range, and those countries reporting greater than 3.1 are in a fourth range.

Figure: Ranged Map



All records are assigned to a range and then assigned a color based on that range. For example, the countries with the higher growth rates are shaded in red. The other ranges are shaded in lighter shades of red to light green and finally darker green. When you display the map, the colors make it readily apparent which locations have the highest growth rate in relation to their neighbors.

Ranges are also useful when the size of the region is not directly related to the magnitude of the data values. In our population density example in this section, we see that countries that are small in size can be very densely populated, and countries that are large in size may not be densely populated. Differences like these are more readily apparent when the regions are shaded in this manner.

Types of Ranged Values

MapInfo Pro can create ranges automatically using five methods: Equal Count, Equal Ranges, Natural Break (Standard Deviation), Quantile, and Custom. To set ranges manually, use Custom.

Equal Count has the same number of records in each range. If you want MapInfo Pro to group 100 records into 4 ranges using Equal Count, MapInfo Pro computes the ranges so that approximately 25 records fall into each range, depending on the rounding factor you set.

When using Equal Count (or any other range method), it is important to watch out for any extreme data values that might affect your thematic map (in statistics, these values are referred to as *outliers*). For example, if you tell MapInfo Pro to shade according to Equal Count with this database:

John	5000	Andrea	7000
Penny	6000	Kyle	5500
Miguel	4500	Angela	7500

Linda	5000	Elroy	6000
Ben	100	Mark	7000

Ben and Miguel are grouped in the same range (since they have the two lowest values). This may not produce the results you want since the value for Ben is so much lower than any of the other values.

Equal Ranges divides records across ranges of equal size. For example, you have a field in your table with data values ranging from 1 to 100. You want to create a thematic map with four equal size ranges. MapInfo Pro produces ranges 1-25, 25-50, 50-75, and 75-100. (Since ranges use ">=" and "<=", they need to overlap.)

Keep in mind that MapInfo Pro may create ranges with no data records, depending on the distribution of your data. For example, if you tell MapInfo Pro to shade the following database according to Equal Ranges:

John	100	Andrea	90
Penny	6	Kyle	1
Miguel	4	Angela	92
Linda	95	Elroy	89
Ben	10	Mark	10

MapInfo Pro creates four ranges (1-25, 25-50, 50-75, and 75-100). Notice, however, that only two of those ranges (1-25 and 75-100) actually contain records.

Natural Break and Quantile are two ways to show data that is not evenly distributed.

Natural Break creates ranges according to an algorithm that uses the average of each range to distribute the data more evenly across the ranges. It distributes the values so that the average of each range is as close as possible to each of the range values in that range. This ensures that the ranges are well-represented by their averages, and that data values within each of the ranges are fairly close together. MapInfo Pro bases its Natural Break algorithm on the procedure described by

Jenks and Caspall in their article "Error on Choroplethic Maps: Definition, Measurement, Reduction" from the Annals of American Geographers, June, 1971.

Quantiling enables you to build ranges that determine the distribution of a thematic variable across a segment of your data. For example, you can quantile state population by urban population to illustrate how urban population is distributed across the United States. Your map legend will not indicate that you have used Quantile to build your ranges. You can customize the map legend so that it shows which field you used to quantile the table.

When you create ranges using **Standard Deviation**, the middle range breaks at the mean of your values, and the ranges above and below the middle range are one standard deviation above or below the mean. You can also define your own ranges using Custom.

Creating a Map by a Range of Values

Displays your data according to ranges you set. The ranges are shaded with colors or patterns. Choose from templates displayed as shaded lines, points, or regions. Ranged thematic maps illustrate data values across points, lines, and regions. They are used to show a relationship between the data values and geographical area (such as sales figures and household income) or to present ratio information, such as population density (population divided by area). Ratio information can be shown in other types of thematic maps when you choose Expression (see [Creating a Thematic Map](#)).

To create a ranged map:

1. Click on a **Map** window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Ranges** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table on which you want to base the shading, and choose the field or expression from where you want to obtain the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.
7. Preview your thematic map's legend and/or customize your map.
8. Click **OK**.

Customizing a Range Map

Customize your thematic map using the **Ranges**, **Styles**, or **Legend** buttons in the **Step 3 - Customizing Your Thematic Map** wizard panel. To go back to any of the earlier wizard panels to make changes, click **Back** until you come to the panel whose information you want to change.

Customize three aspects of a ranged map:

- Ranges
- Styles

- Map Legend

Customizing the Ranges of Range Map

You can calculate your ranges for a map using a number of methods. Your choice of method depends on your data values and the type of analysis you want to perform. You can determine ranges based on a statistical or mathematical formula that MapInfo Pro calculates automatically, such as standard deviation; or you can break the ranges according to the number of records, the range intervals, certain statistical values, or a value you choose. You can also set your own ranges using the Custom method.

To customize ranges on a ranged map:

1. Click on a **Map** window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Ranges** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table you want to shade, and choose the field or expression from where you want to obtain the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.
7. Click **Ranges** to open the **Customize Ranges** dialog box.
8. Choose the items you want to customize and make the desired changes.
9. Click **Options** if you are using the Equal Count or Equal Ranges methods to use the **Forced Break** feature.

Customizing the Styles on a Ranges Map

The styles on a ranged map include the color and size attributes of your map objects. You can customize these attributes to illustrate quantitative information about the data values in each range.

To customize range styles on a map:

1. Click on a **Map** window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Ranges** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table on which you want to base the shading, and choose the field or expression from where you want to obtain the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.
7. Click **Styles** to display the **Customize Range Styles** dialog box.
8. Choose the items you want to customize and make the desired changes.
9. Click **Options** for advanced customizing features.
10. Click **OK** to save your changes.

When you apply attributes to a thematic layer, attributes from other thematic layers are not affected. Since each layer retains its attributes, you can apply different attributes to each layer, creating a bivariate thematic map that illustrates two specific field values simultaneously.

Customizing Range Styles and Inflection Points

When you customize range styles, you can choose which attributes to display on your map: color, size, or all attributes. The size attribute becomes available when you are working with point and line data. You can change the size of each symbol, or use graduated symbols to represent your ranges.

Another effective way to customize the display of ranges of data is by inserting an inflection point between ranges. An inflection point is a color style that provides you with a second interpolation of your data. This option is useful for showing two sets of contrasting information, like data that contains positive and negative values such as profit and loss figures, or population growth. The colors of the top and bottom ranges spread to, but never reach, the inflection point color. They only approach the inflection point. For example, if the inflection point is white, and the top and bottom range colors are blue and red respectively, the color spreads from blue to white, and from white to red. The ranges closest to the inflection point are either very pale blue or red, but they never actually become white.

For more information, see [Using an Inflection Point to Show Distinction](#).

Customizing the Legend of a Range Map

MapInfo Pro creates a legend automatically when you create a thematic map. Keep the default settings or customize your legend to suit your needs. Click **Legend** in the **Customize** section of the **Create Thematic Map - Step 3 of 3** wizard panel to customize your map legend's fonts, titles, and more (see [Customizing a Thematic Map Legend](#)).

Working with Bar Chart Themes

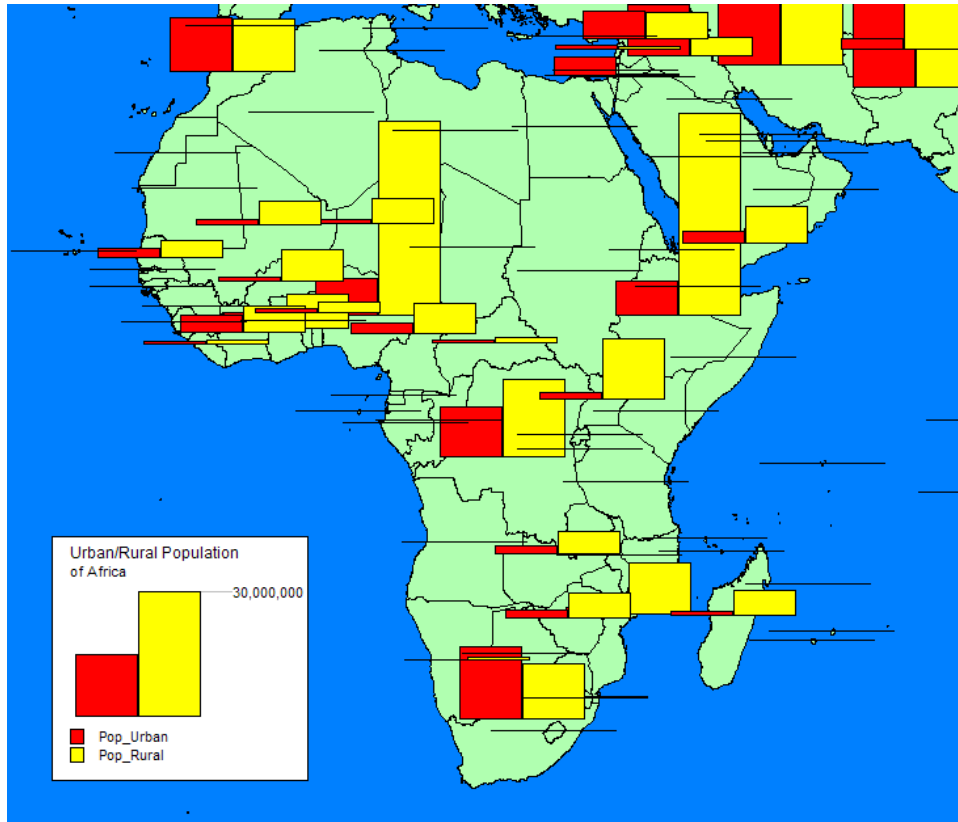
About Bar Chart Maps

Unlike thematic maps for single variables such as ranges of values or graduated symbols, a thematic bar chart map allows you to examine more than one variable per record at a time. A bar chart is built for every map object at the centroid of the object, enabling you to analyze the thematic variables in a particular chart by comparing the height of the bars. You can also examine the same variable across all the charts in your map.

You can customize the color of each bar, create a frame around each chart, and fill the empty space inside the frame with a pattern or color. In addition, you can change the bar chart's orientation, such

as displaying horizontal bars instead of vertical (the default). You can also control where to display the chart: over the object's centroid (the default) or any of eight other locations.

You can also change the type of bar chart. In our example, you can create a multi-bar chart, where each thematic variable has its own bar, or a stacked bar chart with each thematic variable on top of one another, or a graduated bar chart, where the bars are graduated in size based on some value. You can also scale the bars in a multi-bar chart independently from one another. To show negative values in a bar chart map, the bars extend in the opposite direction to the chart's orientation. Note that negative values do not display in stacked bar charts.



Bar Chart Map

Creating a Bar Chart Map

Use bar charts to analyze multiple variables per record, to make comparisons between the size of the bars in each chart and obtain information about a record in your table. Compare one bar in all the bar charts to draw conclusions about a variable across all of the records, or compare the height of the bar charts to obtain information about your entire table.

To create a map with bar charts:

1. Click on a Map window containing the layer you wish to create the theme for.

2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Bar Charts** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** dialog box.
5. Choose the table on which you want to base the bar charts, and choose the fields or expressions containing the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** dialog box.

Use this panel in the wizard to customize the map or its legend.

7. Click **OK**.

Customizing Bar Chart Styles on Your Map

You can customize your Bar Charts thematic map using the **Styles** and/or **Legend** button. To go back to any of the earlier wizard panel to make changes, click **Back**. You can customize two areas on a bar chart map:

- Styles
- Map Legend

The bar styles styles include the height, width, and color of the bars, the type of bar chart, the bars' scale, the charts' orientation, and other bar attributes, such as the border of the bars and the frame around the bars.

To customize bar chart styles:

1. Click on a Map window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Bar Charts** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** dialog box.
5. Choose the table on which you want to base the bar charts, and choose the fields or expressions containing the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** dialog box.

Use this panel in the wizard to customize the map or its legend.

7. Click **Styles** to open the **Customize Bar Styles** dialog box.
8. Choose the items you want to customize and make the desired changes.
9. Click **Options** for additional customizing features.
10. Click **OK** to save your changes.

All bars are scaled down to a zero-sized bar for a zero value. The default setting is to scale by a constant, which is best for representing data in one dimension. Since you are only concerned with one dimension in bar charts, the height of the bars, we recommend that you stay with the default scaling method.

If your data range is extremely large, or the numbers are related in an exponential way, graduate the size by log.

Customizing the Legend of a Bar Chart

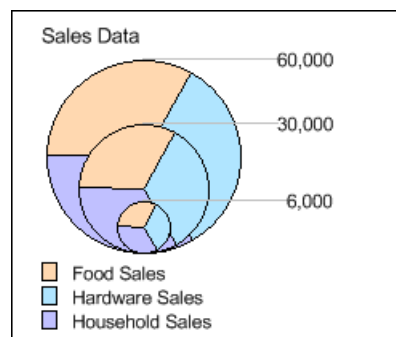
MapInfo Pro creates a legend automatically when you create a thematic map. Keep the default settings or customize your legend to suit your needs. Click **Legend** in the **Customize** section of the **Create Thematic Map - Step 3 of 3** dialog box to customize your map legend's fonts, titles, and more (see [Customizing a Thematic Map Legend](#)).

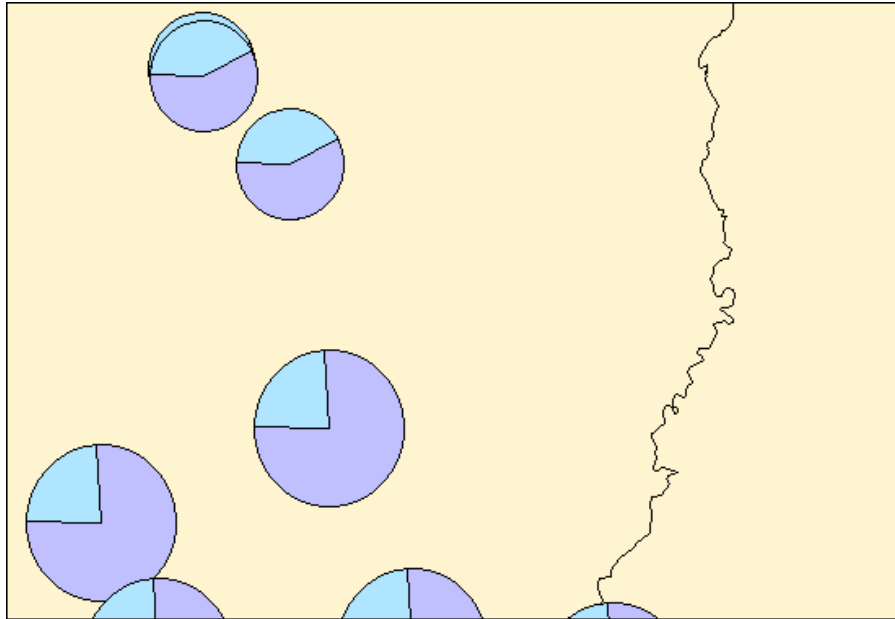
Working with Pie Chart Themes

About Pie Chart Maps

Thematic maps using pie charts enables you to examine more than one variable per record at a time. Like comparing the height of the bars in bar charts, in pie charts you compare the wedges in a single pie, or examine a particular wedge across all pies. Pie charts enable you to compare parts of a whole.

Both pie and bar charts are particularly useful for analyzing demographic data. For example, you have a table of demographic information for the United States. Your table shows the populations of several major demographic groups. Using pie charts, you can show the population of each demographic group, and see what fraction of the pie it makes up in each pie. This enables you to see the distribution of demographic groups on a per state basis, or across the entire United States. You can also look at one demographic group and see how the population of the group varies in different states. For best results, use no more than four to six pie wedges per pie chart in your analysis.





You can customize the color of each pie wedge as well as the borders of the wedges and the whole pie. You can also specify the angle at which you want to place the first pie wedge, and whether the variables go in a clockwise or counterclockwise direction. Like bar charts, you can also change the pie's orientation. The default is to place the pie over the centroid of the object.

You can choose from graduated pies or half pies. Graduated pies graduate the size of the pies according to the sum of their components. Half pies distribute your data across half a pie instead.

Creating a Pie Chart

Use pie charts on your map to analyze more than one variable at a time. You can compare the size of the pie wedges in each chart to obtain information about a record in your table, or compare one pie wedge in all the pie charts to draw conclusions about a variable across all the records, or compare the diameter of the pie charts to obtain information about your entire table.

To create a map with pie charts:

1. Click on a Map window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Pie Charts** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table on which you want to base the pie charts, and choose the fields or expressions containing the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel. Use this panel to customize the map or its legend (see the [Customizing a Pie Chart](#)).
7. Click **OK**.

Customizing a Pie Chart

Customize your Pie Chart thematic map using the **Styles** and/or **Legend** button. To go back to any of the earlier wizard panel to make changes, click **Back**. You can customize two areas on a pie chart map:

- Styles
- Map Legend

The Pie Charts styles include the diameter of the pies and the color of each pie wedge, the type of pie chart, the pies' scale, the charts' orientation, and other pie attributes, such as the border of the pies, the angle at which the first pie wedge begins, and the order of the pie wedges (clockwise, counter-clockwise).

To customize a pie chart map:

1. Click on a Map window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Pie Charts** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table on which you want to base the pie charts, and choose the fields or expressions containing the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel. Use this panel to customize the map or its legend.
7. Click **Styles** to open the **Customize Pie Styles** dialog box.
8. Choose the items you want to customize and make the desired changes.
9. Click **Options** for additional customizing features.
10. Click **OK** to save your changes.

Customizing the Legend of a Pie Chart

MapInfo Pro creates a legend automatically when you create a thematic map. Keep the default settings or customize your legend to suit your needs. Click **Legend** in the **Customize** section of the **Create Thematic Map - Step 3 of 3** wizard panel to customize your map legend's fonts, titles, and more (see [Customizing a Thematic Map Legend](#)).

Working with Graduated Symbol Themes

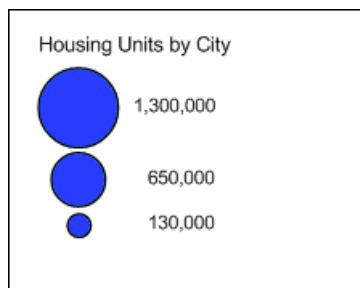
About Graduated Symbol Maps

Graduated symbol maps use symbols to represent different values. You can use graduated symbols regardless of the type of map object with which you are working.

For instance, use graduated symbols to show the number of housing units by city. When you select the graduated symbols option, MapInfo Pro varies the size of each symbol according to the value in the sales order field.

You can also represent how much interest each customer has expressed in a given product by assigning a symbol whose size is proportional to the customer's interest.

Graduated symbols maps work best when you use numeric data. If you are working with a layer of restaurants, it makes no sense to create graduated symbols based on the type of cuisine each restaurant serves. However, graduated symbols are appropriate when you want to show the relative number of housing units by city as in the next figure.





Graduated Symbol Map

There are three attributes you can customize on a graduated symbols map: the color, type, and size of the symbol. To change the symbol's attributes in Create Thematic Map - Step 3 of 3, choose **Customize Settings** and click the symbol icon in the **Customize Graduated Symbols** dialog box to access the **Symbol Style** dialog box. The default symbol is a red circle.

In the **Customize Graduated Symbols** dialog box, the size of the symbol in the **Symbol** box is the size for the value listed in the **Value** box. All values between the high value and zero have interpolated point sizes. If you want the symbols at the low end to be larger, increase the point size.

You can also display symbols for negative data values. To change it, click **Options** in the **Customize Graduated Symbols** dialog box. There is a separate symbol picker so that you can make this symbol as distinct from the symbol for positive values as you want. When you click the icon a different **Symbol Style** dialog box displays, enabling you to choose a different symbol type, change the color or the size, or change any combination of the three attributes. The default symbol for negative values is a blue circle, and all values between zero and the low value (a negative number) also have interpolated point sizes.

Creating a Graduated Symbols Map

A graduated symbols map shows data points with specific numerical values. It is useful for illustrating quantitative information, such as high-to-low rankings of point data. The size of the symbols is proportional to the data values of the points. Points that have larger data values appear larger, and points that have smaller data values appear smaller.

To create a thematic map using graduated symbols:

1. Click on a Map window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Graduated** and select from the list.
4. Click **Next**. The **Create Thematic Map - Step 2 of 3** wizard panel opens.
5. Choose the table on which you want to base the shading, and choose the field from where you want to obtain the data values.
6. Click **Next**. The **Create Thematic Map - Step 3 of 3** wizard panel opens. Use this dialog box to customize the map or its legend.
7. Click **OK**.

A graduated symbols map is created based on either the default settings or customized settings you entered.

Customizing a Graduated Symbols Map

Customize your Graduated Symbols thematic map using the **Settings** and/or **Legend** button. To go back to any of the earlier wizard panel to make changes, click **Back**. You can customize two areas on a graduated symbols map:

- Settings
- Map Legend

Customizing the Styles in a Graduated Symbols Map

The **Customize Graduated Symbol** dialog box enables you to customize the settings for your graduated symbols map. The settings include the type of symbol that displays, its size and color attributes, and the data value on which to base the size of the symbol you choose. Additional options allow you to choose the symbol scale, the symbol's orientation, and a symbol for negative values.

To customize a graduated symbols map:

1. Click on a Map window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Graduated** and select a template from the list.

4. Click **Next**. The **Create Thematic Map - Step 2 of 3** wizard panel opens.
5. Choose the table on which you want to base the shading, and choose the field from where you want to obtain the data values.
6. Click **Next**. The **Create Thematic Map - Step 3 of 3** wizard panel opens.
7. Click **Settings** to display the **Customize Graduated Symbols** dialog box.
8. Choose the items you want to customize and make the desired changes.
9. Click **Options** for additional customizing features.
10. Click **OK** to save your changes.

Customizing the Legend of a Graduated Symbols Map

MapInfo Pro creates a legend automatically when you create a thematic map. Keep the default settings or customize your legend to suit your needs. Click **Legend** in the **Customize** section of the **Create Thematic Map - Step 3 of 3** wizard panel to customize your map legend's fonts, titles, and more (see [Customizing a Thematic Map Legend](#)).

Customizing a Graduated Symbols Map

Customize your Graduated Symbols thematic map using the **Settings** and/or **Legend** button. To go back to any of the earlier wizard panel to make changes, click **Back**. You can customize two areas on a graduated symbols map:

- Settings
- Map Legend

Customizing the Styles in a Graduated Symbols Map

The **Customize Graduated Symbol** dialog box enables you to customize the settings for your graduated symbols map. The settings include the type of symbol that displays, its size and color attributes, and the data value on which to base the size of the symbol you choose. Additional options allow you to choose the symbol scale, the symbol's orientation, and a symbol for negative values.

To customize a graduated symbols map:

1. Click on a Map window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Graduated** and select a template from the list.
4. Click **Next**. The **Create Thematic Map - Step 2 of 3** wizard panel opens.
5. Choose the table on which you want to base the shading, and choose the field from where you want to obtain the data values.
6. Click **Next**. The **Create Thematic Map - Step 3 of 3** wizard panel opens.
7. Click **Settings** to display the **Customize Graduated Symbols** dialog box.

8. Choose the items you want to customize and make the desired changes.
9. Click **Options** for additional customizing features.
10. Click **OK** to save your changes.

Customizing the Legend of a Graduated Symbols Map

MapInfo Pro creates a legend automatically when you create a thematic map. Keep the default settings or customize your legend to suit your needs. Click **Legend** in the **Customize** section of the **Create Thematic Map - Step 3 of 3** wizard panel to customize your map legend's fonts, titles, and more (see [Customizing a Thematic Map Legend](#)).

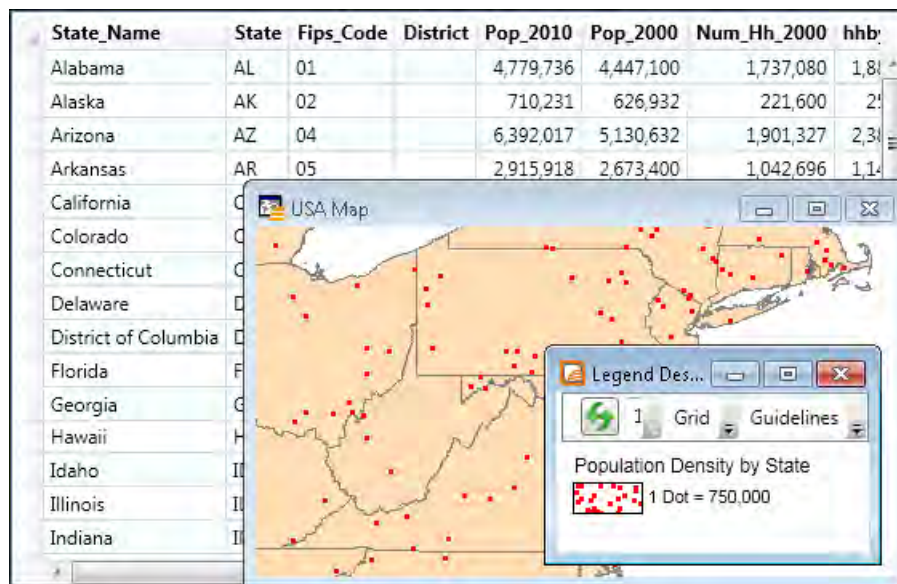
Working with Dot Density Themes

About Dot Density Maps

Dot density maps use dots to represent the data value associated with a boundary or region. The total number of dots in a region represents that region's data value. If you have 10,000 senior citizens in a county, and each dot represents 100 senior citizens, there would be 100 dots in the county boundary.

Dot density is particularly useful for showing raw data where one dot represents a large number of something: population, number of fast food restaurants, number of distributors who carry a brand of soda, etc.

For example, if you have a table of age demographics broken down into postal codes, you could use the dot density option to show the concentration of small children in each postal code boundary.



There are three customizing options for dot density maps. You can specify the value of one dot. For example, you have a table of population statistics, broken down by county. There are 10,000 pre-school students in Rensselaer County, New York. If you display Rensselaer County according to the number of pre-school students using the dot density method, each dot could represent 200 students. In that case, there would be 50 dots in Rensselaer County. You can specify the number of units each dot represents using the **Customize Dot Density Settings** dialog box.

When you increase the value each dot represents, you decrease the number of dots that display on the map. You could modify your dot density map so that one dot represents 400 students. In that case, there would only be 25 dots in Rensselaer County.

A second option is to change the size of the dots according to your needs, either large or small. If you are working with large populations, or large counts of something, make the dot size smaller so that the distribution of dots is easier to see.

Conversely, if you are working with a small data set, making the dot size larger might illustrate your analysis more clearly.

Note: Distribution of dots is random within the region. If you shade states according to population, the dots for New York are spread out throughout the state; they are not concentrated in New York City, where the majority of the state's population lives.

Thirdly, in the **Customize Dot Density Settings** dialog box, change the color of the dot to either red or black to add more variety to the final map. In this dialog box, you can select Circle or Square dot thematics and specify the dot density width (in pixels) of the square or circle. In general, squares look clearer at small sizes. At larger sizes, it may be more appropriate to use circles. You can create multiple dot density maps on the same layer by varying these options.

In the **Create Thematic Map - Step 3 of 3** wizard panel, click **Customize Settings**. This opens the **Customize Dot Density Setting** dialog box. Here you can change the number of units that each dot represents, and also select the dot shape (square or circle) size, and color. You can specify a circle size from 2 to 25 pixels in width. For a square, the size can range from 1 to 25 pixels.

Creating a Dot Density Map

A dot density map enables you to examine raw counts of data (such as population). Each dot represents a number of units. That number, multiplied by the total number of dots in the region, equals the data value for that region.

To create a dot density map:

1. Click on a **Map** window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Dot Density** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table on which you want to base the dot density map, and choose the field on which you want to obtain the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.

Use this panel to customize the map or its legend (see [Customizing a Dot Density Map](#)).

7. Click **OK**.

A dot density map displays based on either the default settings or whatever customized settings you entered.

Customizing a Dot Density Map

Customize your Dot Density thematic map using the **Settings** and/or **Legend** button. To go back to any of the earlier wizard panel to make changes, click **Back**. You can customize the following on a dot density map:

- Settings
- Map Legend

Customizing the Styles in a Dot Density Map

The **Dot Density Styles** dialog box enables you to customize the settings for your dot density map. The Settings include how many units each dot represents and the size of the dots. The color of the dots cannot be changed; it is always black.

To access the **Dot Density Styles** dialog box:

1. Click on a **Map** window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Dot Density** and select from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.

5. Choose the table on which you want to base the dot density map, and choose the field on which you want to obtain the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.
7. Click **Settings** to open the **Customize Dot Density Settings** dialog box.
8. Choose the items you want to customize and make the desired changes.
9. Click **OK**.

Customizing the Legend of a Dot Density Map

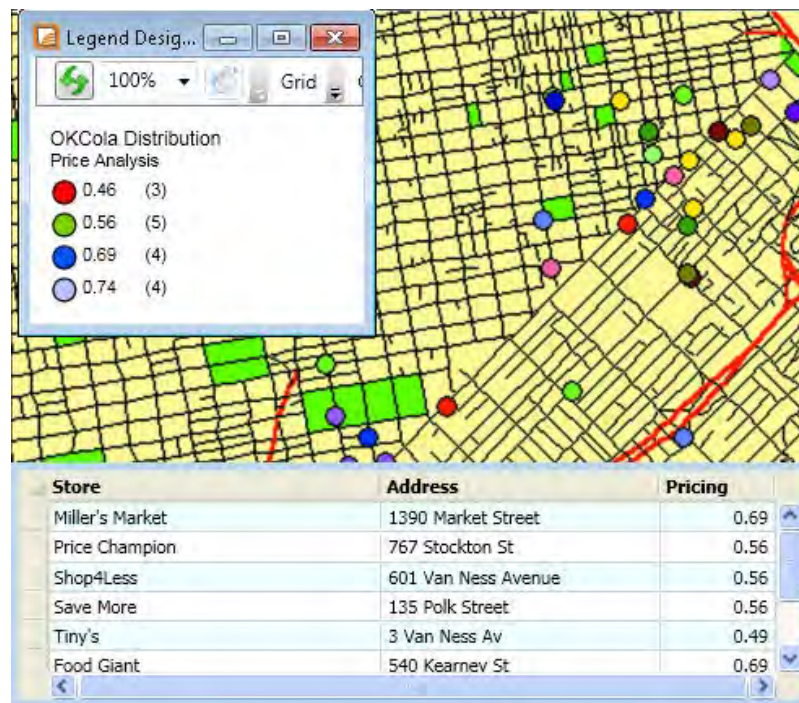
MapInfo Pro creates a legend automatically when you create a thematic map. Keep the default settings or customize your legend to suit your needs. Click **Legend** in the **Customize** section of the **Create Thematic Map - Step 3 of 3** wizard panel to customize your map legend's fonts, titles, and more (see [Customizing a Thematic Map Legend](#)).

Working with Individual Value Themes

About Individual Value Maps

Individual Value maps show points, lines, or boundaries that are shaded by individual values contained in a particular field. You can use both numerical and nominal values in individual values maps. MapInfo Pro gives each unique value its own color or symbol. When an individual values map uses symbol types, the symbols are taken from the base table.

For example, a soft drink distributor maintains a table of the supermarkets that buy soft drinks from him. Each supermarket sells the distributor's brand of soft drink for a different price. If the distributor shades the supermarket points by price, using individual values, all stores that sell the soft drink for 49 cents are shaded one color, all stores that sell the soft drink for 51 cents are shaded another color, and so on. Each unique value is assigned its own color. The distributor is able to see the price distribution among the supermarkets and can determine where he should increase his sales volume, based on the price.



If you are shading your points, lines or boundaries using nominal data, you can shade *only* by individual values. Nominal data is either non-numerical data (name, type of cuisine served, or brand of automobile sold) or numeric data where the numbers represent non-numeric data like an ID number. Dates are considered numeric data and can be used in both ranged and individual values maps.

For example, you have the results from a consumer survey. One question on the survey reads "What is your favorite Sunday afternoon activity?" The possible responses are:

1. Sleeping
2. Watching TV
3. Taking a drive
4. Reading
5. Playing or watching sports
6. Visiting museums or art galleries
7. Going to the movies

You want to shade each consumer point with the response for the favorite Sunday activity. The SUNDAY column of your table contains the number that corresponds to the consumer's favorite activity. However, the numbers in this column do not represent quantitative values. Going to the movies is not greater than Playing or watching sports even though $7 > 5$. When numbers are used as names instead of values, you must shade your objects by individual values. The numbers are only used to reference the pastimes so color can be assigned to them.

Custom Sort Order for Individual Value Thematic Map Legends

Customers have asked us to be able to change the sort order in the map legend list for Individual Value thematic maps. This allows you to control the look of your map legend.

Note: This feature is only available for Individual Value thematic map legends.

To customize the map legend label order of an Individual Value thematic map legend:

1. In the **Legend Designer** window, activate with a single click on the thematic map legend to modify.
2. In the **Modify Thematic Map** dialog box, choose the **Custom** radio button and then click **Order**.
3. In the **Customize Legend Label Order** dialog box, select an entry in the **Legend Label List** that you want to move and use the **Move Up** or **Move Down** buttons to reposition it in the list.
4. Click **OK** to save your settings and close the dialog boxes.

Your changes display for the thematic map legend in the **Legend Designer** window.

Important Notes

When you are creating and merging theme templates:

- MapInfo Pro saves the custom label order only when the option to **Save Individual Value categories** is selected in the **Save Theme to a Template** dialog box. This implies that when you create a theme based on a template, MapInfo Pro applies the custom label order only when the thematic expression creates the same categories as those in the template.
- When you are merging theme templates, the custom label order from the source template is applied to the current theme only when the option to **Merge Individual categories** is selected in the **Merge a Template to a Theme** dialog box and the template and current theme have the same number of categories.
- Saving a Template - The entry for theme templates on the **PRO** tab, click **Options**, and **Directories** to open the **Directories Preferences** dialog box allows you to designate the directory where theme templates reside.

Saving Individual Categories in a Theme Template for an Existing Thematic Map

For individual value themes you can save the actual categories in a theme template. For example, if you choose to build an individual value theme on a table to show land usage, you can assign a different region style to each type of land usage (such as commercial, forest, residential, and farm land). You may then want to take those same assignments and apply them to another table. You can do this by storing the category in a template, it will be associated appropriately when the template is applied to the second table.

To save individual categories in a theme template for an existing thematic, you must first create a thematic map. You would then:

1. Activate the legend for the theme in the **Legend Designer** window.

2. On the **LEGEND** tab, in the **Content** group, click **Modify Theme** to open the **Modify Thematic Map** dialog box.
3. Click **Save As** to open the **Save Theme to a Template** dialog box.
4. Specify a template name, and select the **Save Individual Value Categories** check box.
5. Click **OK** to return to the **Modify Thematic Map** dialog box.
6. Click **OK**.

Template saves and can be used to apply the stored individual categories to a second table. On the **MAP** tab, in the **Content** group, click **Add Theme** to have the template's name appear in the **Template Name** field in the **Create Thematic Map - Step 1 of 3** wizard panel.

Saving Individual Categories in a Theme Template When Creating a Thematic Map

For individual value themes you can save the actual categories in a theme template. For example, if you choose to build an individual value theme on a table to show land usage, you can assign a different region style to each type of land usage (such as commercial, forest, residential, and farm land). You may then want to take those same assignments and apply them to another table. You can do this by storing the category in a template, it will be associated appropriately when the template is applied to the second table.

To save individual categories in a theme template when creating a thematic:

1. Activate a **Map** window
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click the **Save As** button in the **Template** to open the **Save Theme to a Template** dialog box.
4. Specify a template name, and select the **Save Individual Value Categories** check box.
5. Click **OK** to return to the **Modify Thematic Map** dialog box.
6. Click **OK**.

These categories save in a template for future use when creating an individual thematic map.

See Also:

[Modifying a Thematic Map](#)

Creating an Individual Values Map

A thematic map that draws map objects according to individual values is useful when you want to emphasize categorical differences in your data rather than show quantitative information (such as types of stores in a given area, and zoning classifications in a given area).

To create an individual values map:

1. Click on a **Map** window containing the layer you wish to create the theme for.

2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Individual** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table on which you want to base the shading, and choose the field or expression that contains the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.

Use this wizard panel to customize the map or its legend.

7. Click **OK**.

Customizing an Individual Values Map

Customize your Individual Values thematic map using the **Styles** and/or **Legend** button. To go back to any of the earlier wizard panel to make changes, click **Back**. You can customize two areas on an individual values map.

- Styles
- Map Legend

Customizing the Styles of an Individual Values Map

The **Customize Individual Styles** dialog box allows you to customize the line, fill, or symbol used to shade each individual value.

To access the **Customize Individual Values** dialog box:

1. Click on a **Map** window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Individual** and select a template from the list.
4. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
5. Choose the table on which you want to base the shading, and choose the field or expression that contains the data values.
6. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.

Use this wizard panel to customize the map or its legend.

7. Click **Styles** to open the **Customize Individual Styles** dialog box.
8. Choose the items you want to customize and make the desired changes.
9. Click **OK**.

Customizing the Legend of an Individual Values Map

MapInfo Pro creates a legend automatically when you create a thematic map. Keep the default settings or customize your legend to suit your needs. Click **Legend** in the **Customize** section of the

Create Thematic Map - Step 3 of 3 wizard panel to customize your map legend's fonts, titles, and more (see [Customizing a Thematic Map Legend](#)).

Working with Grid Surface Maps

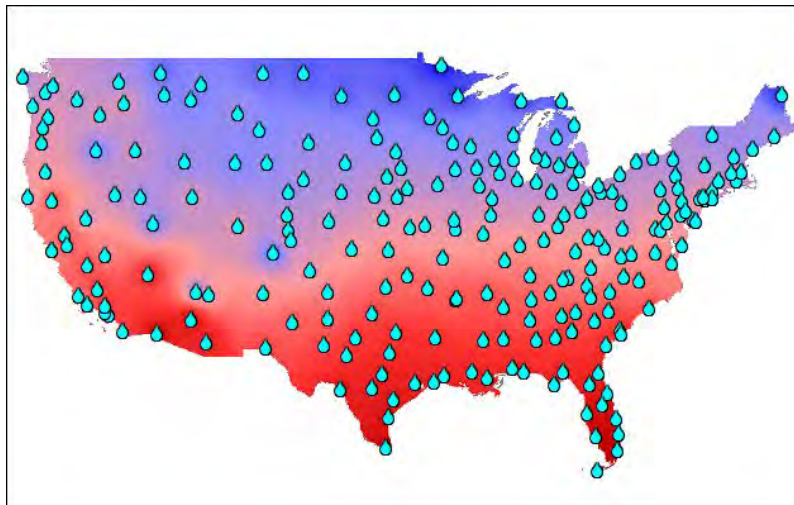
About Grid Surface Maps

The thematic maps we have discussed are based on vector layers. MapInfo Pro takes thematic mapping to a new level with a method that displays data as continuous color gradations across the map. This type of thematic mapping, known as grid mapping or surface theme mapping, is produced by an interpolating point data from the source table. MapInfo Pro generates a grid file from the data interpolation and displays it as a raster image in a **Map** window.

Grid theme maps are appropriate analytical tools in traditional GIS environments and other industries where the data points have measured values that reflect those locations. For example, use grid shading to illustrate temperature changes, snowfall amounts, or change in elevation.

The next figure shows the light to dark gradual transition across the United States, which represents low to high average annual temperatures. The continuous shading allows you to derive measurements at places other than where measurements were taken.

Figure: Grid Surface Thematic Map



See also:

- [Spreading Inflections by Equal Cell Count](#)
- [Modifying a Thematic Map](#)

About Grid Image Files

Grid mapping produces a file type called a grid image. When you create a grid thematic map using MapInfo Pro's grid handler, MapInfo Pro generates a default file name of *tablename_fieldname* with the extension .MIG (for example, USELEV_ELEVFEET.MIG). In the **Create Thematic Map - Step 2 of 3** dialog box MapInfo Pro displays the path and the root file name, where you can change it as necessary.

MapInfo Pro contains one read/write grid handler and a Grid Engine tool kit that shows you how to create your own. Once you have written a grid engine, you place this file in your MapInfo Pro application directory and set the preference in the **Map Window** dialog box. Specifically, to set the default grid writeable handler, go to the Map window preferences and specify your grid handler file. The available handler formats depend on what grid handlers have been installed. Changing the default grid handler will change the default file extension of the grid file name.

Grid files are stored by default in the data directory specified as a preference. Grid files can be opened from the **HOME** tab. Click the **Open** command like other MapInfo Pro supported file types.

When you open a table that has a grid filename associated with it, MapInfo Pro searches for the file if it cannot find it immediately. For example, the search capability can simplify opening tables if your .TAB file refers to an image that resides on a DVD drive, and different letters are used to designate the DVD drive on different systems.

MapInfo Pro uses the following search order:

1. Search for the file where specified by the **FILE** tag in the .TAB file.
2. Search for the file in the same directory as the .TAB file.
3. Search for the file in the **Table Search** path specified on the **PRO** tab, by clicking **Options**, and **Directories**.

MapInfo Pro either opens the table as though it found the file in the specified location, or it will report an error because the file could not be found in any location.

Creating a Grid Surface Thematic Map

To create a Grid Surface thematic map:

1. Click on a Map window containing the layer you wish to create the theme for.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Click **Grid**.

The inflection colors for the templates are displayed in the Preview section of the dialog box.

4. Choose a grid template from the **Grid Template** list box.
5. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
6. Select a table and field:

- **Table** - Select the table that you want to create the thematic map on. The list contains all of the open, mappable tables.
 - **Field** - Only numeric data columns display; date columns do not display.
 - **Ignore Zeroes or Blanks** - Check this to treat zeroes or blanks as NULL values. In the case of grids, we do not interpolate points with a zero value if this box is checked.
 - **Grid Options** - These options display only if the theme being created is a grid theme.
7. Select a table of boundaries to clip against:
- **Clip Table** - Choose a table of regions to clip the grid against. Defaults to **none**. Grid cells will be written if the cell falls within the regions of the selected table.
 - **Grid File Name** - Specify the directory and name of the new grid file that will be created. By default the grid will be named according to the source table and field. The new grid file will be saved in the directory specified by the **New Grids** (on the **PRO** tab, click **Options**, and **Directories**).
 - **Browse** - Click to display a directory picker; select a directory in which to place the new grid file. If you click **OK** in the directory picker, the directory in the **Grid File Name** edit control will be updated.
8. Click **Next**. The **Create Thematic Map - Step 3 of 3** wizard panel opens. The following options apply specifically to grid surface thematic maps:
- **Settings** - Choose **Settings** to display the **IDW Interpolator Settings** dialog box. This dialog box lets you change settings for the interpolator selected in the Interpolator combo box.
 - **Styles** - Displays a dialog box where color inflections and adjustment are specified.
 - **Legend** - Edit the map legend title, subtitle, and range labels.
 - **Interpolator** - Disabled when you are modifying an existing grid that does not have interpolation settings. Only visible when building grid surface themes.
 - **Template** - The buttons in the **Templates** group enable you to specify a name for a template, save the thematic map as a template, and when modifying an existing theme merge the thematic map with another template.
 - **Save As** - The grid template file will be saved with the .thm extension.
 - **Merge** - Select this option to display the **Merge Template** dialog box. This dialog box displays only themes of the same type as the theme you are merging. The **Merge** button is enabled only when you are modifying an existing theme, not when you are creating a theme.

Creating Custom Read/Write Grid Handlers

This section shows how to write your own read/write grid handler. MapInfo Pro provides two interpolators for creating grid themes: Inverse Distance Weighting (IDW) and Triangulated Irregular Network (TIN).

IDW Interpolator

The IDW interpolator is best suited for data values that produce arbitrary values over the grid, that is, data that does not have any relationship or influence over neighboring data values, such as population. This method of interpolation also works well for sparse data.

The IDW interpolator calculates the value of grid cells that cover the mapping area. Each data point value from your source table that is considered in the calculation for a cell value is weighted by its distance from the center of the cell. Because the interpolation is an inverse distance weighting calculation, the farther the point is from the cell, the less influence its value will have on the resulting cell value.

MapInfo Pro's grid mapping process begins by determining the minimum bounding rectangle (MBR) of the source table. The grid is divided into equal sized square cells of some size. For example, using the Grid default template, the STATES table in MapInfo Pro's sample data set creates a grid dimension of 200 cells by 303 cells. By calculating the number of cells in the grid and knowing the dimension of the MBR, MapInfo Pro determines that each cell needs to be 18.1 by 18.1 miles square. (Your cell size will be in whatever distance units you have set for the Map window. To change the units, go to the **MAP**tab and click **Map Options**).

The settings for the IDW interpolator are controlled via the **Settings** button in the Step 3 of 3 wizard panel. The illustration above shows the settings for the STATES table if you are basing the grid theme on the Grid Default or Grid Gray Default templates that ship with MapInfo Pro. Note the cell size number represents both the height and width of the cell. Any change to the cell size will result in an automatic update of the grid dimensions. With the cell size and the source points and values known, MapInfo Pro calculates a value for each cell. This value is determined by calculating a distance-weighted average of the points that lie within the specified search radius. Points are inversely weighted by their distance from the center of the cell.

In IDW, the exponent determines how much influence each point will have on the result. The higher the exponent the greater the influence closer points will have on the cell value. Exponents can range from one to 10.

You can also choose an aggregation method for the z-values of source data points that are in the same grid cell. Choose from: average, count, sum, min, and max.

TIN Interpolator

The TIN interpolator works best for terrain data and for data points that have a linear progression or relationship to each other across the grid, such as temperature.

The TIN interpolator produces triangles from a network of points that more closely reproduces the original map terrain than the IDW interpolator. It draws lines between points, dividing them into triangles and connecting all the points that it can. It creates a mesh of connectivity so that the grid points can be interpolated. The interpolation is not influenced by the neighboring original data values, so you do not get the "false bumping" of data that you can get with the IDW interpolator.

To access the **TIN Interpolator Settings** dialog box:

1. Click the Map window to make it active.
2. Do either of the following:
 - Create a new thematic grid map - On the **MAP** tab, in the **Content** group, click **Add Theme**. Click **Grid** as the thematic type and select from the list of Grid templates. Proceed to the **Create Thematic Map - Step 3 of 3** wizard panel.
 - Modify an existing thematic grid map layer - In the **Layers** or **Explorer** window double-click on the thematic layer to open the **Modify Thematic Map** dialog box.

3. Click **Settings**.

The **TIN Interpolator Settings** dialog box opens.

4. Set the values that you want to apply to create the network of non-overlapping triangles. Option descriptions are provided following these instructions.
5. Click **OK**.

The dialogs close and generate a thematic grid map layer on the map.

As in the IDW interpolator, the **Cell Size** indicated in the TIN interpolator is square: the number represents both the height and width of the cell. The grid dimensions are automatically updated when the cell size is changed.

The TIN settings can be manipulated to give more or less detail to the map terrain. The **Tolerance** setting controls whether closely spaced points are discarded. The tolerance is a fraction of the diagonal length of the bounding box of the points.

The **Distance** value controls the output. For non-zero distance radius values, only edges or triangles contained within a sphere centered at mesh vertices are output. This is useful to constrain the triangulated irregular network to a specified distance (radius); otherwise, the triangulation will cross concave regions. Usually the output is a triangle mesh, but if a non-zero Distance value is specified, then only triangles, edges, and vertices lying within the distance radius are output. In other words, non-zero Distance values may result in arbitrary combinations of triangles, lines, and vertices.

The **Feature Angle** setting controls the angle (in degrees) that defines a sharp edge. This setting is used for smoothing the final grid. If the difference in angle across neighboring polygons is greater than this value, the shared edge is considered "sharp."

Delaunay triangulations are used to build topological structures from unorganized (or unstructured) points. The input to this filter is a list of points specified in either 2D or 3D. The triangulation is 2D, so the triangulation is constructed in the x-y plane, and the Z coordinate is ignored (although carried through to the output). The Delaunay triangulation can be numerically sensitive in some cases. To prevent problems, avoid injecting points that will result in triangles with bad aspect ratios (1000:1 or greater). In practice this means inserting points that are widely dispersed, and enables smooth transition of triangle sizes throughout the mesh. (You may even want to add extra points to create a better point distribution.) If numerical problems are present, you will see a warning message to this effect at the end of the triangulation process.

Grid Appearance

Once the cell values are calculated, MapInfo Pro groups them into a color spectrum that is bounded by the minimum and maximum values in the table. The grid's appearance is controlled in the **Grid Appearance** dialog box, which you can access by clicking the **Styles** button in the **Create Thematic Map - Step 3 of 3** wizard panel.

Inflection Methods

You can control how the color is spread by specifying an inflection method, and the number of inflection points. The Number of inflections drop-down list shows numbers 2-16, but you can type any number between 2 and 255. You can also apply a rounding factor to the inflection values. If the inflection method is based on cell count, you may not see the effects of the rounding factor until the inflection values are calculated. The inflection methods include:

- *Equal Cell Count*-Sets the inflections so that approximately an equal number of grid cells fall between each inflection value.
- *Equal Value Ranges*-Spreads the inflections evenly between the minimum and maximum values of the data range.
- *Custom Cell Count*-Use this method to specify your own percentages.
- *Custom Value Ranges*-Use this method to specify your own values.

The Grid default template assigns blue to the minimum value and red to the maximum value. These minimum and maximum values are also expressed as percentages of the range. These color settings/values are known as inflection points and will display in the map legend with a particular color, value and percentage. If a cell has the exact value as the inflection point, it will display that color on the map. A cell value that falls between two inflection points displays with the color that is in between the colors of those inflection points.

When you increase the number of inflections, MapInfo Pro chooses default colors for the new inflections. The last inflection color remains the same. New inflection colors are inserted between the new last inflection and the one before it.

To change the color of an inflection point, double-click the color swatch and choose a new color from the palette. To edit the inflection percentages/values, single or double-click a value. You can type the new value right over the old value.

Relief Shading

Relief shading allows you to shade your grid surface map according to a virtual light source. MapInfo Pro adjusts the brightness of each grid cell based on its orientation to the light source. This enables you to take surface slope and direction into account relative to the direction of the light.

The brightness values that MapInfo Pro assigns to each cell correspond to light striking the surface. The light source can be the sun shining on a topographic surface. The maximum brightness is assigned at points where the sun's rays are perpendicular to the surface (the slope directly faces

the light source). As the slope faces turn away from the light source, lower brightness values are assigned.

Grid Translucency

The translucency setting allows you to set how much you can see through the grid layer. For example, in a boundary map, you may want to be able to see the boundaries as well as the topological terrain. A translucency setting of 0% produces a completely opaque image. A setting of 100% produces a completely transparent image. Set the translucency according to how much of the details in the layers underneath the grid you want to see.

Final Adjustments

You can make other color adjustments to your grid surface map. You can set the contrast and brightness level, or show the grid in gray-scale. You can also invert the inflection colors using the **Flip Colors** button.

Once the inflection settings, any relief shading, and other color settings are finalized, you are ready to produce the map. MapInfo Pro generates the grid theme map layer as a raster image. The inflection points grade from one color to another in smooth transitions to illustrate the distribution of the data.

Zoom Layering

Zoom layering for grid layers is controlled in the Map window preferences. To change the zoom layering setting for the current grid surface map, go to the **Map Options** dialog box (on the **PRO** tab, click **Options**, and **Map Window**) and check or clear the check box **Automatic Grid Zoom Layering**. The setting is turned off by default.

Working with Grid Handlers

In addition to the MapInfo Pro read/write grid handler (*.MIG) we also supply READ-ONLY grid handlers to support the direct opening of the following grid file formats:

- DEM-USGS ASCII(*.DEM)
- DTED-levels 1, 2, and 3 (*.DT0, *.DT1, *.DT2)
- GTOPO30 (*.DEM)

You can open these grid file types directly from the **Open** dialog box (on the **HOME** tab, from the **Open** list, click **Table**). You will see the file extensions listed next to the **Grid Image** file type in the **Files of type** drop-down list in the bottom of the dialog box. Because the handlers are read-only, they cannot be used to create grid files during the thematic mapping process.

If the relief shading option is enabled (in the **Create Thematic Map - Step 3 of 3** wizard panel, click **Styles** and then **Grid Appearance**), a separate file will be created to store the hill shade information.

The hillshade file is stored in the same location as the grid file and has the same base name as the grid but with the extension ".MIH". If the grid file is read-only, for example, it is located on a DVD, the .MIH files will be created in the same location as the .TAB file. The .TAB file will contain a new metadata key, for example:

```
"\Grid\Hillshade File" = "d:\tmp\AntiochSouth.MIH"
```

Working with Grid Thematic Layers

The grid thematic layer is different from other thematic layers in that, once it is created, it is independent of its base layer. Because it is a type of raster image, it can be reordered in the **Map** window as a separate layer. If the data in the base layer changes, the grid will not automatically update. In that case, you must re-interpolate the grid. The layer displays in **Layers** window with a default layer name of **table name fieldname**.

Using the Info Command and InfoTips with Grid Layers

You can use the **Info** command to get information on individual grid cells. When the **Map** window is active, on the **MAP** tab, in the **Options** group, click **Map Tools**, and click **Info**. Click on the map to display the surface grid's name and the data value associated with it. The information in the **Info** window is read-only in this instance, as you cannot change the cell's value. When InfoTips are active, hovering the cursor over a grid cell will display the cell's value.

Changing the Default Status of InfoTips

An InfoTip displays the label expression for the object in the topmost selectable layer. InfoTips are activated by default and are available in a **Map** window. They work for the **Select**, **Label**, and **Info** commands.

To set InfoTips for a particular layer, adjust the Selectable attribute in the **Layers** window so that the tips display for the layer you want.

To turn off (or on) the default status of InfoTips:

1. On the **PRO** tab, click **Options**, and **Map window** to open the **Map Window Preferences** dialog box.
2. Clear the **Show InfoTips** check box to turn off InfoTips. Select this check box to turn on InfoTips
3. Click **OK**.

Working with Bivariate Thematic Maps

About Bivariate Thematic Mapping

There are times when you need to create a thematic map that displays two different thematic variables at the same time. For example, if you are trying to show population growth and literacy at the same time, you might want to draw more than one theme on the same layer. Bivariate thematic mapping uses point or line objects to represent two thematic variables. For example, a star can represent one variable, such as the number of teenagers, while a blue fill for the star represents their annual purchase amounts. To create a bivariate map in MapInfo Pro, you create two thematic maps, and layer one over the other so that the objects display two variables.

The only types of thematic maps suitable for bivariate mapping are ranged and individual values maps. You can choose between two combinations for a bivariate map, depending on your data:

- two ranged maps
- one ranged map and one individual values map

Prism maps can also be used for bivariate theme mapping. For more information, see [Working with Prism Maps](#). If you have a non-numeric variable, one of your maps must be an individual values map. You cannot create a bivariate map with two non-numeric variables.

This feature is found from the **Create Thematic Map** wizard or by clicking the **Modify Thematic** command on the **LEGEND** tab.

You can use transparent pattern styles over an original layer to make the underlying layer(s) visible. This allows the thematic variable to retain the pattern but display transparently over another thematic variable. For more information, see [Creating a Transparent Bivariate Layer](#).

Example of Bivariate Thematic Mapping

To illustrate this process, suppose as a sales manager you want to know which businesses have generated the most sales in your territory. You have a table of customers with their total sales and sales representative.

First, you must decide what combination of thematic maps to use. Because you are working with sales representatives (non-numeric data) and total sales (numeric data), you must create both an individual values map and a ranged map.

Second, decide how you want to display the data. You can use a combination of color and size attributes to display your thematic variables. You want to assign a color to each sales representative and use a different size symbol to represent each range of sales figures. Note that this is different

than a graduated symbols map, where the symbol is scaled to one value. Here, the size of the symbol represents a range of values.

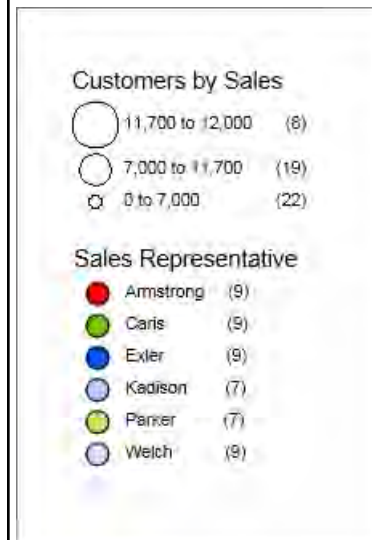
Third, you must create a separate thematic map for each variable. For the Individual Values map, use the table of customers as the table and choose Sales_rep as the field to which to assign values. MapInfo Pro assigns each sales representative a different color.

Next, create a ranged thematic map that shows the customers' total sales. Choose the Customer table as the table, and choose Sales as the field. Divide the total sales into six ranges with approximately the same number of customers in each range. In the **Thematic - Step 3 of 3** wizard panel choose the **Ranges** button, change the number of ranges to six, and verify that the type of range is set to **Equal Count**.

To show the ranges as sized symbols, choose **Styles** in the **Thematic - Step 3 of 3** wizard panel. In the **Autospread** group choose **Size**. The symbols in the **Styles** group change to graduated size. However, the only variable you want to display is size, as the symbols' color is coming from the individual values map. Choose **Options** to display the **Apply** group and choose the **Size** button again.

The selection in the **Apply** group overrides any selection you make in the **Autospread** group. To specify or change which symbol attributes display, you must choose **Options**, and choose the **Color** or **Size** button in the **Apply** group.

The symbols become hollow circles that are graduated in size. Choose **OK**, and your ranged map draws over the individual values map. The symbol color from the individual values map indicates the sales representative, and the size of the symbol represents a range of total sales figures. The map legend lists the bivariate map as two separate thematic maps, in effect displaying two legends. The legend does not combine the two variables.



Note: If you do not see both variables displayed on the map, make sure your variables did not overwrite each other. Also check the **Layers** window to see that the **Visible On/Off** check box is checked on both maps.

Creating a Transparent Bivariate Layer

You can create a transparent bivariate layer, so that you can see the underlying layer on the map. You can do this for both ranged theme and individual value bivariate layers.

Creating a Transparent Bivariate Layer (Ranged Theme)

To create a Ranged theme in which you can see the underlying layer:

1. Do one of the following:
 - Create a thematic map. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel. Select the **Ranges** type with a transparent style. Continue setting the options until you get to **Create Thematic Map - Step 3 of 3** wizard panel.
 - Open and modify an existing map. Activate the Legend frame for the theme and on the **LEGEND** tab, in the **Content** group, click **Modify Theme** to open the **Modify Thematic Map** dialog box.
2. Click **Styles** to open the **Customize Range Styles** dialog box.
3. Clear the **Replace Layer Style** check box to enable bivariate layer support.

The **Replace Layer Style** check box controls whether the layers under the Range theme should be drawn. When this check box is selected, the layer(s) under the theme are not drawn. When this check box is cleared, the layer(s) under the theme are drawn.

Note: The default behavior of the **Replace Layer Style** check box is set in the **Map Window Preferences** dialog box. See [Setting the Default Behavior of the Replace Layer Style Check Box](#).

4. Click **OK**.

Your theme displays. When there are other thematic layers beneath this one, you can see the bi-variant effect.

Creating a Transparent Bivariate Layer (Individual Value Theme)

The process for the Individual Value theme map is the same as described under [Creating a Transparent Bivariate Layer \(Ranged Theme\)](#), but the location of the check box is different.

1. Do one of the following:

- Create a thematic map. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel. Select the **Individual Value** type. Continue setting the options until you get to the **Create Thematic Map - Step 3 of 3** wizard panel.
 - Open and modify an existing map. Activate the Legend frame for the theme and on the **LEGEND** tab, in the **Content** group, click **Modify Theme** to open the **Modify Thematic Map** dialog box.
2. Click **Styles** to open the **Customize Individual Styles** dialog box .
 3. Clear the **Replace Layer Style** check box to enable bivariate layer support.

The **Replace Layer Style** check box controls whether the layers under the Individual Value theme should be drawn. When this check box is selected, the layer(s) under the theme are not drawn. When this check box is cleared, the layer(s) under the theme are drawn.

4. Click **OK**.

Displaying Attributes of a Symbol

To display two variables within one symbol, it is important to choose a different symbol attribute for each variable. For example, you cannot choose color for both variables because one color will overwrite the other. Choose from the following combinations:

- Color and symbol type
- Color and size
- Size and symbol type

Symbol type should only be used for nominal or non-numeric data, as there is no inherent association between a symbol type and a quantity.

Using an Inflection Point to Show Distinction

In thematic mapping, an inflection point is a color style you insert between ranges. It provides a second way to interpret your data.

The inflection point is placed where there is a distinct marker between the ranges of values above it and the ranges of values below it, or where a numeric shift in your data occurs. Most often, the inflection point is inserted as close to the zero value as possible, since zero marks the shift between positive and negative values, or at the mean of your data values.

The inflection point enables you to see this shift on your map. You see two different color spreads in your ranges. Instead of spreading toward each other, the top and bottom range colors both approach the color of the inflection point.

Another type of inflection point map is a grid surface thematic map. Here every color that displays in the map legend is an inflection point. Values that fall between these inflection points display with

a blend of the two colors. This allows you to see a continuous gradation of color across the map. See [Working with Grid Surface Maps](#) for a discussion on this type of thematic map.

Example of an Inflection Point Map

To show positive and negative population growth in the United States, you can insert an inflection point close to where the zero value is in your ranges. The top and bottom range points will spread, or graduate, toward the inflection point: one for increased population, and one for decreased population.

For a detailed description of the figures involved in this process, see [Updating Columns using Thematic Mapping](#). Since here we are focusing on the Inflection Point options, the process will cover that aspect of this map in more detail.

To enhance a map using an inflection point:

1. In the **Create Thematic Map - Step 1 of 3** dialog box, click **Ranges** and a template type.
2. Click **Next** to open the **Create Thematic Map - Step 2 of 3** wizard panel.
3. Create an expression to show population growth. For this example, we are using the expression $(POP_1990 - POP_1980)/POP_1980 * 100$.
4. Click **Next** to open the **Create Thematic Map - Step 3 of 3** wizard panel.
5. Click **Ranges** to customize the ranges.

For our example, choose **Equal Ranges**, and set the number of ranges to **14**.

When you use an inflection point, it is important that your data distribute well across the ranges. You may want to increase the number of ranges, or compare the distribution of the data between **Equal Count**, **Equal Ranges**, and **Natural Break** to see which gives the best representation of your data.

You may also want to use **Custom** to adjust the range values so that zero is the minimum value in one range, and the maximum value of the range below it. This is optional.

6. Click **OK** to redisplay the **Create Thematic Map - Step 3 of 3** wizard panel.
7. Click **Styles** to choose the range style.

The **Customize Range Styles** dialog box opens.

8. Choose **Options** to expand the dialog box and display more options.
9. Determine where among the ranges the inflection point should lie and specify the range position for the inflection point.

Examine the preview before you create the inflection point to locate where you want to place it. When you choose an inflection point, you must choose a number that identifies the position of a range in the map legend. Count the ranges in the preview map legend until you get to the range with a zero at one of its ends. If your Legend Label Order is Descending, count the ranges up from the bottom. If it is Ascending, count down from the top. You can keep the default color spread between the ranges (red to blue), or you can choose a different color spread. For this example, keep the top range at red, and change the bottom range to blue.

In the **Inflection at** box, choose **2** for the second range, as you determined above. The default is **None**, meaning no inflection point.

10. Click on a **Styles** button to set the style for the inflection point.

A style dialog box opens.

11. Select the color for the inflection point.

The default style is a white fill with no pattern.

12. Click **OK** to return to the **Create Thematic Map - Step 3 of 3** wizard panel.

13. In the **Create Thematic Map - Step 3 of 3** wizard panel, preview your map legend.

Your map legend does not show explicitly where the inflection point is, as your range colors only approach the inflection point. You can, however, add the inflection point to the map legend title or subtitle.

14. Click **OK**.

The Map window redraws with the inflection point you created.

Controlling the Number of Inflection Values

The **Grid Appearance** dialog box allows you to control the number of inflection values for grid themes.

To access the **Grid Appearance** dialog box:

1. Click on the Map window to make it active.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to open the **Create Thematic Map - Step 1 of 3** wizard panel.
3. Proceed to the **Create Thematic Map - Step 3 of 3** wizard panel.
4. Click **Styles** to open the **Grid Appearance** dialog box.
5. In the **Number of Inflections** field, select from a list of 2 to 16 inflections or type a number between 2 and 255.
6. Click **OK** to close the dialogs and wizard panel.

Applying Rounding Factors to Inflection Values

The **Grid Appearance** dialog box applies rounding factors to inflection values for grid themes.

To access the **Grid Appearance** dialog box:

1. Click the Map window to make it active.
2. On the **MAP** tab, in the **Content** group, click **Add Theme**.
3. Proceed to the **Create Thematic Map - Step 3 of 3** wizard panel.
4. Click **Styles** to open the **Grid Appearance** dialog box.
5. In the **Round** field, choose from a list of rounding factors to be applied to inflection values.

You may not see the effects of this rounding if the spread method is based on cell count until inflection values are actually calculated once the grid is created or re-interpolated.

6. Click **OK** to close the dialogs and wizard panel.

Spreading Inflections by Equal Cell Count

The **Grid Appearance** dialog box spreads inflections by equal cell count for grid maps.

To access the **Grid Appearance** dialog box:

1. Click the **Map** window to make it active.
2. Do one of the following:
 - In the **Layers** or **Explorer** window, double-click on the thematic layer to open the **Modify Thematic Map** dialog box.
 - In the **Legend Designer** window, activate the thematic map's legend with a single click and choose **Modify Theme** from the **Content** group on the **LEGEND** tab. (A double-click opens the **Legend Frame Properties** dialog box.)
3. Click **Styles**.
4. In the **Grid Appearance** dialog box, select the **Equal Cell Count** method to set the inflection values so that approximately an equal number of grid cells fall between each inflection value. Inflection breaks can be expressed as a percentage of the whole.
5. Click **OK** to close the dialogs and wizard panel.

For example, for a grid that has four inflections that have been spread by equal cell count, 33% of the grid cells will have colors between the colors of the first two inflections, 33% of the grid cells will have colors between the second and third inflection colors, and 33% of the grid cells will have colors that fall between the third and fourth inflection colors. Additionally, the percentages are additive. 67% of the grid cells will have colors between the first and third inflection colors. And 100% or all of the grid cells will have colors between the first and last inflection colors.

When the grid cells are interpolated, these percentages can be converted to actual values. If the inflection spread is based on cell count (equal or custom), you will see percentages in the inflection list view and in the preview map legends. You will not see the actual values until the grid is computed.

When the spread method is based on cell count, any time you change an interpolator parameter or choose to use a different interpolator for an existing grid theme, you will see percentages in the preview map legend.

Changing the number of inflection values in the combo box will respread the cell count percentages. So, if the number of inflections changes from 4 (based on equal cell count, the percentages would be 0%, 33%, 67%, and 100%) to 6, the new percentages would be 0%, 20%, 40%, 60%, 80%, and 100%.

Setting the Default Behavior of the Replace Layer Style Check Box

You can set the default behavior for the **Replace Layer Style** check box in both the ranges and individual value theme dialog boxes.

To set the default behavior of the **Replace Layer Style** check box:

1. On the **PRO** tab, click **Options**, and then **Map Window**.
2. In the **Map Preferences** dialog box, do one of the following:
 - Select the **Draw Layers Under Themes** check box to clear the **Replace Layer Style** check box by default.
 - Clear the **Draw Layers Under Themes** check box to select the **Replace Layer Style** check box by default.
3. Click **OK** to save this preference.

Working with 3D and Prism Maps

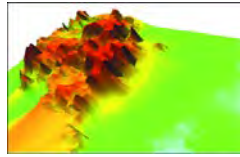
Working with 3D Maps

A 3D Map allows you to express your data using three axes: length, width, and height, which can give your maps greater impact. Prism Maps are a type of 3D map in which the height of the geography correlates to a specific value so that the greater the value, the higher the height of the geography. For more about prism maps, see [Working with Prism Maps](#).

MapInfo Pro contains a 3D viewing capability. Based on Microsoft's implementation of OpenGL software graphics interface, it allows freehand tilt and rotation of the image. The traditional pan, zoom, and Info commands also operate in the 3DMap window.

You can create a 3D view of any map that contains a continuous grid layer. For example, import digital elevation model (DEM) files or interpolate from a layer of points that contain elevation values. The image of any other layers will be draped over the 3D surface. Keep in mind, the 3D surface is not limited to representing elevation. It can also be used to show property value, sales potential, population density, air temperature, etc.

The following figure shows is an example of a 3D map:



You can rotate, zoom, and pan the 3D view. Additionally, you can clone the 3D view. The 3DMap window is a stand-alone window. If you modify the tables in the Grid thematic map used to create the map, you can update it by right-clicking on the 3DMap and choosing Refresh Texture. To change the settings in a 3DMap window, right-click on the layer in the Map window and choose **Properties** to open the **3DMap Properties** dialog box.

Creating a 3D Map

The **Info**, **Pan**, and **Zoom** commands are available for use within the **3DMap** window. The **Info** command returns the grid elevation value at a selected point.

For more information on creating a Grid thematic map or to open an existing grid layer, see [Working with Grid Thematic Layers](#).

To create a **3DMap**:

1. On the **HOME** tab, in the **Window** group, click **3DMap** to open the **Create 3DMap** dialog box .

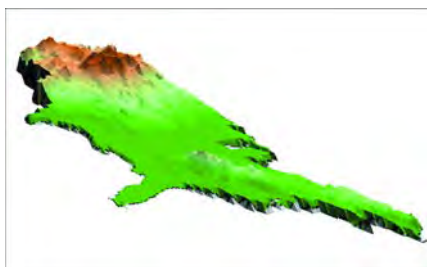
Note: This menu option is only available if the active Map window contains a Grid thematic map.

2. Select one of the following:
 - **Camera** - Specify the camera position and orientation.
 - **Light** - Designate the position and color of the light source.
 - **Appearance** - Specify appearance attributes including Units, Resolution, and Scale. Units is only available when first creating a **3DMap**. Resolution and scale are available later as well.
3. Click **OK**.

This creates a **3DMap** using the default settings. The 3D View of the map displays.

4. Use the left mouse button to manipulate the **3DMap**.

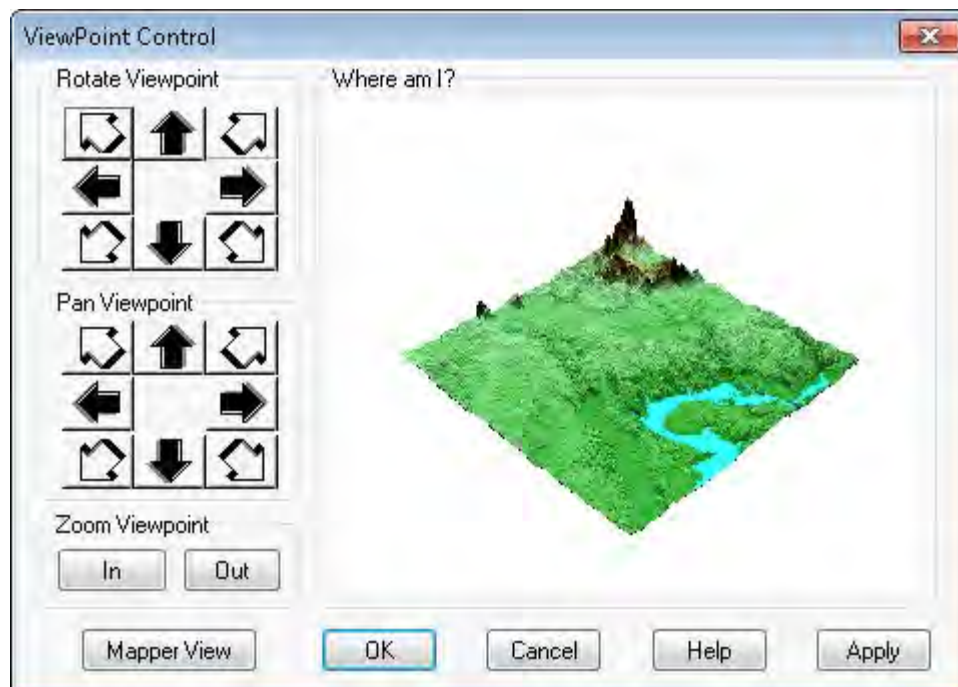
The map displays land elevations in the United States. It is the ELEV_FT.MIG file from the MapInfo Pro DVD.



Understanding the 3DWindow Commands

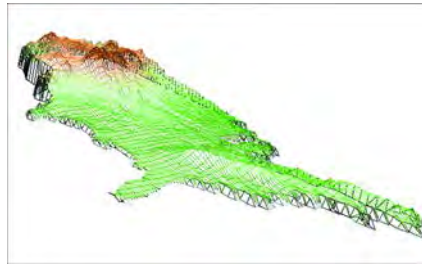
When the **3DMap** is the active window, a context menu is available when you right-click on the map. Choose from the following commands:

- **Refresh Texture** - Regenerates the image used for the texture on the grid. Use this option if you change or update the tables or objects used in the **3DMap**.
- **Clone View** - Creates a clone of the **3DMap** window.
- **Previous View** - Returns to the previous view of the **3DMap**.
- **View Entire Layer** - Re-centers the 3DMap in the window. If you zoom or pan the map from view, use this option to redisplay the map in the window.
- **Viewpoint Control** - Displays the **Viewpoint Control** dialog box which duplicates the functionality you have with the selection and the zoom commands, and includes a **Mapper View** button that repositions the **3DMap** window to match the view from the original Map window.



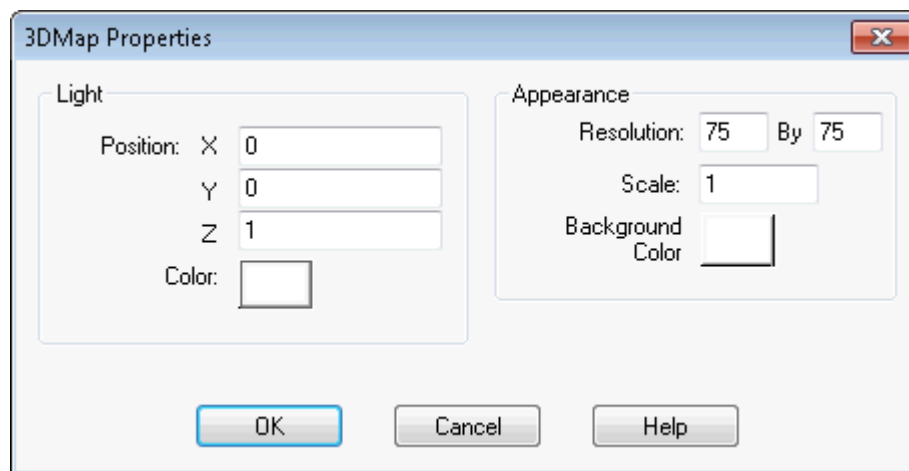
- **WireFrame** - Toggles between a wireframe and surface representation of the grid. Additionally, cloned **3DMap** windows have the surface representation of the grid, even if the cloned window is in wireframe mode. To toggle the wireframe mode on and off, press the **`W'** key on the keyboard while the **3DMap** window is active.

Here is an example of a wireframe map:



Note: This option is not saved to a workspace.

- **Properties** - Display the **3DMap Properties** dialog box displaying the current **3DMap** settings. Use this dialog box to modify the Light and Appearance settings of the active **3DMap**. Additionally, display this menu by right-clicking when in the **3DMap** window.



Toggling Between a Wireframe and Surface Representation of the Grid

Use this feature when you want to show the resolution of the underlying grid.

To toggle between a wireframe and surface representation of the grid, right-click on the **3DMap** and choose **Wireframe**.

Modifying the Properties of a 3DMap

The **3DMap Properties** dialog box contains the current 3DMap settings. Use this dialog box to modify the **Light** and **Appearance** settings of the active **3DMap**.

To access the **3DMap Properties** dialog box:

1. Click the **3DMap** window to make it the active window.
2. Right-click the **3DMap** and choose **Properties**.

The **3DMap Properties** dialog box opens.

3. Specify the desired options.
For field descriptions, click **Help**.
4. Click **OK**.

Refreshing the Grid Texture of a 3DMap

You can regenerate the image that is used for the texture on the grid. This is useful when the tables change or objects are updated.

To refresh the grid texture of a **3DMap**:

1. Make the **3DMap** the active window.
2. Right-click the **3DMap** and choose **Refresh Texture**.

The image is regenerated.

Controlling the Viewpoint of a 3DMap and a Prism Map

The **Control Viewpoint** dialog box allows you to rotate, pan, or zoom in and out on the sample view of your **3DMap** and **Prism** maps. Using the Mapper View button, you can also display the view of the map used to create the **3DMap** or the **Prism** map.

To access the **Control Viewpoint** dialog box:

1. Click the **3DMap** window to make it the active window.
2. Right-click the **3DMap** and choose **Viewpoint Control**.

The **Viewpoint Control** dialog box opens.

For a description of **Rotate Viewpoint**, click **Help**.

Manipulating a 3DMap

You can move the **3DMap** window around to determine the most effective angle for displaying your information.

To manipulate the view of a **3DMap** window:

1. Display a 3D Map.
2. Click the **Select** command.
3. Click and hold the left mouse button in the **3DMap** window.

As you move the mouse the viewpoint will be rotated around the focal point. You can also use the Grabber, and Zoom commands to move the **3DMap** window around the Map window.

The Info command displays the grid elevation value at the point you select.

Viewing the Entire 3DMap

If you zoom or pan the **3DMap** and the map becomes out of view. Use the View Entire Layer command to recenter the 3DMap in the window.

To display an entire **3DMap**:

1. Make the **3DMap** the active window.
2. Right-click the **3DMap** and choose **View Entire Layer**.

Viewing a Previous 3DMap

By using Previous View repeatedly, you can toggle back and forth between two views of your map.

To return to the previous view of a **3DMap**:

1. Make the **3DMap** the active window.
2. Right-click the **3DMap** and choose **Previous View**.

If you find yourself doing this often with a particular map, you might want to create two maps of the same table, each with a different view. Then you can view the two simultaneously.

Cloning a 3D Map or a Prism Map

You can create an identical clone of a **3D Map** or **Prism Map**.

To create an identical clone:

1. Make the **3D Map** or **Prism Map** the active window.
2. Right-click on the map and choose **Clone View**.

An identical clone is created.

Working with Prism Maps

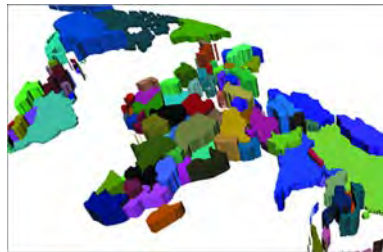
Prism maps offer another way to create a three-dimensional view of your map. In a **Prism Map**, the height of the geography is raised according to a specified column value from your table or a derived value from an expression-the greater the value, the higher the height of the geography. Each geography becomes a prism, allowing you to compare data values of objects relative to each other according to the height of each prism.

Prism maps are created using region layers. Other closed objects such as rectangles, ellipses, and rounded rectangles are also included in the **Prism Map**, as well as the region portion of Collection objects. Point objects are not included in the **Prism Map**.

The prism effect does not interfere with the display of other components in a **Map** window, including other map layers, themes, or labels. When the **Prism Map** is created, the image from the original **Map** window is "pasted" on the resulting 3D objects.

Note: Creating a **Prism Map** from complex geographical objects (for example, high resolution boundaries) requires a significant amount of memory and time. Memory resources may run out on some systems.

The commands for Prism maps are the same as those for 3DMaps. You can control the view of the map, create a duplicate view, and set the map's point of view, enabling you to choose the angle that will best emphasize the prism effect of the raised geographies.



Creating a Prism Map

You can create a **Prism Map**, which displays the base geometry to the height of a corresponding row value. A **Prism Map** displays the magnitude of certain mapped values with respect to others. You can combine a **Prism Map** with a color thematic map to display two attributes onto one map to correlate and compare various values.

To create a **Prism Map**:

1. Click the **Map** window to make it active and ensure that the **Map** window contains a region layer.
2. On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Prism Map** from the list, to open the **Create Prism Map** dialog box.
3. In the Choose Layer and Column group, choose the layer to map, and choose a column value.

Only numeric columns from the layer you chose display in the dialog box.

4. From the **Column** drop-down list, choose **Expression** to use a character column.

The **Expression** dialog box opens.

5. Create an expression.

Select the character column you want to use, and use the Val() function to convert a character string to a numeric value. This function returns zero for any character string that has no numeric meaning.

6. In the **Appearance** group, select the **Background** color.

This color is used for the window's background.

7. Select the **Light** color.

This color is the lighting for your map. It acts as a "cover" to the camera lens as it views the map.

8. In the **Camera** group, choose the camera's position and orientation.

The **Horizontal Angle** measures the rotation of the map around the center point of the grid. This value can range from 0-360 degrees. The **Vertical Angle** measures the rotation in elevation from the start point directly over the map. This value ranges from 0-90 degrees.

9. Click **OK**.

The **Prism Map** displays in your **Map** window.

Note: The display characteristics that were in your original map display on your prism objects. This includes all layer, thematic, and label objects.

Viewing the Entire Prism Map

If you zoom or pan the **Prism Map** and the map becomes out of view. Use the **View Entire Layer** command to recenter the Prism map in the window.

To display an entire **Prism Map**, right-click and choose **View Entire Layer**.

Viewing a Previous Prism Map

By using Previous View repeatedly, you can toggle back and forth between two views of your map.

To return to the previous view of a **Prism Map**, right-click and choose **Previous View**.

If you find yourself doing this often with a particular map, you might want to create two maps of the same table, each with a different view. Then you can view the two simultaneously.

Bivariate Prism Maps

Because prism maps preserve the display of other map elements, including themes, you can easily add a second theme to your **Prism Map**, such as ranges or individual values, to create a bivariate map. For more about Bivariate maps in general, see [About Bivariate Thematic Mapping](#).

Prism Map and Browser Editing

If you change a row value of an object in a **Prism Map** or edit an object directly in a **Map** window, the **Prism Map** will reflect these changes. For example, if you change a data value that was used directly in a **Prism Map**, or as part of an expression that was used to calculate a value, the prism height of the corresponding objects will change to reflect the new value. This includes single row changes and column updates.

When you move objects in a **Prism Map**, the Prism map object that is based on the original object will also move. When you add objects to the **Prism Map**, they will display flat because data values for new objects are initially set as zero.

Sometimes an object in a **Prism Map** displays the incorrect texture or image. This usually occurs when the geometry of an object has changed for some reason, for example, as a result of map clipping, moving the object, or adding or removing nodes. Use the **Refresh Texture** command on the shortcut menu in the **Prism Map** window to correct the display.

Modifying a Prism Map

To modify the properties of a **Prism Map**:

1. Right-click to display the shortcut menu, and then choose **Properties**.

The **Prism Map Properties** dialog box opens.

2. Modify the **Background** and **Light** color settings.
3. Select **InfoTips** and set a scale for the **Z** direction (vertical) of the map.

The **InfoTip** information can come from any column in the table or valid expression. The values will display when you hover the cursor over an object using a command that supports ToolTips.

A scale for the Z direction is calculated during the initial creation of the **Prism Map**. If you decide to modify it, keep in mind that the values used for the prism height may greatly exceed the x and y dimensions.

For example, in a **Prism Map** of population, values could easily be in the millions. The scale must be small enough so that the objects can be viewed. A scale value >1 will exaggerate the topology in the Z direction; a value <1 will scale down the topological features in the Z direction.

4. Click **OK**.

The prism properties save and are applied to the map.

Refreshing the Grid Texture of a Prism Map

You can regenerate the image that is used for the texture on the grid. This is useful when the tables change or objects are updated.

To refresh the grid texture of a **Prism Map**:

1. Make the **Prism Map** the active window.
2. Right-click on the map and choose **Refresh Texture**.

The image is regenerated.

9 - Preparing Your Map for Publishing

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About Map Layouts

Once you have created the perfect map, you can create and customize a layout to showcase your work in high-quality presentations or printouts. MapInfo Pro includes a layout designer to customize your map presentation for printing or sharing on-line.

Creating a layout for publishing a map is different than stylizing a map in the **Map** window. In a **Map** window you adjust the map presentation, by setting labels styles, adding a scale bar adornment, and a legend, to make it easier for anyone viewing or using your map file to understand the data being represented. Creating a layout in the **Layout** window lets you prepare a version of the map for publishing and distribution. You can publish versions of a map for different audiences and describe the contents of your map or the results of your analysis.

A map layout usually includes a title, scale bar, and legend, to help orient the viewer to the data on display. It also includes legal information, such as a company logo and copyright citation, and supporting information to describe the map data or the results of your analysis, such as descriptive text, images, and tables of data. The map presentation may also use unique or custom symbols to highlight key data points on the map.

A layout consists of a canvas and frames on the canvas that hold content, such as a map, legend, scale bar, text, shape, image, or table. You design a layout by rearranging these frames. You can move and resize them, align them to each other or to a grid or to grid lines, overlap them, and change their style by adding borders and backgrounds to them. You can also copy and paste them to another layout or to create a duplicate within the same layout.

For the commands to add content to your layout, see *LAYOUT Tab* in the *MapInfo Pro: Getting Started Guide*.

When you add a map to the **Layout** window it is live, so that you can make edits to it; you do not need to toggle between the layout and editing in the **Map** window. The **Layout** window shows the map using the printer resolution, so that you know beforehand what your printout will look like (you will know what labels will be on the printed map). In contrast, the **Map** window shows maps using the screen resolution, which is not an accurate representation of what the printed map would look like (labels in a **Map** window may not be on the printed map). To add a map to your layout, see [Adding a Map to a Layout](#).

Opening a Layout Window

- On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Layout** from the list.
- On the **LAYOUT** tab, in the **Page** group, click **New Layout**.



Scrolling the **Layout** window shows the extents of the paper that the layout will print to.

Working with the Layout Window

Re-Center and Specify a Zoom Level for the Layout Window

It is easy to design a layout when there are this many ways to change the view by zooming in or out.

To change the zoom level in a **Layout** window:



- Make the zoom level smaller or larger, to see more or less detail, by using the slider bar located along the bottom of the **Layout** window.
- Enter a new value for the zoom level. Click on the label (the percentage value) to the left of the zoom slider to make it a text box. Type a new percentage value between 5 and 400 in to the text box and then press the **Enter** or **Tab** key. To discard what you entered, press **Esc** or click away from the text box.
- Enlarge the view, so that you can see more detail, by clicking the **Zoom in**  button to the right of the zoom slider.
- View the entire contents of the layout by clicking the **Fit Layout in Window**  button to the right of the zoom slider, or right-click on the canvas. The **Layout** window zooms out to show the entire page and all layout frames. If you have a large page size and a small **Layout** window, then **Fit Layout in Window** may not show the entire layout. To view the rest of the layout, either make your **Layout** window bigger or use the scrollbars.

To quickly reposition your view of the map:

- Zoom into the canvas using the **Zoom In** command on the **LAYOUT** tab, in the **Tools** group. When you select this command and click on the layout canvas, the layout re-centers to where you clicked and the area magnifies by a factor of two (this shows more details in a smaller area). When you click and drag it diagonally across the layout canvas, the area enclosed by the dotted rectangle becomes the new view. You can return to the **Select** tool by pressing **Esc** or clicking the **Select** command.
- Zoom out of the canvas using the **Zoom Out** command on the **LAYOUT** tab, in the **Tools** group. When you select this command and click on the layout canvas, the layout re-centers to where you clicked and increases the visible area of the map by a factor of two (this shows a larger area on the map). When you click and drag it diagonally across the layout canvas, more of the map displays around the area enclosed by the dotted rectangle. You can return to the **Select** tool by pressing **Esc** or clicking the **Select** command.

- Pan the canvas using the **Pan** command on the **LAYOUT** tab, in the **Tools** group. When you select this command and then click and drag it across the layout canvas, you recenter the map to a new location (this changes what you see in the map view). You can return to the **Select** tool by pressing **Esc** or clicking the **Select** command.

Working with Multi-Page Layouts

You can easily create and manage multi-page layouts that can be saved as a PDF document. To add pages to your layout, click the **Add New Page to Layout**  button located on the bottom left corner of the **Layout** window. To delete a page from your layout, click the **Delete Selected Page**  button. To scroll through pages to view them in the window, use the scroll bar located on the right side of the **Layout** window, or use the page links located on the lower left corner of the **Layout** window.

All of the pages in a **Layout** window have the same page size, orientation and margins. If you change the page setup, then the new setup applies to all of the pages in that **Layout** window. **Layout** windows are independent of each other, so one **Layout** window could be set up with Landscape orientation and another **Layout** window set up with Portrait orientation. Content that hangs off of a page is clipped when printing or exporting (it does not continue onto a different page).

The **Layout** window displays only one page at a time. To go to a different page, use the navigation buttons located along the lower left corner of the **Layout** window status bar, or click on a thumbnail page image on the left edge of the **Layout** window. You can resize the thumbnails list by dragging the vertical bar that separates the layout page from the thumbnails. Dragging the bar all the way to the left hides the thumbnails list.

Tip: Clicking on a map name in the **Explorer** window or **Layer Control** window causes that map's window to come to the front. If the map is in a layout frame, the layout switches to that page to show the selected map.

If you have set up your layout to show grids and or guidelines, then those grids and guidelines stay in place as you navigate from page to page. If you have frames selected on one page and you change pages, the selection will clear. Frame selection on multi-page layouts exist just for a single page.

If you add pages and then save to a workspace, earlier versions of MapInfo Pro cannot open that workspace; only version 15.2 or later can open workspaces containing multi-page layouts.

Layout Window Context Menu

Right-clicking on the layout canvas displays a context menu with the following options:

- **Page Setup** - Opens the **Page Setup** dialog box where you can set the paper size, orientation, margins, and print settings for your layout.
- **Fit Layout in Window** - Resizes the canvas to view the entire page in the **Layout** window.

- **Cut** - Removes the current selection and saves it to the clipboard.
- **Copy** - Creates a duplicate of the current selection and saves it to the clipboard.
- **Paste** - Inserts the contents of the clipboard at the current location.

Setting Layout Window Preferences

MapInfo Pro lets you set a **Layout Designer** window preference that manages how to deactivate a layout frame. A layout frame is active when you click on the frame, and is no longer active when you click somewhere else. You can turn off this setting, so that a layout frame remains active when clicking outside of the frame.

To turn off deactivating a layout frame by clicking somewhere else:

1. On the **PRO** tab, click **Options**, and then **Layout Window** to open the **Layout Preferences** dialog box.
2. Clear the **Frame activation can be deactivated by clicking outside of the frame** check box to turn off this option.
3. Click **OK** to close the dialog and save your settings.

When this option is turned off, clicking outside of a frame in the **Layout** window no longer deactivates the frame.

Mini Toolbar for Layout Window

You can use the Mini Toolbar on the Layout window for quick access to often used actions. Tasks like Select, Pan, Zoom In / Zoom Out, Alignment and many more are directly available on the Layout window when you right-click inside (above or below the context menu depending on where you click in the window).

Available options are:

Command	Description
Select	Selects an object on the canvas.
Pan	Repositions a Layout within its window. Active when a Layout window is active.
Zoom In / Zoom Out	Zoom In Provides a closer area view of a Layout window. To display a wider area view of the current Layout window, choose Zoom Out .

Command	Description
Align	<p>Align Left: To align the left edge of the selected objects or frames to the nearest guideline on the Layout window.</p> <p>Align Center: To move the selected objects horizontally such that the vertical centers are aligned, if only one object is selected then the object will be centered relative to the page.</p> <p>Align Right: To align the right edge of the selected objects to the nearest guideline on the Layout window.</p> <p>Align Top: To align the top edge of the selected objects to the nearest guideline on the Layout window.</p> <p>Align Middle: To move the selected objects vertically such that the horizontal centers are aligned, if only one object is selected then the object will be centered relative to the page.</p> <p>Align Bottom: To align the bottom edge of the selected objects to the nearest guideline on the Layout or Legend Designer window.</p>
Modify	<p>Modify Symbol Style: To select the symbol that will be inserted.</p> <p>Modify Line Style: To set the line type, thickness and color of line objects (lines, arcs and polylines). You can also modify the line pattern and width.</p> <p>Modify Region Style: To open the Region Style dialog box to set the color, pattern, and outline of closed objects. This also sets the default style, which is used when you create new objects.</p>
Bring To Front	Moves the frame you selected to the front, so that it is on top of all of the other frames.
Send To Back	Moves the frame you selected to the back, so that it is behind all of the other frames.
Add Vertical Guideline	To add a new vertical guideline to the Layout or Legend Designer window.
Add Horizontal Guideline	To add a new horizontal guideline to the Layout or Legend Designer window.
Remove Frame content	Clears one or more selected frames of their content on the Layout canvas.
Insert Frame Content	<p>Insert Symbol: To insert a symbol into the map or layout.</p> <p>Insert Line: To draw a straight line on the map or Layout window.</p> <p>Insert Polyline: To insert a polyline into the map or Layout window.</p> <p>Insert Ellipse: To draw a circular shape.</p> <p>Insert Rectangle: To draw a rectangular shape on the window.</p> <p>Insert Rounded Rectangle: To draw a rectangular shape with the rounded corners on the window.</p> <p>Insert Polygon: To insert a region/polygon shape into the Layout window.</p>

Customize Mini Toolbar for Layout Window

The Layout Mini Toolbars can be customized to suit your needs and work style. Commands can be added to and removed from the toolbars.

To customize a toolbar:

1. Right-click on the ribbon and choose **Customize Quick Access Toolbar** to open the **Customize Ribbon** dialog box.

This dialog is also available from the **Customize Quick Access Toolbar** menu, in the upper left corner of the desktop, by choosing **More Commands**.

2. Highlight **Layout Toolbar** in the left pane to access the customizable settings.
3. In the left pane, highlight a command and click the **Add** button.
4. To remove a command from a custom tab or group, click the **Remove** button.
5. To organize the commands within a tab or group, use as the Up and Down arrows. You can also reorder any of the tabs, including the standard ones.
6. Click **OK** to save your changes.

You can also create toolbar customizations for added ease of use. This would allow you to have a different selection of commands on the toolbar for every customization.

To create a new customization:

1. Customize a toolbar as per your requirement.
2. Enter a Name in the **Customization Name** text box.
3. Click on the "+" icon above the **Customization Name** text box to add and save the customization.
4. Use the Save and Delete icons to save updates to or delete a customization.

Layout Templates

MapInfo Pro's Layout window is a page layout feature that allows you to combine your Map, Browser, Legend and other layout items on a page and arrange them for output. You can add any currently open window to the layout and move and resize it to find the best look to show off your work. Add text such as titles and labels to pull the entire presentation together. You can save this layout presentation layer created above and reuse with it a different set of maps, browsers, legends, etc. allowing you to publish your maps faster with the help of **Layout Templates**.

A **Layout Template** is as a user defined format that contains a Layout window with required placeholders for maps/browsers/etc. in a specific arrangement for presentation. You can choose from a list of pre-built templates provided as part of MapInfo Pro or create and define your own and

automate the filling on contents within it. **Layout Templates** are made up of empty frames that get filled in with contents of other windows such as maps or browsers, static content (text, shapes, images, etc) and dynamic text such as date, path, etc. They are portable and can be used in any environment in which MapInfo Pro operates and with any MapInfo products.

Layout Templates is a MapInfo Pro tool that is loaded by default when you install MapInfo Pro. Once loaded, it extends the functionality of the **New Layout** button in the **Page** group under the **LAYOUT** tab. The **New Layout** button now opens a drop-down gallery containing a default blank system template and a list of pre-built custom templates. It also adds a set of tool buttons that enables creating, editing, and saving layout templates. Also, the following two new options are added to the Layout context menu:

1. Remove Content - Removes content from the selected frames.
2. Delete Selected Frames - Removes selected frames from the layout.

Creating or Saving a Layout Template

Once you create a Layout you can save it as a **Layout Template** by clicking the **Save As Template** button in the **Page** group under the **LAYOUT** tab. Once saved this is added to the list of custom templates and available for reuse later.

Applying a Layout Template

To apply a template to an existing layout, click on the **New Layout** button in the **Page** group under the **LAYOUT** tab and select a template from the gallery. This will create a new Layout window and arrange the contents according to template being applied.

Note: For Mapper and Browser placeholders in the Layout Template - Mapper/Browser placeholders would only be filled automatically if the template contains only one placeholder for mapper/browser and only one map/browser window is open in the workspace, else a layout with empty placeholders would be created.


Note: Legend frames would automatically be filled only when the corresponding mapper window is auto-populated while applying a template.

Note: In case the mapper window contains a thematic layer, the thematic legends would get preference while populating the legend placeholders.

Adding a Map to a Layout

You can add the maps that you have open in MapInfo Pro to your layout in the **Layout** window.


To add a map to your layout:

1. On the **LAYOUT** tab, in the **Page** group, click **New Layout**.
2. On the **LAYOUT** tab, in the **Edit** group, use the **Map**  command to add a map frame to your layout. This command can be used in the following ways:

Click the **Map** command to open the **New Map** dialog where you can select the available layers to add to a new map frame.

Expand the **Map** command drop-down list to select from the **Map** windows that you have open and any map frames that you already have in your layout.

New Map	Opens the New Map dialog box where you can select the map layers that are currently open in MapInfo Pro, to add to a frame in your layout.
Maps	Indicates a Map window. Select to copy a Map window into a new map frame in your layout.
Map Frames	Indicates a map frame that is already in your layout. Selecting a map frame duplicates the frame in your layout, so that you can show the same map twice in your output. You can edit each map frame separately. This is useful if you want to show before and after scenarios, or wish to compare and contrast data on your map.

You can also drag a map from a **Map** window in to your layout. To do this, on the **MAP** tab, in the **Options** group, click **Drag Map** . Click on the map in your **Map** window and then drag it in to the **Layout** window. If the **Map** window has a legend, then the legend copies into a frame in the **Layout** window as well.

You will see the map frame listed in the **Layers** window.

For stand-alone **Map** windows, MapInfo Pro clones all of legend frames for the first **Legend Designer** window created for the map and places them along the right side of the map frame. Legend frames are not cloned for embedded map frames.

Note: Closing open **Map** windows does not affect your layout.

Editing the Contents of a Map Frame

You can activate a map frame in your layout to access the **Map** window context menu (the right-click pop-up menu). When you activate a map frame, you have access to all of the editing commands that are available for the corresponding **Map** window. Making changes in a map frame affects only that frame. If the map frame was created by copying a **Map** window into the layout, the frame and

the window are two separate maps. Modifying the map frame has no effect on the original **Map** window.

The content of an active map frame in the **Layout** window differs from that of the stand-alone **Map** window. The display of the map, in particular the display of labels, is based on the printer metrics associated with the **Layout** window. The labels displayed may differ from those displayed in a stand-alone **Map** window, which uses screen metrics.

To edit the display of a map frame:

1. Right-click on the map frame and click **Activate**, or double-click on the map. This highlights the border of the active frame.
2. Select an object on the map frame and then right-click to open a pop-up menu.
3. Make a selection to change the view of the map, edit the selected object, or get more information about the object.

The map options are located on the **MAP** tab under the **Options** group. For a description of the map options, search for the options in the *Help System*.

The contents of the frame is fully embedded in the **Layout** window and not linked to any other window, so editing the contents of the frame in the layout does not affect the display in the corresponding **Map** window.

Clicking away from the active frame deactivates it.

Editing the Map Display Style

Changing the map display styles for a map in a **Layout** window is similar to changing display styles for a map in a **Map** window. Both types of maps are in the **Map** list where you can select map layers to change their display styles. The changes you make to the map in the **Layout** window does not affect the contents of the **Map** window and vice versa.

To edit the map display style in your layout:

1. Double-click on the frame, or right-click and select **Activate**. This highlights the border of the active frame.
2. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Layers** from the list, to open the **Layers** window.
3. In the Layers list, highlight the layer for the map that is in the Layout window.

Note: You will also see the map from the Map window in the list. If you choose this map, the style changes will apply to the **Map** window, not the **Layout** window.

4. To change the style for the layer, do one of the following:
 - Double-click on the *style swatch* to change the display style. A dialog box opens that is specific to the type of items in the layer and what you clicked on, such as points, lines, or regions. For details about the options that you can set in the dialog, click the dialog's **Help** button.

- Double-click on the *layer name* to change the display style and labels for the layer. This opens the **Layer Properties** dialog box. For more details, click on the dialog's **Help** button or see [Changing how a Layer Displays on the Map](#).

The changes you make to the map in your layout does not affect the contents of the **Map** window and vice versa.

Adding a Scale Bar for a Map in a Layout

If the **Map** window has a scale bar, then it comes with the map when you add it to a layout. You can edit this scale bar's properties, or remove it, by right-clicking on the map frame to make it active (select **Activate**) and then right-clicking on the scale bar.

For professional quality cartographic output, we recommend placing a live dynamic scale bar on your layout by using the **ScaleBar** command on the **LAYOUT** tab. This command lets you add a custom scale bar anywhere on your layout and gives you better presentation effects than the simple scale bar available with a **Map** window. Adding a scale bar to a map in your layout does not affect your **Map** window.

To add a scale bar to your layout:

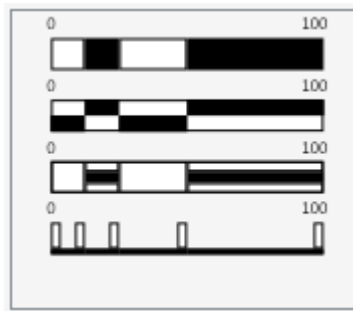
1. On the **LAYOUT** tab, in the **Edit** group, click **Scalebar** to open the **Create Scale Bar** dialog box.
2. From the **Link to Map** list, select the map from this list to create a scale bar for.

You can have multiple maps on a layout and you can create a scale bar for each map.

3. Specify the bar length, or use the default values. The two values are proportional: the first value is the distance on the paper map, the second value is what the first value represents as a distance on the Earth's surface. Specify the length of the scale bar to a maximum of 34 inches or 86.3 cm on the printed map.

The **Scalebar Preview** updates as you change scale bar display settings.

4. Check the **Use Automatic Scaling** check box to include a "nicer" scale value on a map. There is a description just below this check box that explains how the current scale bar will be drawn into the map.
5. Check the **Add Cartographic Scale** check box to include a representative fraction (RF) with the scale bar. In MapInfo Pro, a map scale that does not include distance units, such as 1:63,360 or 1:1,000,000, is called a **cartographic scale**.
6. Select a preset scale bar: Check Bar, Solid Bar, Line Bar, or Tick Bar.



7. Customize the look of the scale bar using the following buttons:
 - **Select Scalebar Font and Font Style** - Sets the font type, style, and color. Use the slider under the preview panel to adjust the font size.
 - **Select Scalebar Color One** - Opens the **Select Color** dialog to set the fill color. Click on the color wheel to select a color and use the slider to adjust the transparency of the fill color. For more precision choosing a color, enter RGB (Red, Green, Blue) values or a hexadecimal value in the fields provided. You can also enter a transparency value in the field labeled A (Alpha component); use zero (0) for fully transparent and 255 for fully opaque.
 - **Select Scalebar Color Two** - Opens the **Select Color** dialog to set the fill color.
 - **Select Scalebar Border One** - Opens the **Select Color** dialog to set the border color.
8. Click **OK** to close the dialog box.

The map frame refreshes to include the scale bar.

The scale bar is within a layout frame, and has the same properties as any layout frame. To move the scale bar, select and drag it to a new location on the layout canvas. To resize the scale bar, select it and drag a corner to a new size. To adjust the frame properties and make other selections, right-click on the scale-bar to display a context menu.

To remove the scale bar, select it and press the **Delete** key.

Layout Scalebar Unit Customization

You can now customize the units string shown in the layout scalebar. This helps in the case when you may want to produce a layout and show a unit name with an alternate spelling, such as "kilometers" vs. "kilometres".

The default unit naming convention has not changed. But if you wish to alter the units string, you can do so in the Layout Scale properties dialog during creation or you can modify an existing scalebar.

You can either click on the unit name shown below the scalebar sample, or click on the pencil icon to begin editing.

Note: If a scalebar has a customized unit name, the scalebar will not open in older versions of MapInfo Pro (version 16.0 or earlier).

Adding a Map Legend to a Layout

When a map is embedded in a **Layout** window, any legends you create for the map are also placed in the same **Layout** window. But you may want to add a legend after the map is in the Layout window.

To add a map legend to your layout that already contains a map:

1. Open the **Create Legend - Choose Layers** dialog box by doing one of the following:
 - On the **LAYOUT** tab, in the **Edit** group, click **Legend**.
 - In a **Layout** window, right-click on the map frame and select **Add Legends** to open the **Add Frames** wizard.
 - Activate a map (right-click and select **Activate**) on your layout and then on the **MAP** tab, in the **Content** group, click **Add Legends**.
2. Select the map layers that you would like to create a legend for and then click **Finish**, or click through the wizard to keep the default settings.

For a detailed descriptions of the options in the wizard, click **Help** in the wizard.

By default, the legend is beside the map in the **Layout** window. A legend has separate legend frames for each layer on the map. This lets you customize the legend to show only the information for those layers that are important to what the map conveys. By showing some legend frames and not others and by changing the map title and legend text, you can use identical maps to create two very different layouts. This is useful when the same map is used for two different audiences.

You can delete a legend frame from your layout by selecting it and pressing the **Delete** key. To add a layer to your legend, because you deleted the legend frame or did not include the layer when creating the legend, follow the steps in this section and select the layer that you want to add in the **Create Legend** wizard.

You cannot create a second legend in your layout for the same map layer.

Removing a layer from a map deletes the legend for that layer.

Editing a Legend in a Layout Window

A map legend in a **Layout** window is made up of individual legend frames that are each unique to a layer on the map. To customize your map legend, you would edit the contents of the legend frames to support the design of the final map and to clearly communicate the map contents to the reader.

Each legend frame may have a title and subtitle. You can edit the label text, change the font size and style, and change the sample size. You also have control over how to sort the labels.

To edit the contents and display of a legend frame:

1. Double-click on the legend frame to open the **Legend Frame Properties** dialog box.
2. Change or remove the title. Optionally add a subtitle, change the display of the labels and the sample size. For a detailed description of the dialog options, click **Help**.

For some legend themes, you can control the order of the rows in the legend (by ascending, descending, or customizing the order), and show or hide the count beside each row.

For additional information, see *Changing Map Legend Titles and Font Style* in *MapInfo Pro: Managing the Look of Your Map* Guide.

3. Repeat the previous steps for each legend frame that you wish to change in your layout.

To have more than one column in a legend frame, either set the number of columns in the **Legend Frame Properties** dialog box or resize the legend frame.

To modify how a thematic legend displays, right-click on it and select **Modify Legend's Thematic Map** to open the **Modify Thematic Map** dialog box. You can then customize the display properties of the thematic map legend. This option is only available on a thematic map legend frame.

Refreshing the Contents of a Legend Frame

You can edit object styles on the map by adding new styles and removing existing styles, which may affect what the styles look like in the legend. A legend does not update automatically except when overriding, changing, or removing an existing style. For other style changes made to a layer, you must refresh that layer's legend frame.

You cannot refresh a thematic legend frame. Legends based on raster layers are automatically refreshed when changes are made to the raster table. When thematic layer properties are changed the thematic legend refreshes automatically.

Right-click on the legend frame and click **Refresh Legend Styles**.

The legend frame refreshes to show the most current styles in use for the layer.

Adding a Thematic Map to the Layout Window

When creating a layout of a map in the **Layout** window, you can add a thematic layer to the map.

To add a thematic map to your layout:

1. Right-click on the map frame and then click **Activate**. This highlights the border of the active frame.
2. On the **MAP** tab, in the **Content** group, click **Add Theme** to start the theme wizard.

3. Select from the options that the wizard presents.

For details about the wizard and creating a thematic map, see *Creating a Thematic Map* in the *MapInfo Pro: Creating Thematic and Themed Maps* Guide.


By default, the thematic legend is positioned beside the map in the **Layout** window.

If you do not want to create a legend with your thematic map, then in Step 3 of the create theme wizard, click **Legend** to open the **Customize Legend** dialog box. From the **Into Window** drop-down list, select **No Legend**. MapInfo Pro applies the theme to the map in the **Layout** window, but does not create a legend.

You can delete a legend frame from your layout by selecting it and pressing the **Delete** key.

Adding a Table (Browser) to a Layout

If a **Browser** window is open in MapInfo Pro, then you can add it as a table in your layout. Adding a table is useful when you want to show more details about the data than the map displays.

On the **LAYOUT** tab, in the **Edit** group, use the **Browser**  command to add a browser frame to your layout. This command can be used in the following ways:

Click the **Browser** command to open the **Browse Table** dialog where you can select an open table to add to a new browser frame.

Expand the **Browser** command drop-down list to select from the **Browser** windows that you have open and any browser frames that you already have in your layout.

New Browser	Opens the Browse Table dialog box where you can select a table that is currently open in MapInfo Pro, to add to your layout.
Browsers	Indicates one or more Browser windows. Select to copy a Browser window into a new browser frame in your layout.
Browser Frames	Indicates one or more browser frames that is already in your layout. Selecting a browser frame duplicates the frame in your layout, so that you can show the same data twice in your output. You can edit each browser frame separately. This is useful if you want to show before and after scenarios, or wish to compare and contrast data on your map.

The table you select is in a browser frame in the **Layout** window.

Note: Closing open **Browser** windows does not affect your layout. However, closing a table closes the browser in all windows including the **Layout** window.

Editing the Contents of a Browser Frame

Activating a browser frame in your layout gives you access to the **Browser** context (right-click) menu. The data is read-only, but you can sort and filter the contents and resize and reorder columns. You cannot edit the data in a browser frame; you can only make cosmetic changes.

You cannot select rows in a browser frame in the **Layout** window, and selections to the same base table made in other windows does not affect the browser frame.

To edit the display of a browser frame:

1. Right-click on the browser frame and from the pop-up menu, select **Activate**. This highlights the border of the active frame.
2. Right-click on a column in the browser frame and from the pop-up menu, select to sort the column or apply a filter to it.

For a description of the **Browser** context menu, see *About Browser Window Commands and Context Menu* in the *MapInfo Pro: Getting Started* Guide.

Clicking away from the active frame deactivates it.


Adding an Image to a Layout

You can add an image to your layout, such as a corporate logo, on-location photo, or backdrop for your map. The following are supported image formats that you can work with:

- JPEG Interchange Format (*.jpeg, *.jpg)
- Portable Network Graphics (*.png)
- Windows Bitmap (*.bmp)
- Graphics Interchange Format (*.gif)
- Tag Image File Format (*.tif, *.tiff)
- Icon Format (*.ico)

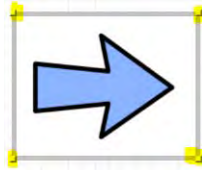
The image frame maintains a reference to the image file, so the original image file must remain in the same location for it to display. The reference to the image file is also maintained in a workspace.

To add an image to your layout:

1. On the **LAYOUT** tab, go to the **Edit** group and click **Image**  to open the **Insert Image** dialog box.

2. Locate the image file that you want to insert, select it, and then click **Open**. The image displays in your layout.

You can resize an image by selecting it and then dragging a corner to a new size. The image scales to fit within the image frame.



The Layout maintains the image aspect ratio (ratio between width and height) as you resize it, so that the image does not look distorted. When replacing an image, the image frame resizes to match the aspect ratio of the new image.

You can move an image by selecting it and dragging it to a new location on the layout canvas.

For details on how to resize and move an image with more precision, see [Resizing Frames](#) and [Moving Frames](#).

Error Message: Image Not Found

A message displays in a **Layout** image frame when the image file that the frame references cannot be found. The message includes the path to the file that is missing. The image frame retains the reference to the image, so restoring the image file restores its display in the image frame.

As an example, you will see a message after deleting or renaming the image or when an image is in a shared location on your network and you lose access to the network. After restoring the image, or restoring your network connection, the image displays in the layout.


The Layout retains the image in the layout during your session, so you may not see a message until after reloading the layout, such as when resizing the image in the layout or after opening a workspace.

Adding Text to the Layout Window

You can add text to your layout, such as titles, footnotes, copyright date, and other important information that explains your map. The text that you add is within a text frame that can be moved anywhere in the layout.

Each text frame holds up to 2047 characters.

To add text to your layout:

1. On the **LAYOUT** tab, click the **Text**  icon.
2. Click where you want to add text to your layout.
3. Type your text in the text frame.
4. When you are done typing, click anywhere else in the layout or press the **Esc** key.

To edit your text, double-click on the text frame to active it and then make your changes.

Note: If you are editing text while the layout zoom is not set to 100% and your cursor disappears, pressing the left or right arrow keys redisplay the cursor. This is a known issue with the operating system.

Changing the Text Style in a Text Frame

To change the style of text in a text frame:

1. Either:
 - Right click on the text frame and select **Text Style** to open the **Text Style** dialog box.
 - Select the text frame. The Text style options are activated on the **LAYOUT** tab under the **Style** command.
2. Change the font, size, color, bold and italics effects to the text in the frame.
Text effects shown in grey are unavailable for modifying the text in a **Layout** window.
3. Click **OK** to apply your changes.


To change the style for text in multiple frames, press the **Ctrl** key while selecting text frames, right-click on one of the frames, and then select **Text Style**.



Changing Text Alignment and Spacing

You can control the horizontal alignment of the text within a text frame. The alignment determines the appearance and orientation of the edges of the text as left-aligned, right-aligned, or centered. You can also determine how much space occurs between the lines of text.


To control the alignment or spacing of text:

1. Select one or more text frames by clicking or shift-clicking on them.
2. On the **LAYOUT** tab, choose one of these options to align the text in the frame.

	Left Align Text	Left-justifies the text within a text frame.
---	------------------------	--

	Center Align Text	Centers the text within a text frame.
	Right Align Text	Right-justifies the text within a text frame.




3. Choose Line Spacing to set a numeric value for line spacing.

	Line Spacing	Change the spacing between lines of text.
---	---------------------	---

The text refreshes using the new alignment and spacing.

Changing the Text Frame Orientation in a Layout

You can change the orientation of a text frame in two ways.

1. Use the **Rotate Frame**  field on the **Layout** window:
 - a) Select one or more text frames by clicking or shift-clicking on them.
 - b) On the **LAYOUT** tab, in the **Style** group, either select a rotation angle from the **Rotate Frame**  drop-down list, or enter a rotation value in the field.
2. Drag and drop the text frame's bottom-right corner:
 - a) Select one or more text frames by clicking or shift-clicking on them.
 - b) Hover the mouse pointer over the bottom-right corner of the text frame until it turns to .
 - c) Drag and drop the mouse pointer for the desired orientation.

Layout Smart Text

Layout Smart Text is an enhancement to text frames in the Layout Designer. Previously you could only add static text to text frames in the Layout Designer. Smart Text provides the ability to embed dynamic values that can change based on the context. For example, you may wish to include the current date or the layout page number as text in a Layout. Smart Text uses MapBasic expressions to accomplish this.

Syntax

The syntax for a Layout Smart Text expression is:

```
$mb{mapbasic-expression}
```

where `mapbasic-expression` is a valid MapBasic expression.

For example, to display current date in a text frame, use:

```
$mb{FormatDate$(CurDate())}
```

Static Text

You can also use Smart Text along with static text, for example:

```
Current date: $mb{FormatDate$(CurDate())}.
```

In normal mode, the result of this expression would be displayed as:

```
Current Date: 10/25/2017
```

Handling Errors

If the Smart Text contains an invalid MapBasic expression, the text will appear in red with the MapBasic error number. Additionally, if you hover over the text frame the tooltip will show the complete MapBasic error.

For example, if you use the expression:

```
$mb{FormatDate$(CurDat())}
```

the text frame will show:

```
Error(615)
```

When you hover your mouse over the text frame, the tooltip help text will read:

```
Error evaluating FormatDate$(CurDat())Error(615): Found [()] while searching for [)]. Invalid or missing argument list.
```

You must edit the smart text expression and fix all syntax errors.

Escaping a Smart Text Expression

If you want the Smart Text expression to be interpreted literally, you can use the escape character backslash ("\") before the Smart Text expression and make it a literal string. For example, if the text is:

```
\$mb{FormatDate$(CurDate())}
```

The Smart Text expression will not be evaluated and will be displayed as a literal string:

```
$mb{FormatDate$(CurDate())}
```

Aliases

Layout Smart Text supports a list of aliases which can be used in lieu of a MapBasic expression. The syntax for using an alias is:

```
${alias}
```

where `alias` is the alias name for a MapBasic expression.

For example, use the following text in a Layout Text Frame to display the current page and number of pages:

```
Page ${Page} of ${Pages}
```


If the text frame is on the second page of a Layout containing four pages, the text will appear as `Page 2 of 4` in the Layout.

As with regular Smart Text, you can force an alias to be interpreted literally using the escape character backslash ("\"). Using the example above:

```
Page \$${Page} of \$${Pages}
```

the text for the above frame will appear as `Page ${Page} of ${Pages}` in the Layout.

If the alias used is not in the list of aliases, you will see a red error in the text frame and its help text will show additional error information. MapInfo Pro will search a user-modifiable list of aliases first but will fall back to a hard-coded list if the alias is not in the user list.

Click on the **Text**  icon on the Layout Ribbon to display a list of all Layout Smart Text Aliases under the **Smart Text** group.

Aliases Provided by MapInfo Pro

A list of commonly used aliases will be provided with MapInfo Pro. The user-modifiable list will initially be created from an internal hard-coded list and will be saved to the file

```
%APPDATA%\MapInfo\MapInfo\Professional\<current_version>\SmartTextAliases.xml
```

the first time you use an alias in a text frame. The initial list contains the following aliases:

Alias	Expression	Description
Author	"Your name"	Originator's name.
Company	"Your company name"	Company name.
Computer	Env\$("COMPUTERNAME")	Computer name.
Copyright	""Copyright © ""+Year(CurDate())	Copyright notice using current year.
Date	FormatDate\$(CurDate())	Default date format.
ItemName	LayoutItemInfo(CurContext(1),CurContext(3),14)	Displays the frame's Name property
LongTime	FormatTime\$(CurTime(), ""h:mm:ss tt"")	Displays hours, minutes, seconds and AM/PM.
MPVersion	SystemInfo(19)	Full version number of the currently running MapInfo Pro.
Page	LayoutInfo(CurContext(1),12)	Display the current Layout page number.
Pages	LayoutInfo(CurContext(1),11)	Display the total number of Layout pages.
ShortTime	FormatTime\$(CurTime(), ""HH:mm"")	Displays hours, minutes in 24-Hour notation.
Time	FormatTime\$(CurTime(), ""h:mm tt"")	Displays hours, minutes and AM/PM.
User	Env\$("USERNAME")	Current user's name

Modifying and Extending Aliases

To edit this list, open the `SmartTextAliases.xml` file (at `%APPDATA%\Roaming\MapInfo\MapInfo\Professional\<mapinfo_pro_version>`) into a text editor.

Note: For locale other than English, the `SamrtTextAliases.xml` file would be at

`%APPDATA%\Roaming\MapInfo\MapInfo\Professional\<mapinfo_pro_version>\Locale\<la`

The XML file contains an Alias node for each alias which looks as follows:

```
<Alias name="alias-name" description="description of the
alias">expression</Alias>
```

For example, the node for the Company alias from the table above appears like this:

```
<Alias name="Company" description="Company name.">"Your company
name"</Alias>
```

To edit this and see your own company name when you use the Company alias you need to edit the expression and replace it with your own company name in quotes. For example:

```
<Alias name="Company" description="Company name.">"Precisely"</Alias>
```

You can add your own aliases or modify one of the existing aliases. You can delete aliases from the file, but if the alias is from the original list it will still be found.

MapBasic Support for Smart Text

Some enhancements have been added to MapBasic to make Smart Text more powerful and easier to use. These include new functions `CurContext()` and `LayoutItemWinID()`, and enhancements to the `LayoutItemInfo()` and `LayoutPageItemInfo()` functions.

Using the `CurContext()` function

Smart text in a text frame often needs to be able to refer to the current layout window, the current page that the frame is on, or the frame's current ID in order to use various MapBasic functions. `CurContext` provides this context.

For example, the following can be used to display the Name property of a text frame:

```
$mb{LayoutItemInfo(CurContext(1), CurContext(3), 14)}
```

`CurContext(1)` returns the current Layout Window identifier which is then passed as the 1st argument to `LayoutItemInfo`. `CurContext(3)` returns the frame's current ID which is passed as the 2nd argument. `CurContext` is valid only within a Smart Text expression in a text frame, and is used to provide the current context to other MapBasic functions such as `MapperInfo`, etc. For more information and examples see the MapBasic Reference for the `CurContext` function.

Using *LayoutItemWinID()*, *LayoutItemInfo()* and *LayoutPageItemInfo()* functions

The `LayoutItemWinID()` function can be used in any MapBasic context but was added as a way to make it easier to get the Window identifier of a Map, Browser, or Legend Designer frame on a Layout page.

For example,

```
LayoutItemWinID(CurContext(1), "Main Map", 1)
```

Will search the entire Layout document for a Map frame named "Main Map" and return its Window identifier. This in turn can be passed to a `WindowInfo` or `MapperInfo` function to get related information about that Map window.

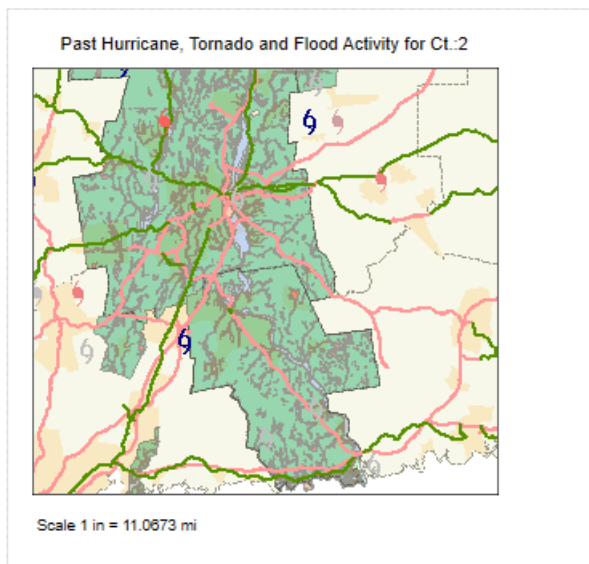
In addition, both `LayoutItemInfo` and `LayoutPageItemInfo` can now take a frame name as an argument instead of a numeric frame ID.

For example,

```
LayoutItemInfo(CurContext(1), "Company Logo", 12)
```

Examples of Smart Text using Frame Names

The following screen shot shows two examples of Layout Smart Text using frame names to link text to map information.



The text showing "Past Hurricane, Tornado and Flood Activity for Ct.:2" is done using this Smart Text expression:

```
$mb{WindowInfo(LayoutItemWinID(CurContext(1), "Main Map", 1), 1)}
```

But could also be done using the additional change to `LayoutItemInfo`:

```
$mb{WindowInfo(LayoutItemInfo(CurContext(1), "Main Map", 5), 1)}
```

The text showing "Scale 1 in = 11.0673 mi" is using Smart Text expression:

```
Scale 1 in = $mb{MapperInfo(LayoutItemInfo(CurContext(1), "Main Map", 5), 2)} $mb{MapperInfo(LayoutItemInfo(CurContext(1), "Main Map", 5), 12)}
```

But could also be done using new `LayoutItemWinID`:





```
Scale 1 in = $mb{MapperInfo(LayoutItemWinID(CurContext(1), "Main Map", 1), 2)} $mb{MapperInfo(LayoutItemWinID(CurContext(1), "Main Map", 1), 12)}
```



Adding Shapes to a Layout

You can add a shape to your layout, such as a line, polyline, ellipse, rectangle, rounded rectangle, or polygon. This is useful for adding borders to your layout, design elements (such as shading behind a legend), or calling out and separating text or areas of the layout for review, sign-off, or special attention.

To add a shape to your layout:

1. on the **LAYOUT** tab, in the **Edit** group, click **Insert** and select a shape from the list.

	Line	Select to insert a frame containing a line shape.
	Polyline	Select to insert a frame containing a polyline (multi-line) shape.
	Ellipse	Select to insert a frame containing an ellipse shape.
	Rectangle	Select to insert a frame containing a rectangle shape.

	Rounded Rectangle	Select to insert a frame containing a rounded rectangle shape.
	Polygon	Select to insert a frame containing a polygon (region) shape.

- On the layout canvas, click and drag to draw the shape onto the canvas. You can cancel selection of the shape by pressing **Esc**.
- After drawing the shape, drag it to a different location or resize it by dragging one of its corners.
- Set the style options for the shape. On the **LAYOUT** tab, in the **Style** group, from the **Style** list, click **Region** or **Line** depending on what the shape is.

For a region, choose a fill color and pattern and border color and width. For a line, choose pattern, color and width. Click **OK** to apply the change.

Editing Shapes in a Layout

You can resize a shape by dragging one of its corners, or you can specify width and height values to be more accurate.

To change the display style of a shape, such as its color and border style, see [Adding Frame Borders and Shape Styles](#).

To rotate a shape and resize it using width and height values:

- Right-click on the frame or object and select **Frame Properties** to open the **Frame Properties** dialog box.

The **Frame Properties** dialog that does not include **Width** and **Height** boxes for symbols. To resize a symbol, see [Editing Symbols in the Layout Window](#).

Note: Double-clicking on a shape opens the **Region Style** or **Line Style** dialog box.

- In the **Rotate Frame** box, enter the value in degrees that you want to rotate the shape on the layout. A value of 360 is a full rotation, a positive value rotates the symbol in a counter-clockwise direction, and a negative value rotates it in a clockwise direction.
- In the **Width** and **Height** boxes, enter new values to make the shape larger or smaller. You can enter a value with up to three decimal places (0.537).

For shapes, you must enter values larger than zero (0).

For lines, you must enter at least one value larger than zero (0). To create a horizontal line, enter a height value of zero (0). To create a vertical line, enter a width value of zero (0).

4. Click **OK** to apply your changes.

For details about changing the size of frames, see [Resizing Frames](#).

For details about resizing and changing the display style for a symbol, see [Editing Symbols in the Layout Window](#).

Adding Symbols to a Layout

Add symbols to your layout to further customize your map display. MapInfo Pro uses the default symbol and style.

To add a symbol to your layout:

1. On the **LAYOUT** tab, in the **Arrange** group, from the **Insert** list, click **Symbol**.
2. Click on the layout where you want to place the symbol. Continue placing symbols on the map in this way.
3. To move a symbol after placing it on the layout, use the **Select** command (in the **Style** group) and drag the symbol to a new location.

To change the display style of specific symbols or to load your own symbols, see [Editing Symbols in the Layout Window](#).

Editing Symbols in the Layout Window

You can edit the symbols on your layout to create truly unique maps. MapInfo Pro lets you choose symbols from many standard sets that install with the product, and you can customize the size, color, effect, and rotation of those symbols.

You can also load your own custom symbol set using the instructions in this section. However, you may not be able to apply all of the display effects to them. Adding a custom symbol set file saves it into the `\CUSTSYMB` directory.

To move a symbol on the layout canvas, click and drag it to a new location. To move a symbol with more precision, right-click on it and select **Frame Properties** to open the **Frame Properties** dialog box. Enter new horizontal (**X**) and vertical (**Y**) values to center the symbol to. You can also change the symbol display style from here by clicking on the **Style** button.

To edit the display style of a symbol on your layout:

1. On **LAYOUT** tab, in the **Style** group, click **Select** and then select the symbol you want to edit.

To select multiple symbols, press the **CTRL** key while selecting symbols.

2. On the **LAYOUT** tab, in the **Style** group, from the **Style** list, click **Symbol** to open the **Symbols** dialog.
3. From the **Symbol Set** list, select the name of the symbol set you want to view and then click on the specific symbol you want to use.

You can also select a symbol using its unique identifier by typing it into the **Character Code** field.

To use your own custom symbols, select **Custom Symbols** from the list and then click **Add**. In the **Add Custom Symbols** dialog, navigate to your custom symbol set file, select it, and click **Open**. You can then select a symbol from your custom symbol set to use on the layout. After adding your custom symbol set, it displays within the **Symbol Set** list for use the next time you edit symbols.

4. Set the style options for the symbol. You can see a preview of the symbol as you make your style selections.
 - **Size** - Select the size of the symbol font from this drop-down list or enter a new value.
 - **Symbol Color** - Select the color for this symbol from this drop-down list. This option is not available for Custom Symbols.
 - **Symbol Effects** - Options such as **Halo**, **Border**, **Drop Shadow**, and **Bold** can enhance the look of your symbols on the map.

Not all options are available for every symbol font. Selecting a **Custom Symbols** shows these options:

- **Show Background** - Displays the custom symbol using the background color that the symbol was created with.
 - **Apply Color** - Replaces all non-white pixels with a color that you choose from the color palette.
 - **Display at actual Size**
 - **Rotate Symbol** - Enter the value in degrees that you want to rotate the symbol on the layout. A value of 360 is a full rotation, a positive value rotates the symbol in a counter-clockwise direction, and a negative value rotates it in a clockwise direction.
5. Click **OK** to save your changes.

Adding Empty Frames

While designing your layout, add empty frames as place holders for maps and data tables. Once you are ready to publish your map, populate the frames. You can design templates in this way using empty frames and text boxes. Save your template to a workspace (.wor file) to populate later or to reuse for a map series.

To add an empty frame to your layout:

1. On the **LAYOUT** tab, in the **Edit** group, on the **Frames** list, click **New Frame**.
2. Do one of the following:
 - Click on the canvas at the location you want to insert the frame. This places a one inch square frame on the canvas.
 - Click and drag on the canvas to draw an empty frame to the dimensions you want.

If you want to cancel the command after clicking **New Frame**, press **Esc**.

To add content to your empty frame, select it and then click the **New Map** or **New Browser** commands located on the **LAYOUT** tab, in the **Edit** group.

Deleting Frames and their Contents

You can delete the contents of a frame, so that it is empty, or delete the frame completely from your layout.

To delete:

- A frame, select it and then on the **LAYOUT** tab, in the **Edit** group, on the **Frames** list, click **Remove**. You can also press the **Delete** key.
- The contents of a frame, select it and then on the **LAYOUT** tab, in the **Edit** group, on the **Frames** list, click **Remove Contents**.

To delete multiple frames, or the contents of multiple frames, press the **Ctrl** key while selecting frames.

When removing the contents of a frame, an empty frame remains on the layout. Its size, position, styles, and name remains unchanged. If the frame has a name, it remains visible.

Saving Your Layout

You can save a layout in a **Layout** window by saving to a workspace.

To save your layout to a workspace:

1. On the **HOME** tab, in the **File** group, click **Save Workspace** to save to an existing workspace or **Save Workspace As** to open the **Save Workspace** dialog box.
2. Select a location to save the workspace to, give the file a name, and then click **Save**.

The workspace does not save with image files. If the layout includes images, then the workspace saves the references to the images. If a workspace cannot find an image when it opens, then an image not found message displays with a path to the image file. This could happen when you:

- Copy the workspace file to a different location before opening it, because the references to the images are now broken.
- Rename or move an image file and then open the workspace, because the image reference is now broken.

To use your layout on another machine, save it using the Workspace Packager tool. This tool collects all referenced tables and files, such as images, into a folder with the workspace. You can then save and share this folder with other MapInfo Pro users.

For more details, see *Workspace Packager Tool* in the *MapInfo Pro: Productivity Aids* Guide.

Saving an Image of Your Layout

You can save an image of a layout page using the **Save Window As** command. This command only operates on the current page. If you have a multi-page layout, you cannot generate an image that represents all of the pages.

To save an image of a page in your layout:

1. Ensure that the page is in view in the **Layout** window.
2. On the **LAYOUT** tab, in the **Output** group, click **Save** to open the **Save Window to File** dialog box.
3. Select a location to save the image to, give the image file a name, select the type of image to save to, and then click **Save**.

Moving Frames

You can move frames anywhere within the **Layout** window, but not above the top edge or to the left of the canvas.

If you need to view the entire contents of the layout before moving frames, then click the **Fit Layout in Window** button to the right of the zoom slider. For details, see [Re-Center and Specify a Zoom Level for the Layout Window](#).

To move:

- A single frame, click on the frame and drag to a new location on the canvas. To use precise measurements, right-click on the frame and select **Frame Properties**. In the **Frame Properties** dialog box, enter new horizontal (**X**) and vertical (**Y**) values.

- Multiple frames, press the **Ctrl** key while clicking on the frames you wish to select and then drag to a new location.

You may add enough frames to the **Layout** window to cause frames to overlap one another. In the **Layout** window all frames are ordered from front to back. Think of them as being stacked in the **Layout** window. When you place a new frame, it is automatically the front most frame, even if it is not overlapping any other frames in the layout. To display your frames properly, you may need to bring a frame forward in front of other frames.

To change the order of frames, right-click on the front frame. From the pop-up menu, select **Send to Back** to reposition it behind the frame you want to move.

Resizing Frames

The contents of a frame scales to fit within the frame.

To resize a frame either:

- Select the frame and then drag an edge or corner to a new size.
- Specify width and height values for the frame. To do this, right-click on the frame and select **Frame Properties**. In the **Frame Properties** dialog box, enter new **Width** and **Height** values.

When resizing image frames, you can only drag a corner. The image scales to fit within the new frame size. For details, see [Adding an Image to a Layout](#).

The **Width** and **Height** values are in the default units set for the application. This setting is on the **System Settings Preferences** dialog box, which you can open on the **PRO** tab, by pointing to **Options** and clicking **System Settings**. The **Paper and Layout Units** list sets the units, such as inches, points, or centimeters, for the **Width** and **Height** values.

For description about setting your system preferences, see *Setting Your System Preferences* in the *Help System*.

For details about changing the size of shapes, see [Editing Shapes in a Layout](#).

Aligning Frames

You can move and position layout frames in the **Layout** window by snapping them to a background grid or guideline. Snapping is an effect where you move a layout frame near a guideline or a grid line and it aligns and attaches (snaps) to the line. This is useful for arranging multiple frames so that their edges line up perfectly.

Grids and guidelines are commands that help you design a layout. They do not display in printouts or exported images.

When working with the grid and guidelines, you may want to zoom into or out of the view in the **Layout** window. For instructions on how to do this, see [Re-Center and Specify a Zoom Level for the Layout Window](#).

Aligning Layout Frames







When grids or guidelines on the **Layout** window are disabled, you can align layout frames in the following ways:

- Align a layout frame with respect to either the page margin or the page center lines - horizontal and vertical.
- Align layout frames with respect to each other.

Aligning a Layout Frame to the Page Margin







If a single frame is selected on the **Layout** window and the guidelines on the page are disabled, then using any **Snap To** command will align the selected frame with the page margin. Using **Align Horizontal Center** or **Align Vertical Center** will move the frame such that its center is aligned with the page center.

Note: The page center is based on the page width/height minus the page margins.

	Snap To Left	The left edge of the selected frame is snapped to the left page margin.
	Snap To Right	The right edge of the selected frame is snapped to the right page margin.
	Snap To Top	The top edge of the selected frame is snapped to the top page margin.
	Snap To Bottom	The bottom edge of the selected frame is snapped to the bottom page margin.
	Align Horizontal Center	The vertical center line of the selected frame is snapped to the vertical center line of the page.
	Align Vertical Center	The horizontal center line of the selected frame is snapped to the horizontal center line of the page.

Aligning Layout Frames to Each Other

If more than one frames are selected on the **Layout** and the guidelines on the page are disabled, then using any **Snap To / Align Center** option will align the frames with each other.

	Snap To Left	The left edges of the selected frames are aligned with the left edge of the left-most frame.
	Snap To Right	The right edges of the selected frames are aligned with the right edge of the right-most frame.
	Snap To Top	The top edges of the selected frames are aligned with the top edge of the top-most frame.
	Snap To Bottom	The bottom edges of the selected frames are aligned with the bottom edge of the bottom-most frame.
	Align Horizontal Center	The vertical centers of the selected frames are aligned.
	Align Vertical Center	The horizontal centers of the selected frames are aligned.

Aligning Layout Frames Using a Grid

You can display a grid, shown as dotted lines, on your layout to use as a guideline for aligning items (frames). Resizing the grid changes the distance between the dotted lines on the screen and gives you more control over designing your layout.

To use a grid to align the position of layout frames in the **Layout** window:

1. On the **LAYOUT** tab, in the **Edit** group, from the **Alignment** list, toggle the grid on and off with the **Show Grid** command.

When enabled, a check mark displays beside **Show Grid** command.

2. Choose **Snap to Grid**, then click on and begin to drag a frame. The upper left corner of the frame will snap to the nearest grid cell corner while being dragged. Snap to Grid is highlighted when this command is enabled.
3. To resize the grid to help position frames, from the **Alignment** list, select **Grid Size**, and then select a grid size from the list.

The grid resizes to your selection.

Note: You can set the units in which you want to resize the grid. On the **PRO** tab, select **Options**, and click **System Settings**. In the **System Settings Preferences** dialog box, select the desired unit from the **Paper and Layout Units** drop-down list.

4. To stop working with the grid, toggle **Show Grid** off (there is no longer a check box beside the command).

Use the arrow keys to move and snap legend frames; each key press moves a frame a single pixel. When **Snap to Grid** is turned on or when pressing the **Shift** key, the frame moves by the number of pixels equal to the current grid increment. Pressing and holding the Control key (**Ctrl**) disables snap when using arrow keys. Pressing **Ctrl** and an arrow key, moves the selected frame one pixel at a time.

While using the left mouse to drag or resize an item, pressing and holding the **Alt** key temporarily disables all **Snap to Grid** and snap to guide behavior. Releasing the **Alt** key enables these behaviors.

Note: **Snap to Grid** does not apply when using the **Frame Properties** dialog to change a legend's position.

Aligning Layout Frames Using Smart Guides

You can use smart guides to align the edge of the item you are moving to the edge of other items on the current layout. This is turned on by default for a new **Layout** window.

To turn on smart guides for a **Layout** window:

1. On the **LAYOUT** tab, in the **Edit** group, from the **Alignment** list, select **Smart Guides**.

When using this option, we recommend disabling **Snap To Grid**.

2. Select one or more layout frames (frame borders display to indicate your selections) and move them to their new position. The edges of the frame or item will align with the edges of any other frames nearby.

Smart guides display a visual cue (an orange vertical or horizontal guideline) when a Smart Guide is actively being used to snap items together.. The item automatically aligns (snaps) to the edge of nearby items as if there is a guide line. Smart guides include the border of an item, so that items visually align.

While using the left mouse to drag or resize an item, pressing and holding the **Alt** key temporarily disables all **Snap to Grid** and snap to guide behavior. Releasing the **Alt** key enables these behaviors.

Aligning Layout Frames Using Guidelines

Working with guidelines is similar to working with a grid, except that you can discretely position items for more control when aligning items in your layout.

To add a guideline to the **Layout** window:

1. On the **LAYOUT** tab, in the **Edit** group, from the **Alignment** list, select either **Add Vertical Guideline** or **Add Horizontal Guideline**.

Selecting **Add Vertical Guideline** or **Add Horizontal Guideline** adds a guideline to the center of the **Layout** window. If you make this selection multiple times, you will have more than one guideline at the center position—it might not look that way until you start dragging them to a new position.

2. Click on the guideline and drag it to where you want to position it in the layout.
3. Select one or more layout frames (frame borders display to indicate your selections) and drag them to the guideline until the frame attaches itself (snaps) to the guideline.

Optionally turn on **Snap to Grid** to make it easier for frame borders to attach to guidelines: on the **LAYOUT** tab, in the **Edit** group, from the **Alignment** list, select either **Snap to Grid**. For details, see [Aligning Layout Frames Using a Grid](#).

While using the left mouse to drag or resize an item, pressing and holding the **Alt** key temporarily disables all **Snap to Grid** and snap to guide behavior. Releasing the **Alt** key enables these behaviors.

Hiding and Removing Guidelines

Hiding Guidelines

Disabling guidelines hides them from view. Your guidelines are still there, just not visible or usable until you enable them.

To hide guidelines, on the **LAYOUT** tab, in the **Edit** group, from the **Alignment** list, select **Disable Guidelines**.

To show guidelines, clear the check mark in front of **Disable Guidelines**.

Removing Guidelines

Removing guidelines clears them from your layout canvas. You have two options for removing guidelines:

- To remove one guideline, right-click on it and then select **Remove Guideline**.
- To remove all guidelines, on the **LAYOUT** tab, in the **Edit** group, from the **Alignment** list, select **Remove All Guidelines**.

Adding Frame Borders and Shape Styles


You can add a border to a frame on the Layout canvas as a frame property. All frames may have a border and a fill color.

Shapes (ellipses, rectangles, rounded rectangles, and lines) do not have borders, but their display style is still set as a frame property. You can set the fill color and pattern for shapes, and the line style and width for shape outlines and for lines.

To add a border to a frame or change the display style of a shape:





1. Right-click on the frame or shape and select **Frame Properties** to open the **Frame Properties** dialog box.

Double-clicking on a shape also opens the **Frame Properties** dialog box.

2. Click **Style** . Depending on your selection, this opens the:
 - **Line Style** dialog box to specify the style, color, and width of the line.
 - **Region Style** dialog box to specify a fill pattern for the frame or shape, and border style (color and width) for the frame or shape outline. For frames, you can only set the foreground color.
3. Click **OK** in the dialogs to close them and apply your changes.

The **Frame Properties** dialog box is also where you can change the frame or shape position from the top left corner of the layout, and size by setting width and height values.

Another way to change the frame or shape style is to select a frame or shape and then click one of the following commands on the **Layout** window.

Style	<p>The Style command list contains the following commands. The last selected style is active.</p> <p> Region: Modify the style of a region object. Activate or open a Layout window and select a region object to modify.</p> <p> Line: Modify the style of a line object. Activate or open a Layout window and select a line object to modify.</p> <p> Frame: Modify the frame style.</p> <p> Symbol Modify the style of a symbol. Activate or open a Layout window and select a symbol to modify.</p>
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Editing in the Layout Window

You can edit the contents of map, legend, browser, or text frames, but not image frames. When you activate a map frame, you have access to all of the editing commands that are available for the corresponding **Map** window. When you activate a browser frame, you can sort the contents, resize and reorder columns.

Right-clicking on the layout canvas displays a context menu with the following options that you can use for frames:

- **Cut** (**Ctrl+X**) - Removes the current selection and saves it to the clipboard.
- **Copy** (**Ctrl+C**) - Creates a duplicate of the current selection and saves it to the clipboard.
- **Paste** (**Ctrl+V**) - Inserts the contents of the clipboard at the current location.

To activate a frame, so that you can change its contents:

- Right-click on the frame and click **Activate**.
- Double-click on the frame, or press the **Ctrl** key and click on the frame.

The border of an active frame highlights.

Clicking away from the active frame deactivates it, as does pressing the **Ctrl** key and clicking in the frame. (Use the **Ctrl** key as a quick way to toggle between making a frame active and inactive.)

For more information about how to edit maps, tables, and text, see:

- [Editing the Contents of a Map Frame](#)
- [Editing a Legend in a Layout Window](#)
- [Editing the Contents of a Browser Frame](#)
- [Changing the Text Style in a Text Frame](#)
- [Editing Symbols in the Layout Window](#)

Backwards Compatibility

Converting Classic Layouts from Previous Versions

If you have workspaces that contain layouts created with the classic **Layout** from before MapInfo Pro version 12.5 or earlier, they are converted to a new version of **Layout** window (also referred to

as the **Layout Designer** window) for use in this release. However, the resulting **Layout Designer** window may not contain every element from your original layout.

The new **Layout** window was added in the 32-bit version of MapInfo Pro 12.5 (2014) alongside the classic **Layout** window. The classic **Layout** window is no longer available in 64-bit versions of MapInfo Pro. The most notable change in the new **Layout** window is that maps and browsers can be activated in place. Maps that are activated in place can also be edited.

Note: The Hotkey to bring up the **Layout Designer** window is **F5**. For more information, see [LAYOUT Tab](#).

When you open an older workspace containing a classic layout, MapInfo Pro preserves the following layout items:

- Map frames
- Browser frames
- Legend Designer frames
 - Legacy Cartographic legends are converted to the **Legend Designer** window, so these will be available in the new **Layout** window.
 - The new **Layout** window only supports the contents of one **Legend Designer** window per map. The contents of the first **Legend Designer** window encountered during the conversion will be converted into legend frames. It can be either a legacy Cartographic, or **Legend Designer** window.
 - More information can be found under [More about Legend Frame Support](#).
- Text - All text styles (Bold, Italic, Underline, Shadow, All Caps, Expanded, Halo and Background) are supported in the new **Layout** window.
- Lines, Rectangles, Rounded Rectangles, Ellipses, Polylines, and Polygons - There is no support for line patterns or fill patterns. Fill patterns are converted to solid fill with the pattern's foreground color. Line patterns are converted to solid lines of the same color.
- Symbols - There is no support for **MapInfo 3.0 Compatible** symbols, which are replaced by **MapInfo Symbols** regardless of system preference settings.
- Empty frames (from `Create Frame` statements in the workspace).

When you open an older workspace containing a classic layout, the following items are ignored and not preserved, because the new **Layout Designer** window does not support them:

- Arcs
- Redistricters
- Graphs - There is no support for **Graph** windows.
- Collection Objects - Multi-point and collection objects are not supported; they are not converted into their individual parts.
- Tool windows, such as InfoTool, Statistics, Message, and Theme Legend.
- Multiple page layouts - The contents will be brought into the **Layout Designer** window maintaining relative positions, however the layout will be a single page. The **Layout Designer** window does support multiple pages but only as separate page views. We suggest you use a custom page size, or larger page size, to fit the content.

More about Legend Frame Support

Text Frames

Text frames in **Legend Designer** windows are ignored during the conversion. If the original legend is in auto-position mode, the converted legend frames are auto positioned in the **Layout Designer** window as if the text frames did not exist. They are placed to the right of their corresponding **Map** window. If the original legend has a custom arrangement, the text frames are still ignored, but the legend frames should maintain their custom positions relative to each other, but still placed on the right side of their corresponding **Map** window.

A Legend Frame for Each Legend

In the classic layout a legend frame was a single object containing the entire contents of a **Legend Designer** window with all of the legend and text frames. When converted to the **Layout Designer** window, each legend frame will become its own layout frame and will have a transparent background.

If you weren't able to see all of your legend frames in the old layout when the legend frame was small, that issue goes away since each legend frame is separate now.

If you had created a drop shadow under the legend frame in the classic layout, it will now be created as a separate rectangle object. It will be covered by multiple legend frames. Adjust the layout as necessary.

Floating Theme Legend and Embedded Legends

The **Layout Designer** window does not support legacy floating **Theme Legend** windows, which display only thematic legends for a map. Embedded legends, created using the **Legend Manager** tool in earlier versions of MapInfo Pro, are not supported in this version of MapInfo Pro. Therefore, they do not convert when opening a classic **Layout** window.

Using MapBasic Applications to Create or Modify Layout Windows

MapBasic applications (*.MBX files) can create or modify **Layout Designer** windows. However, older MapBasic applications that were designed to work with classic layouts will not work on newer **Layout Designer** windows. Newer **Layout Designer** windows (sometimes referred to as **Layout** windows) use different MapBasic command syntax. Therefore, older MapBasic applications may need to be updated or rewritten before they can update newer **Layout Designer** windows.

10 - Publishing Maps

This section describes how to print your maps or save them to image files.

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Printing a Layout

Printing Your Layout

The **Layout** window lets you arrange your maps, legends, logos, copyright citations, and titles for an attractive map presentation. You can also combine different types of data, such as maps, browsers, legends, images, text, and shapes, to create a more informative presentation.

What you see in your printout will look the same as what you see in the layout on your screen. Only the contents of a layout that are inside the margins (shown as lines on the layout) print. The grid guide lines, and frame selections that you see on a layout do not print. Most of the contents of a layout print as vector or text, and not as raster.

Use **Page Setup** to set page size, margins, orientation, and resolution before printing, see [Setting Print Margins](#).

To print your layout:

1. Make the **Layout** window active.
2. On the **HOME** tab, in the **Output** group, click **Print**.
3. In the **Print** dialog box, select the printer you want to use and then click **Properties** to review and change any print settings.
4. If you selected a PDF printer, then click the **PDF** button to review and change PDF print settings.
5. In the **Print** dialog box, click **OK** to proceed with printing.

If you click **PDF** instead of **Print** on the **HOME** tab, then the **Print** dialog box opens with settings already made for printing to a PDF file.

The print operation uses the printer, page, and margins set on the **Print** dialog box. If you change the printer settings on this dialog box when printing, then the layout canvas size changes after the print completes to match the new settings.

Note: If you want the **Print** dialog box to remember your printer selection for future print jobs, then you have to make it MapInfo Pro's default printer. To do this, on the **PRO** tab, click **Options**, and then click **Printer**. The printer you choose here will become the new default for the **Print** dialog box.

Viewing and Printing Text in a Layout



Text size is handled differently in the **Layout** window from what you see in a **Map** window. The **Layout** window contains a live map that you can edit, so that you do not need to toggle between the layout and editing in a separate **Map** window. The **Layout** window shows the map using the printer resolution, so that you know beforehand what your printout will look like (you will know what labels will be on the printed map). This is based on the current layout page setup including the printer resolution. If you are running out of memory, you may want to use **Page Setup** to lower the printer resolution.

See also, [Viewing and Printing Text in a Map](#).

Notes About Printer Settings

Each **Layout** window has a printer associated with it. When you use the **Page Setup** dialog box (in the **Output** group), you are configuring your printer setting for your **Layout** window. For example, if you want to rotate your layout 90 degrees, to give it a landscape orientation, open the **Page Setup** dialog box and select **Landscape**.

The margins that you choose in the **Page Setup** dialog box display as a blank area around the edges of the **Layout**. The printable area of the **Layout** window begins where the margins end.

Note: When you use **Print**  or **Create** , nothing in the margins will print. Layout frames within the margin area do not appear in the printout.

Print settings made on the **HOME** tab by pointing to **Print** are applied to the **Layout** window and used for subsequent printouts.

Layout Paper Size

The layout paper size is tied to the printer settings. New windows are created with the default printer settings. Default printer and paper settings are made on the **PRO** tab, by clicking **Options**, and **Printer**.

You can override the default setting, by setting paper size, margins, and page orientation (portrait or landscape) for a **Layout** window. To do this on the **HOME** tab, in the **Output** group, click **Page Setup** to open the **Page Setup** dialog box.

Print OSBM

Off-Screen Bitmap (OSBM) automatically applies when printing a map frame that contains items or options that require OSBM to preserve their appearance in print. Using OSBM processes each print tile as a raster. This is an automatic setting that you cannot control when printing from a **Layout**

window. Using OSBM applies when the Map has enhanced rendering turned on, and one or more visible layers with:

- Translucent vectors.
- Images (such as raster, grid, WMS, or tile server) with transparency, translucency, or image smoothing.

Printing to a layered PDF does not use the Print OSBM method.

Subdivide Printing

You can turn on subdivide printing as a preference (on the **PRO** tab, click **Options**, and **Output Settings**, on the **Printing** tab click **Subdivide Printing**). When subdivide printing is turned on and Print OSBM is not being used, then each map in a **Layout** window divides into smaller tiles while printing. This reduces the amount memory required to process the print job, especially when the map frame is large. When subdivide printing is off, then each map frame prints at once.

If your map contains translucent images (usually raster, grid, WMS, or TileServer images) and **Enhanced Rendering** is turned off, then it may not print as translucent. To make it print with translucency, on the **PRO** tab, click **Options**, and **Styles**. Check the **Enable Enhanced Rendering** check box.

Layout Improvements

Improvements to Snap in Layouts

The following are improvements to how snap to grid and guides work in Layout windows.

- We changed the way the grid displays on a layout page. It now draws using dots instead of lines to visually reduce detail. The grid does not display on your printout or output.
- Snap now happens when dragging items with the mouse. This gives instant visual feedback for where the item will position after letting go of the mouse. When dragging an item, it's top, left corner snaps to the closest grid intersection. If any edge of the item being dragged is moved within a few pixels of a guideline, that edge snaps to the guideline. When you are dragging a selection of more than one item, the item you are dragging snaps and the remaining items move the equivalent distance.
- Snap now happens when resizing items using the mouse. As you resize any edge, it snaps to the closest horizontal or vertical line of the grid, or to the closest guideline if you resize the edge within a few pixels of the guideline. When resizing a selection of more than one item, the edge of the item snaps and the remaining items resize by the equivalent amount.
- We've added Smart Guide support to help snap and align items with each other more easily. A new menu item for **Smart Guides** has been added to the **Alignment** menu on the **LAYOUT** tab. **Smart Guides** are turned on by default. When you move or resize an item using the mouse while **Smart Guides** are turned on, you can align any edge of the item you are moving to any edge of

other non-selected items on the current page. When **Smart Guides** are activated, they display an orange vertical or horizontal dotted line. As you drag or resize an edge of an item near another item on the page, you will also be able to feel it snap when it aligns with the other item.

- We have fixed the issue when snapping rotated items, so that MapInfo Pro uses the minimum bounding rectangle (MBR) of the rotating item to snap against.
- To temporarily override the snap behavior when Snap To Grid is enabled and the frame moves the number of pixels equal to the current grid increment, hold down Ctrl key while you use an arrow key; this will move the frame a single pixel each key press.
- Snap To Grid or Guidelines will only be active when performing direct manipulation of frames either using the mouse or the keyboard.

Layout Alignment

Use **Smart Guides** and improved snapping to align objects or snap them together quickly. Smart Guides work by snapping objects on the layout together as they move close together. You can use smart guides to align the edge of the item you are moving to the edge of other items on the current layout. This is turned on by default for a new Layout window.

To turn on smart guides for a Layout window:

1. On the **LAYOUT** tab, in the **Edit** group, from the **Alignment** list, select **Smart Guides**.

When using this option, we recommend disabling **Snap To Grid**.

2. Select one or more layout frames (frame borders display to indicate your selections) and move them to their new position. The edges of the frame or item will align with the edges of any other frames nearby.

Smart guides display a visual cue (an orange vertical or horizontal guideline) when a Smart Guide is actively being used to snap items together.. The item automatically aligns (snaps) to the edge of nearby items as if there is a guide line. Smart guides include the border of an item, so that items visually align.

While using the left mouse to drag or resize an item, pressing and holding the Alt key temporarily disables all Snap to Grid and snap to guide behaviour. Releasing the Alt key enables these behaviours.

Zooming / Panning

- When zooming in/out using the zoom tool or mouse, the zoom operation is now centred on mouse location.
- Added **Fit Layout in Window** option in the Layout context menu to quickly zoom out to see the entire Layout.
- Hold down the middle mouse button to pan around the Layout.

Paper Margins

- Paper Margins now shown on the Layout so that you are aware of non-printable space.

- With **Smart Guides** on, you will be able to snap objects to the Paper Margins.

Frame Deactivation

- Map and browser frames can now be activated to edit live content directly from within a Layout.
- Deactivation of these frames can be done with either **Alt-Click** of the mouse or by clicking outside of the frame on the Layout.
- New Preference added to disable frame deactivation clicking somewhere on the Layout. On the **Backstage**, click **Layout Window** in the **Window** group to display the **Layout Preferences** dialog.

Printing a Map

Printing Your Map

You can easily print the contents of an individual **Map** window by clicking **Print** on the **HOME** tab. This gives you a basic view of your map that you can then share in presentations. However, we recommend that you use **Layout** windows for printing because they tie directly to the printer driver.

To print your map:

1. On the **HOME** tab, in the **Output** group, click **Print**.
2. In the **Print** dialog box, specify printer properties, such as a page range for printing and the number of copies to print.

You can override the default printer setting by selecting another printer from the **Name** drop-down list.

3. Click **Options**.
4. In the **Map Print Options** dialog box, specify the size of the map, how its contents will display, the scale, and its width and height. When you have completed your selections, click **OK** to continue.

Map Contents

- **Same as Window** – Prints the map contents as it appears in the **Map** window, with the same proportions and content as what you see.
- **Centered on Window** – Centers the map and fits as much of it as possible on the page. The image may print on more than one page depending on the fit. MapInfo Pro assumes that you want to select the **Fit to Page** radio button with this option, so it selects it for you.

Map Size

- **Window Size** – Select to print the map at the size that it displays on your computer screen.
- **Fit to Page** – Select to fit the map to the page size you have selected in your preferences.
- **Custom** – Select to enter your own custom values in the **Custom Scale**, **Custom Width**, and **Height** fields.

Note: The options are different for printing a Browser or a 3D Map. For more information, see [Redistrict/3DMap Printing Options](#).

5. In the **Print** dialog box, click **OK** to print your results.

The **PDF** button in the **Print** dialog box activates after selecting **MapInfo PDF Printer** from the **Printer** name list. For information about printing to a PDF file, see the section [Saving to a PDF File](#).

If your map is complex (a large map, a 3D map, or a map with 10 or more colors), then click the **Advanced** button on the **Print** dialog box. This opens the **Advanced Printing Options** dialog box where you can apply more settings, particularly for raster images. For details, see [Printing and Saving Translucent Raster Images](#).

Viewing and Printing Text in a Map

There are different kinds of text that can be added to a **Map** window, such as automatic labels, custom labels, and text objects.

With automatic labels the font size **does not** change as you zoom in and out, so if your font size is nine (9) point when zoomed in to the map, then it will still be nine (9) point when you zoom back out. Your screen metrics determines the size and position of automatic labels on the **Map** window, which is not an accurate representation of what the printed map will look like. As an example, you may see two labels near each other on the screen while overlap detection is turned on, but only one of the labels displays in your printout. This is because the size and position of the label changed after applying the printer metrics, which caused one label to overlap the other label.

Custom (or edited) labels are sized the same way as automatic labels: their font size **does not** change as you zoom in and out. However, custom labels are always drawn, so they appear in your printout.

The size of Text objects **does** change as you zoom in or out on the map. The font size scales to make text appear larger as you zoom in and smaller as you zoom out. Text objects, like other map objects, always print.

To have the screen mirror your printout when the map includes automatic labels, put your map into a **Layout** window. The **Layout** window uses the printer metrics, so that you know what your printout will look like (and you will know what labels will be on the printed map).

See also, [Viewing and Printing Text in a Layout](#).

Removing the Map Border when Printing

By default, MapInfo adds a black border to map image that you print. However, you can remove this border when printing the map.

Note: Borders are not exported from **Layout** windows. To control the border for each frame in a **Layout** window, select the frame, right-click and select **Frame Properties**, and then click **Style**.

To printing a **Map** window without a border:

1. On the **HOME** tab, click **Print**.
2. In the the **Print** dialog box, click the **Advanced** button.
3. In the the **Advanced Printing** dialog box, clear the **Print Border For Map Window** check box to print the map without a border.

This check box is selected by default. MapInfo Pro remembers your selection for this **Map** window for the duration of this session.

4. Click **OK** to close the dialogs and proceed with printing.

Printing to Fit the Page

By default, MapInfo Pro prints the contents of the **Map** window fit to the page size.

Note: The options described in this section do not apply when printing a **Layout** window.

To print a map to fit the page size:

1. On the **HOME** tab, click **Print**.
2. In the **Print** dialog box, click **Options**.
3. In the **Map Print Options** dialog box, select the **Fit to Page** radial button to fit the map to the page size you selected as a preference.

To set a custom map scale, see [Setting the Map and Cartographic Scale](#).

4. Click **OK** to close the dialogs and save the change.

The **Advanced Printing** dialog box overrides the default print settings for individual windows. To change the default print settings, on the **PRO** tab, click **Options**, and **Output Settings**.

The page size is set as a preference. For instructions on how to set this, see [Setting Your Printer Preferences](#).

Setting the Map and Cartographic Scale

You can set scale options for map printing from the **Print** dialog box.

Note: The options described in this section do not apply when printing a **Layout** window.

Note: For advice about handling the fill patterns you see on the screen to more closely match what the printer will produce, see [Recommendations for Effective Pattern Scaling](#).

To set a custom map scale and cartographic scale:

1. On the **HOME** tab, click **Print**.
2. In the **Print** dialog box, click **Options**.
3. In the **Map Print Options** dialog box, select the **Custom** radial button and then enter new values in the **Custom Map Scale** and **Custom Cartographic** fields.
4. Click **OK** to close the dialogs and save your changes.


The **Advanced Printing** dialog box overrides the default print settings for individual windows. To change the default print settings, on the **PRO** tab, click **Options**, and **Output Settings**.

About Printing

Setting Print Margins

Before printing, review your page setup to ensure that the print margins, paper size, source, and orientation are set to what you want.

To review and change the page setup:

1. Make the **Map** or **Layout** window active.
2. On the **HOME** tab, in the **Output** group, click **Page Setup** .
3. In the **Page Setup** dialog box, set the paper size, orientation, and margins.
4. Click **OK** to save your changes.

You are now ready to print your layout. If you save to a workspace, these settings save with it.

Printing Fill Patterns

When it comes to printing objects, some fill patterns print faster than others. In general, the fill patterns on the top row of the pattern list in the **Pattern** drop-down list print the fastest. The difference in printing speed varies from printer to printer. The fill patterns on the top row are also the ones most likely to plot correctly on pen plotters, although results depend on which plotter driver you use. For more coaching on printing fill patterns, review the *MapInfo Pro Printer Guide*, which is located in the `Documentation` subfolder of your installation directory.

Printing and Saving Translucent Raster Images

The following advanced printing options are useful for printing or saving a translucent raster image. These options are turned on in MapInfo Pro by default. If you are experiencing issues printing or saving translucent raster images, then check that these options are turned on.

- **Internal Handling for Transparent Vector Fills and Symbols** - When set, MapInfo Pro handles transparent fill and bitmap symbols for vector images instead of your printer handling the transparency. For instructions, see [Handling Transparent Vector Fills and Symbols](#).
- **Use ROP Method to Display Transparent Raster** - MapInfo Pro's Raster Overlay by Pixel (ROP) operation manages the transparent pixels when printing raster images. This method is used to draw transparent (non-translucent) images on-screen. ROP is useful when printing a raster image as a metafile (EMF or WMF), because it renders any underlying data in the original form. The ROP Method is largely a display method, so not all printers and plotters can use it. We recommend experimenting with this setting until you get the results you want. For instructions, see [Handling Transparent Vector Fills and Symbols](#).
- **Print Raster in True Color When Possible** - MapInfo Pro prints your 24-bit raster or grid file images in true color when the image is 24-bit and the printer supports more than 256 colors. It uses a halftone dither method when your image converts from 24-bit to 256 colors. For instructions, see [Printing Raster in True Color](#).

Handling Transparent Vector Fills and Symbols

You can have MapInfo Pro handle transparent fill and bitmap symbols for vector images instead of your printer handling the transparency.

You can have MapInfo Pro's Raster Overlay by Pixel (ROP) operation manage the transparent pixels when printing raster images. This method is used to draw transparent (non-translucent) images on-screen. ROP is useful when printing a raster image as a metafile (EMF or WMF), because it renders any underlying data in the original form. The ROP Method is largely a display method, so

not all printers and plotters can use it. We recommend experimenting with this setting until you get the results you want.

To add a border when printing a **Map** window:

1. On the **HOME** tab, click **Print**.
2. In the the **Print** dialog box, click the **Advanced** button.
3. In the the **Advanced Printing** dialog box, select **Internal Handling for Transparent Vector Fills and Symbols** to have MapInfo Pro handle transparency. This check box is selected by default.

If you clear the check box, your printer or plotter manages the transparency.

4. Select **Use ROP Method to Display Transparent Raster** to use a raster operation (ROP) to handle transparent pixels.

If you are using transparency in a raster image, clear the **Use ROP Method to Display Transparent Raster** box to have MapInfo Pro handle the transparency internally. The image will be broken down into small rectangular regions that do not contain transparency. It is recommended that you check this option because printers do not always handle transparent raster images correctly. This method may produce large plot files.

5. Click **OK** to close the dialogs and proceed with printing.

The **Advanced Printing** dialog box overrides the default print settings for individual windows. To change the default print settings, on the **PRO** tab, click **Options**, and **Output Settings**.

Printing Raster in True Color

By default, MapInfo Pro prints your 24-bit or higher raster or grid file images in true color when the image is 24-bit and the printer supports more than 256 colors. It uses a dither method when your image converts from 24-bit to 256 colors.

Dither is large-scale patterns in images, such as color banding. Dithering may occur when the **Print Raster in True Color When Possible** feature is disabled in MapInfo Pro or when the printer color depth is 256 colors or less. You would change the dither method from halftone to error diffusion when you want to enhance edges in an image or make text in images more readable.

The **Print Raster in True Color When Possible** feature is only necessary when working with a color printer.

To print your 24-bit raster or grid file images in true color:

1. On the **HOME** tab, click **Print**.
2. In the the **Print** dialog box, click the **Advanced** button.
3. In the the **Advanced Printing** dialog box, select **Print Raster in True Color When Possible** to use 24-bit true color to print raster and grid images.

This check box is selected by default. Clear this check box to turn off printing your 24-bit raster or grid file images in true color.

4. From the **Dither Method** list, select either **Halftone** or **Error diffusion**.

This option is only available after selecting **Print Raster in True Color When Possible**.

5. Click **OK** to close the dialogs and proceed with printing.

The **Advanced Printing** dialog box overrides the default print settings for individual windows. To change the default print settings, on the **PRO** tab, click **Options**, and **Output Settings**.

Handling Scale Patterns

By default, MapInfo Pro matches the non-transparent fill patterns in your print output to more what you see on your screen. However, you can select to turn this feature off to give the printer driver exclusive control over rendering the pattern fills.

To have the printer driver handle how pattern fills render:

1. On the **HOME** tab, click **Print**.
2. In the the **Print** dialog box, click the **Advanced** button.
3. In the the **Advanced Printing** dialog box, clear the **Scale Patterns** check box.

This check box is checked by default. Clear this check box to let the printer driver have exclusive control over rendering the pattern fills.

4. Click **OK** to close the dialogs and proceed with printing.

The **Advanced Printing** dialog box overrides the default print settings for individual windows. To change the default print settings, on the **PRO** tab, click **Options**, and **Output Settings**.

Note: For advice about handling the fill patterns you see on the screen to more closely match what the printer will produce, see [Recommendations for Effective Pattern Scaling](#).

Saving or Restoring Printer Information in Workspaces

You can specify that MapInfo Pro save printer information in a workspace and restore printer information from workspaces.

To save or restore printer information in a workspace:

1. On the **PRO** tab, click **Options**, and **Startup**.
2. In the **Startup Preferences** dialog box, select **Save Printer Information into Workspaces**.

This saves printer information for each window with the workspace including information that overrides the printer specifications made in the **Printer Preferences** dialog box.

3. Select **Restore Printer Information from Workspaces**.

This restores printer information for each window when opening a workspace. If the printer designated in the workspace is not available, or this option is not checked, then MapInfo Pro uses the printer set on the **PRO** tab, by clicking **Options**, and then **Printer**.

4. Click **OK** to save your changes.

Printing as Enhanced Metafile (EMF)

You can send your MapInfo Pro image to the printer as an Enhanced Metafile (EMF). MapInfo Pro generates an Enhanced Metafile from the print contents, which is then sent to the printer. This method produces good quality output while reducing printing time and spool sizes, but your printer must be able to handle the metafile.

Printing directly to a printer device does not support translucent images. If your map or layout contains a translucent image, then you must print as an Enhanced Metafile (EMF).

Printing to a PDF device as an Enhanced Metafile (EMF) creates a flat, non-layered, PDF file.

Note: Exporting to EMF/WMF is different than the printer option for Print Using EMF. Exporting produces EMF/WMF files. The print option for using EMF happens to use a metafile temporarily while printing.

To print an Enhanced Metafile (EMF):

1. From the **HOME** tab, in the **Output** group, click **Print**.
2. In the **Print** dialog box, click **Advanced**.
3. In the **Advanced** dialog box, select **Print using Enhanced Metafile (EMF)** and then click **OK**.

Note: If you are printing a map or layout that contains a translucent image, you must select **Print Using Enhancement Metafile (EMF)**. The **Print Directly to Device** option does not support translucent images.

4. Clear the **Print to File** check box, so that it is not selected.
5. Click **OK**.

If the **Print to File** dialog box displays, then you have chosen a printer that is a file writer, such as the Microsoft XPS Document Writer or the MapInfo PDF Printer. Type the name of the file you want to create in the field provided and click **OK**.

Printing as Offscreen Bitmap (OSBM)

You can send your MapInfo Pro image to the printer as an Offscreen Bitmap (OSBM). You would do this depending upon the type of translucent content in the map and enhanced rendering state of the window.

When **Print using Offscreen Bitmap (OSBM)** is turned on, MapInfo Pro renders the map or layout "behind the scenes" to an offscreen bitmap prior to sending it to your printer or plotter. If saving to a PDF file, MapInfo Pro generates a layered PDF. Images print as OSBM regardless of the translucency and anti-alias settings. When **Print using Offscreen Bitmap (OSBM)** is turned off, MapInfo Pro prints offscreen bitmaps only for the translucency and anti-alias conditions listed below.

- Invoked when your map or layout contains translucent vectors (e.g., map layers, themes, or labels) and enhanced rendering has been enabled.
- Invoked if your map contains images with either **High Quality** or **Low Quality** smoothing enabled.
- Invoked for translucent raster and grid images provided enhanced rendering is enabled.

The enhanced rendering setting is described under *Enabling Enhanced Rendering* in the *MapInfo Pro: Managing the Look of Your Map* Guide.

The enhanced rendering setting is described under [Enabling Enhanced Rendering](#).

For translucent raster and grid images, you can also print using EMF when enhanced rendering is not enabled. For details, see [Printing as Enhanced Metafile \(EMF\)](#).

Note: Direct printing to a printer or plotter does not support translucency. If **PrintOSBM** is on, then MapInfo Pro saves flat PDF files that are not layered.

To print an Offscreen Bitmap (OSBM):

1. From the **HOME** tab, in the **Output** group, click **Print**.
2. In the **Print** dialog box, click **Advanced**.
3. In the **Advanced** dialog box, select **Print using Offscreen Bitmap (OSBM)** and then click **OK**.
4. Clear the **Print to File** check box, so that it is not selected.
5. Click **OK**.

If the **Print to File** dialog box displays, then you have chosen a printer that is a file writer, such as the Microsoft XPS Document Writer or the MapInfo PDF Printer. Type the name of the file you want to create in the field provided and click **OK**.

Printing to a Printer File (.PRN)

You can save your map or layout to a printable text file (.PRN) to share it or to print it later if you currently have no printers on line. This is a useful file format when you want to print your map or layout from a computer that does not have MapInfo Pro installed on it.

To print a map or a layout to a file:

1. From the **HOME** tab, in the **Output** group, click **Print** or **Create** to open the **Print** dialog box.
2. Select the **Print to File** check box.
3. Click **OK** to open the **Print to File** dialog box.
4. Type the name of the file you want to create in the field provided and click **OK**. Use the extension `.PRN` to help you identify the file as a print file.

Saving to a PDF

Printing a Layout to a Layered PDF

It is useful to turn layers of information on or off in the PDF file that you create, so that you have more control over what you see or print from the PDF file. You can create layers in your PDF by turning on embedded layer support, which is a printer property, when you print to a PDF.

Each map and browser frame becomes a layer in the PDF file. If you added a legend for a map, then it saves to a single layer in the PDF file.

When you create a legend in a **Layout** window, each layer on the map is represented in its own legend frame. This gives you a great deal of flexibility for designing your layout, because you can rearrange the order or placement of each legend frame. When you print the layout to a layered PDF, the legend frames save to a single layer in the PDF. You can have more than one map in a layout, so for each map you will see a legend layer in the PDF.

To print to a layered PDF file:

1. On the **HOME** tab, in the **Output** group, click **Print** to open the **Print** dialog box.
Note: Do not select the **Print to File** check box in the **Print** dialog box. Selecting this option generates a flat, non-layered, PDF file.
2. From the **Name** list, select **MapInfo PDF Printer**.

This PDF driver installs with MapInfo Pro.

3. Click the **PDF** button to open the **PDF Preferences** dialog box.
4. Select the **Layered PDF** check box.

When unchecked, you are unable to toggle visibility of layers of the map in the resulting PDF file.

You only need to set this once. This setting persists until you uncheck this check box.

5. Click **OK** to close the dialogs.
6. On the **Output File Name** dialog box, give the PDF file a name and select a location to save it to.
7. Click **OK** to save the file.

It may take some time to process a layout that has a large map with many layers.

When you open the PDF file, all layers are shown unless you choose to hide some of them.

Printing a Map to a Layered PDF

PDFs are capable of holding multiple pages of information in the same space through the use of Optional Content Groups (OCG), which are more commonly known as layers. Layers in PDFs are very similar to MapInfo Pro map layers.

Each layer may hold any portion of the document's objects and layers may be made visible or invisible, showing or hiding their contained objects, in any combination. By selectively hiding layers, you reduce distractions to concentrate on particular areas or types of objects. Layers can be organized into groups and the visibility option can apply to all layers within a group as one step.

To print a map to a layered PDF:

1. On the **HOME** tab, in the **Output** group, click **Print** or **Create** to open the **Print** dialog box.

Note: Do not select the **Print to File** check box in the **Print** dialog box. Selecting this option generates a flat, non-layered, PDF file.
2. From the **Name** list, select **MapInfo PDF Printer**. This PDF driver installs with MapInfo Pro.
3. Click **PDF** to open the **PDF Preferences** dialog box.
4. Select the **Layered PDF** check box and then click **OK**. When unchecked, you are unable to hide parts of the map in the resulting PDF file. You only need to set this once, this setting persists until you uncheck this check box.
5. Optionally, click **Properties** to set any printing preferences.
6. Click **OK** to print to a layered PDF file.

It may take some time to process a large map with many layers.

Labels in a **Map** window are saved to a separate layer in the PDF with a name that includes the parent layer name.

Adornments are saved as a separate Adornments layer in the PDF.

An empty Cosmetic layer is not saved to the PDF.

To generate a flat PDF, uncheck the **Print PDF as Layered Type** check box in the **PDF Preference** dialog box.

See also:

Printing a Layout to a Layered PDF

Restrictions when Printing to a Layered PDF

Embedded legends in Map windows that export to the PDF file do not toggle on or off in the PDF.

Note: When printing a Layered PDF the MapInfo Advanced printing option only permits direct to device printing. Print OSBM or Print using EMF is disabled.

For more details about printing from a **Layout** window to a layered PDF, see [Notes About Printer Settings](#).

Printing a PDF with Attribute Information

PDF files may contain attribute information that you can query and identify using the **Object Data** tool in Adobe Reader and Adobe Acrobat.

To print a map or a layout to a PDF with attribute information:

1. On the **HOME** tab, in the **Output** group, click **Print** or **Create** to open the **Print** dialog box.
2. From the **Name** list, select **MapInfo PDF Printer**. This PDF driver is installed with MapInfo Pro.
3. Click the **PDF** button.
4. In the **PDF Preferences** dialog box, select the **Add Attribute Data to PDF** check box and then click **OK**.

You only need to set this once, this setting persists until you clear this check box.

Add Attribute Data to PDF is enabled after selecting **Layered PDF**.

5. Click **OK** to print to a PDF file with attribute information.

About PDF Attributes

The following kinds of data are included as PDF attributes:

- Tabular data, such as data from fields in columns, can be written as PDF attributes.
- Only data from selectable layers is included.

- Data is included from all columns.
- If an object gets drawn, it is included.
- Data is grouped by table.
- If the same table is included multiple times as different layers, the attributes only appear once per table.

Some objects are not drawn due to clipping, yet their attributes are included in the PDF.

Viewing PDF Attributes in the PDF File

To view PDF Attributes in Adobe Acrobat, click **Tools**, **Analysis**, and then **Object Data Tool**. The attribute data displays in the **Adobe Model Tree** tab.

When using the **Object Data Tool** to select an object in the PDF file, the first click on an object selects all objects from that table. The second click selects just that one object. You must have **Add Attribute Data to PDF** turned on in MapInfo Pro before generating the PDF file to see attribute data.

Printing a Layout with Hotlinks

When printing from a **Layout** window to the **MapInfo PDF Printer** that installs with MapInfo Pro, text in the form of a URL becomes a PDF hotlink. When the person viewing the PDF clicks on a hotlink, it launches the URL or file from the text. The automatic conversion of text to hyperlinks is a setting in the MapInfo PDF Printer driver.

To turn on automatic conversion of text to hyperlinks when printing:

1. On the **HOME** tab, in the **Output** group, click **Print**.
2. In the **Print** dialog box, select **MapInfo PDF Printer** from the list of available printers and then click **Properties**.
3. In the **MapInfo PDF Printer Properties** dialog box, on the **Advanced Options** tab, check the **Automatic conversion to hyperlinks** check box. Once selected, it remains turned on for subsequent printing.
4. Click **OK** to save your setting.
5. In the **Print** dialog box, click **OK** to print the layout.

If you have a URL in a text frame in your layout, it becomes a hotlink in your PDF output. The same is true for hotlinks in your map or browser frames. You can create hotlinks for objects or labels on a map in the **Map** window, and for text in a table in the **Browser** window.

Printing a Georegistered PDF

You can select to store the bounds and coordinate systems of the map or layout view in your PDF file. This type of file is called a Georegistered PDF.

To print a map or a layout to a Georegistered PDF:

1. On the **HOME** tab, in the **Output** group, click **Print** or **Create** to open the **Print** dialog box.
2. Click **PDF**.

The **MapInfo PDF Printer** is already selected for you in the **Name** list. MapInfo Pro installs with this PDF driver.

3. In the **PDF Preferences** dialog box:
 - a. Select the **Georegistered PDF** check box. To view Georegistration coordinate units, you must have **Georegistered PDF** turned on before generating the PDF file.
 - b. Select either **Use Map Units** or **Use Degrees options**. For a description of these options, see [Saving Preferences for Georegistration Coordinate Units](#).
 - c. Click **OK**.

You only need to set these once, because these settings persist until you change them.

4. In the **Print** dialog box, click **OK** to print to a Georegistered PDF file.

About the Georegistered PDF

- Geographic locations of map windows are stored in the PDF file.
- Georegistration is independent of the **Layered PDF** setting and work for layered or non-layered PDF files.

Viewing a Georegistered PDF

To view Georegistration information in Adobe Acrobat, click **Tools**, **Analysis**, and **Geospatial Location Tool**. When using the Geospatial Location Tool, moving the mouse around the map shows the current position.

You must have **Georegistered PDF** turned on in MapInfo Pro before generating the PDF file to see Georegistration information.

To adjust the display in Acrobat, click **Edit**, **Preferences**, and then in the **Categories** list select **Measuring (Geo)**. If the PDF was created from a Longitude\Latitude **Map** window or a map within a **Layout** window, then check the **Primary Display** check box and select **Longitude\Latitude** from the list. For other projected coordinate systems, select **Northing**, **Easting** from the list.

Note: Georegistered PDF support is available with Adobe Reader/Acrobat 9.0 or later. No other Geospatial plugin is supported. Adobe Acrobat Reader X no longer supports Geospatial

information display in the Northing/Easting panel, MGRS (Military Grid Reference System) panel, and USNG (United States National Grid) panel. The location in degrees displays only in the Longitude/Latitude panel. To see the location value conversions in Northing/Easting, MGRS, or USNG, use Adobe Acrobat versions prior to Adobe Acrobat X.

Saving Preferences for Georegistration Coordinate Units

You can select to store the bounds and coordinate systems of the map or layout in your PDF file. This type of file is called a Georegistered PDF. You can save preferences to set the georegistration coordinate units to either **Use Map Units** or **Use Degrees**.

Use Map Units sets the Georegistration points to the coordinate units in which the map data is displayed, such as meters, yards, survey feet, or degrees. Select this option when you want to display the Northing/Easting values in the current map units using Acrobat Reader-if map units are in feet then Northing/Easting values display in feet and if map units are in meters then Northing/Easting values be display in meters.

Note: When using **Use Map Units**, if the map units are something other than meters (such as feet, survey feet or yards), then the Longitude/ Latitude values in Adobe Acrobat's location display may be incorrect. However, the Northing/Easting values will be correct.

Use Degrees sets the Georegistration points in degrees irrespective of the current map units. Select this option when the current map data displays in map units other than meters or degrees (such as feet, survey feet or yards). The Northing/Easting values display in meters irrespective of the current map unit-if the location readings for a point in MapInfo Pro is:

Northing: 10000 feet and Easting 10000 feet

then in Acrobat the values will be:

Northing: 3048 meter and Easting 3048 meter

To save coordinate unit preferences for Georegistered PDFs, you must print to a Georegistered PDF, see [Printing a Georegistered PDF](#).

Acrobat Reader X and higher does not display advanced Geospatial information in the PDF in the Northing/Easting panel, MGRS (Military Grid Reference System) panel, and USNG (United States National Grid) panel. Instead, you will only see the location in degrees in the Longitude/Latitude panel.

Known Issue

MapInfo PDF Printer driver does not support the GeoRegistration or PDF Attribute data export along with PDF security options or encryption.

The GeoRegistration or PDF Attribute exporting support has been validated with the following MapInfo PDF Printer configuration in the **Destination** tab:

- **Preview document before proceeding** and **Prompt for destination options** should be unchecked.

- File system should be selected as destination. On the **File System Options** tab, the following fields should be set:
 - **Destination File** should be selected to *Prompt for file name*.
 - **Default directory** should be left blank.
 - **Default Filename** should be left blank.
 - **Overwrite** option should be selected as anything but **Append to Existing file**.
 - **Print to** should be set as **Do not Print**.

If the above configuration settings are not made, then printing a GeoRegistered PDF or exporting PDF data may generate an error message, An unknown error occurred while exporting Geographic/Attribute data to PDF.

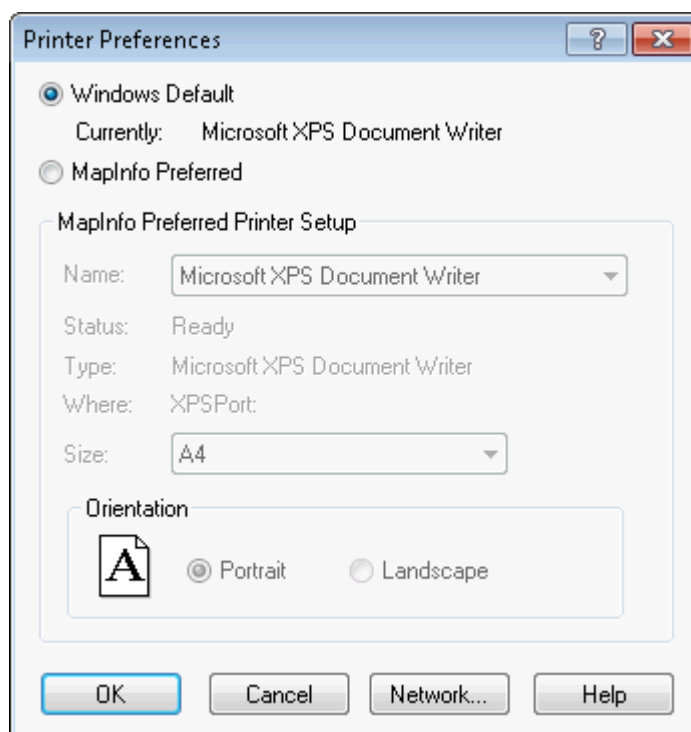
Printer Settings

Setting Your Printer Preferences

You can use the printer preferences to select a printer for MapInfo Pro output, which can be separate from your default Windows printer.

To set your printer preferences:

1. On the **PRO** tab, click **Options**, and **Printer** to open the **Printer Preferences** dialog box.



2. Choose either:

- **Windows Default** - This displays the path to the default printer specified for your operating system. This is the default setting.
- **MapInfo Preferred** - This lets you set a different default printer when printing while using MapInfo Pro. This can be a printer or a plotter.

3. If you chose **MapInfo Preferred**:

- Select the name of the printer, from the **Name** drop-down list, to use as the default printer.
- Select a paper size from the **Size** drop-down list, which pre-fills with the paper sizes available for the printer.
- Specify the direction that the paper faces (the orientation). **Portrait** indicates that the paper is taller than it is wide (as shown in the previous figure); **Landscape** indicates that the paper is wider than it is tall.

4. Click **OK** to close the dialog and save your settings.

If you selected **Save Printer Information to Workspaces** in the startup preferences, then MapInfo Pro saves the printer information and settings to the workspace. To set this preference, on the **Options** screen, click **Startup**.

Setting Your Output Preferences

MapInfo Pro has output preferences that control raster and grid file color settings for on-screen display, printed output, and file export settings. You can also specify how you want to handle transparency in vector and raster files in both your printed output and exported files. Other printer settings enable you to specify an output method, map scaling, and whether to print a border around a **Map** window.

These output preferences become the default settings in MapInfo Pro. These preferences are the default settings in the **Advanced Printing** dialog box for example. You can override the default settings by changing them, in the **Advanced Printing** dialog box for example, and then saving your map in a workspace.

Note: You can get additional printer advice in the *MapInfo Pro Printing Guide*, which is located in the `Documentation` subfolder of your installation directory.

To set output preferences: On the **PRO** tab, click **Options**, and **Output Settings** to open the **Output Preferences** dialog box.

There are several tabs of preferences:

- **Display tab** - set the on-screen display options for raster or grid files.
- **Printing tab** - set the printing options for **Map** windows, **Layout** windows, and all other output file types. (You can reset these preferences by overriding them for your map.)
- **Exporting tab** - set the export options for **Map** windows, **Layout** windows, and all other output file types. (You can reset these preferences by overriding them for your map.)

The following sections explain the display settings, the printing options, and window export options in **Output Preferences** dialog box. Some of the options appear in more than one dialog so we have grouped all of the same explanations together.

Display tab (Output Preferences)

The **Display** tab sets the on-screen display options for raster or grid files.

- **Polygon Mode** - Select this check box to display the rendering that draws the object as a single request with all nodes. **Polygon Mode** has three preferences based on three types of drawing: on-screen, printing, and exporting. You can select **Polygon Mode** separately for display, printing, and export on the **Display**, **Printing**, and **Exporting** tabs. When **Polygon Mode** is off, MapInfo Pro renders with special processing.

Note: Printing to PDF files may produce extra hairlines in the output when **Polygon Mode** is off.

- **Display Raster in True Color When Possible** - Select this check box to display your 24-bit raster or grid file images in true color (make sure your display settings are set to greater than 256 colors). Clear this check box to display images using 256 colors. This box is checked by default.
- **Fast Symbol Rendering** - MapInfo Pro optimizes how point symbols render on the screen by drawing a point symbol only once at a specific location when rendering a layer. This preference is enabled by default. Disable to see symbols rendered at the same location, such as when using the Dispersed Groups font that comes with MapInfo Pro or when using rotated symbols.
- **Dither Method** - Select this check box when it is necessary to convert a 24 image to 256 colors, use either halftone or error diffusion. This option is used when printing raster and grid images. Dithering occurs when **Print Raster In True Color When Possible** is off or when the printer color depth is 256 colors or less. Select a dither method from the drop-down list:
 - **Halftone** dithering calculates a series of half tone differences in color between high-contrast elements in your image to create a smooth transition of color. This option is selected by default for display, print, and export options.
 - **Error diffusion** dithering calculates an interim color between contrasting colors and shades the surrounding pixels to blend evenly toward that interim color.

Note: You can select dithering separately for display, printing, and exporting on the **Display**, **Printing**, and **Exporting** tabs.

Printing tab (Output Preferences dialog box)

Click the **Printing** tab to set the printing options for **Map** windows, **Layout** windows, and all other output file types. Select the appropriate printing settings based on your output requirements. Remember that resetting these printer options locally overrides these preferences.

Output Method

- **Print Directly to Device** - Select this option to print your image file directly from MapInfo Pro. This check box is checked by default.
- **Print Using Enhanced Metafile (EMF)** - Select this option to generate an enhanced metafile of your MapInfo Pro image before sending it to the printer. This setting takes advantage of current printer technology to shrink the spool size and print your file quicker without sacrificing quality. When printing to PDF, selecting this option generates a flat, non-layered, PDF file.

Note: You must use this setting if you are printing a map containing a translucent raster or grid layer. If you do not use this setting, the image will not print translucently.

- **Print Using Offscreen Bitmap (OSBM)** - Select this option to generate an Offscreen bitmap of your MapInfo Pro image before sending it to the printer. Offscreen bitmap is invoked depending upon the type of translucent content in the map and enhanced rendering state of the window. However, setting OSBM from this window means that while printing Offscreen bitmaps (OSBM) will be selected regardless of the translucency and anti-alias settings.

- **Print Border for Map Window** - Select this check box to print a black border around the image you are printing. Clear this check box to leave the image without a border. This check box is checked by default.
- **Internal Handling for Printing Transparent Vector Fills and Symbols** - Select this check box to have MapInfo Pro handle transparent fill patterns and bitmaps for vector images when printing or exporting. This check box is checked by default. Clear this check box to let the printer or Windows export functions handle this.
- **Scale Patterns** - Select this check box to match the non-transparent fill patterns in your print output to more closely match what you see on your screen. This check box is checked by default. Clear this check box to let the printer driver have exclusive control over rendering the pattern fills.

Note: The **Scale Patterns** check box does not affect transparent fill patterns because transparent fill patterns are always scaled.

- **Subdivide Printing** - Select this check box to break print jobs into multiple, smaller, print requests for better print quality. This is useful when printing large raster/translucent maps to large paper sizes. If unchecked, the print is done in a single request.
- **Polygon Mode** - Select this check box to display the rendering that draws the object as a single request with all nodes. **Polygon Mode** has three preferences based on three types of drawing: on-screen, printing, and exporting. You can select **Polygon Mode** separately for display, printing, and export on the **Display**, **Printing**, and **Exporting** tabs. When **Polygon Mode** is off, MapInfo Pro renders with special processing.

Note: Printing to PDF files may produce extra hairlines in the output when **Polygon Mode** is off.

- **Use ROP Method to Display Transparent Raster** - Select this check box to allow the internal ROP (Raster Overlay by Pixel) to manage the transparent pixel display and printing in raster images. Since the ROP Method is largely a display method, not all printers, plotters, and export programs can use it. We recommend that you either check with the printer manufacturer before using this setting or try a few test prints or exports to get the results you want. This check box is cleared by default.

Using the ROP method may not produce problems unless you print the metafile.

- **Print Raster in True Color When Possible** Select this check box to print and export your 24-bit raster or grid file images in true color (make sure your printer settings are set to greater than 256 colors). Clear this check box if you are not working with a color printer. This check box is checked by default.
- **Dither Method** See the description under **Display tab (Output Preferences)**.

Exporting tab (Output Preferences dialog box)

Click the **Exporting** tab settings to set the export options for Map windows, Layout windows and all other output file types. Select the appropriate window export settings based on your output requirements. Remember that resetting these options locally overrides these preferences.

- **Export Border** - Select this check box to include a black border on images you are exporting. This check box is checked by default. Clear this check box to export the image without a border.

Note: The preference setting definitions for **Internal Handling for Transparent Vector Fills and Symbols**, **Use ROP Method to Display Transparent Raster**, **Print Raster in True Color When Possible**, and **Dithering Methods** are the same for export as for printing.

- **Internal Handling for Transparent Vector Fills and Symbols** - Select this check box to have MapInfo Pro handle transparent fill patterns and bitmaps for vector images when printing or exporting. This check box is checked by default. Clear this check box to let the printer or Windows export functions handle this.
- **Polygon Mode** - Select this check box to display the rendering that draws the object as a single request with all nodes. **Polygon Mode** has three preferences based on three types of drawing: on-screen, printing, and exporting. You can select **Polygon Mode** separately for display, printing, and export on the **Display**, **Printing**, and **Exporting** tabs. When **Polygon Mode** is off, MapInfo Pro renders with special processing.

Note: Printing to PDF files may produce extra hairlines in the output when **Polygon Mode** is off.

- **Use ROP Method to Display Transparent Raster** - When the ROP method is selected, the transparent image is rendered using a raster operation (ROP) to handle the transparent pixels. This method is used to draw transparent (non-translucent) images on-screen.
- **Export Raster In True Color When Possible** - Select this check box to display your 24-bit raster or grid file images in true color (make sure your display settings are set to greater than 256 colors). Clear this check box to display images using 256 colors. This box is checked by default.
- **Use Anti-Aliasing** - Select this check box to apply the anti-aliasing options available in MapInfo Pro. For a description of the anti-alias preferences, see [Understanding the Anti-Aliasing Export Preferences](#).

Note: We recommend using the enhanced rendering settings that are described under *Enabling Enhanced Rendering* in the *MapInfo Pro: Managing the Look of Your Map* Guide, because they superseded these anti-alias settings. For backwards compatibility, we continue to support the previous anti-alias settings that are described here.

Note: We recommend using the enhanced rendering settings that are described under [Enabling Enhanced Rendering](#), because they superseded these anti-alias settings. For backwards compatibility, we continue to support the previous anti-alias settings that are described here.

Recommendations for Effective Pattern Scaling

When you are printing, find out what type of printer driver you are using. Many PCL6 and some HPGL drivers handle fill pattern scaling and give you control over this feature. Turning off their scaling may be the difference between what you see in print and what you see on your monitor.

Before exploring your printer driver's scaling options, we recommend you try our scaling options, because we have enhanced our method to better meet your map and layout requirements. Then try turning off our scaling and turn your printer driver's back on and see what you like better. Our tests show that our scaling seems to produce output that more closely matches your screen's display.

To turn on MapInfo Pro's pattern scaling options:

- On the **PRO** tab, select **Options**, and then click **Output Settings**.
- In the **Output Preferences** dialog box, on the **Printing** tab, select the **Scale Patterns** check box.

For a description of how to set **Scale Patterns** for a single print job, see [Handling Scale Patterns](#).

Understanding the Anti-Aliasing Export Preferences

To apply anti-aliasing to your maps, we suggest that you use the enhanced rendering settings that are described under *Enabling Enhanced Rendering* and *Anti-Aliasing*, because they superseded the settings described in this section. For backwards compatibility, we continue to support previous anti-alias settings described here.

To give you more control over map images when exporting MapInfo Pro maps, you can use anti-aliasing methods. This is particularly important when you are saving maps created in MapInfo Pro for use in other Windows-based applications, in particular in slide presentations or for web pages.

The benefits of anti-aliasing can include:

- Make your fonts look smoother
- Make jagged edges in maps look rounder
- Can make text can be easier to read (for some) because it looks more like printed type
- Make maps look more visually attractive

Anti-aliasing allows you to smooth images in all types of windows, such as **Map** windows, layouts, and legends. However, you cannot anti-alias images you are saving to .EMF or .WMF format, because these are not true raster formats.

There are three smoothing options you can use to customize your raster image:

1. Smooth using a Filter value. You can set a flag that selects one of six filters that allow you to choose the direction the filter is applied to the image from.
 - Vertically and Horizontally (Smooths the image vertically and horizontally)
 - All Directions (1) (Smooths the image in all directions)
 - All Directions (2) (Smooths the image in all directions using a different algorithm)
 - Diagonally (Smooths the image diagonally)
 - Horizontally (Smooths the image horizontally)
 - Vertically (Smooths the image vertically)
2. Smooth using a Mask value. You can select a value that indicates the size of the area you want to smooth. For example, to create a 3x3 pixel mask value, you would enter a three (3) in this field. This would limit the amount of change in the color of the pixels. Typically mask sizes would

be 2-3 pixels when exporting at screen resolution. If you are exporting at a higher resolution, a larger mask might be appropriate.

3. Smooth using a Threshold value. You can select a threshold value to indicate which pixels to smooth. Each pixel in an image has a value based on its color. The smaller the pixel value, the darker the color. Select this option to smooth all of the pixels above the threshold you enter in this field. When you set this value to zero (0), MapInfo Pro will smooth all of the pixels.

You must either set a global preference for these anti-aliasing options or set them during the export process (using the **Advanced** button).

Note: For advice about handling the fill patterns you see on the screen to more closely match what the printer will produce, see [Recommendations for Effective Pattern Scaling](#).

Setting Anti-Aliasing When Exporting a Map or Layout

By default, MapInfo Pro uses the anti-alias settings made as a preference when you save a **Map** or **Layout** window as an image. You can override these preferences when you save an image by selecting the **Use Anti-aliasing** check box in the **Save Window As** dialog box.

You cannot use anti-aliasing when saving an EMF or WMF image.

To override the anti-aliasing options when saving a map as an image (exporting):

1. After completing your work in a window, click **Save Image**, which is located in the **Output** group, on the **HOME** tab.
2. In the **Save Window to File** dialog box, select the folder location to save the file to and then type a file name into the **File name** field.
3. Click **Save** to continue.
4. In the **Save Window As** dialog box, select the **Use Anti-aliasing** check box and then click **Advanced**.

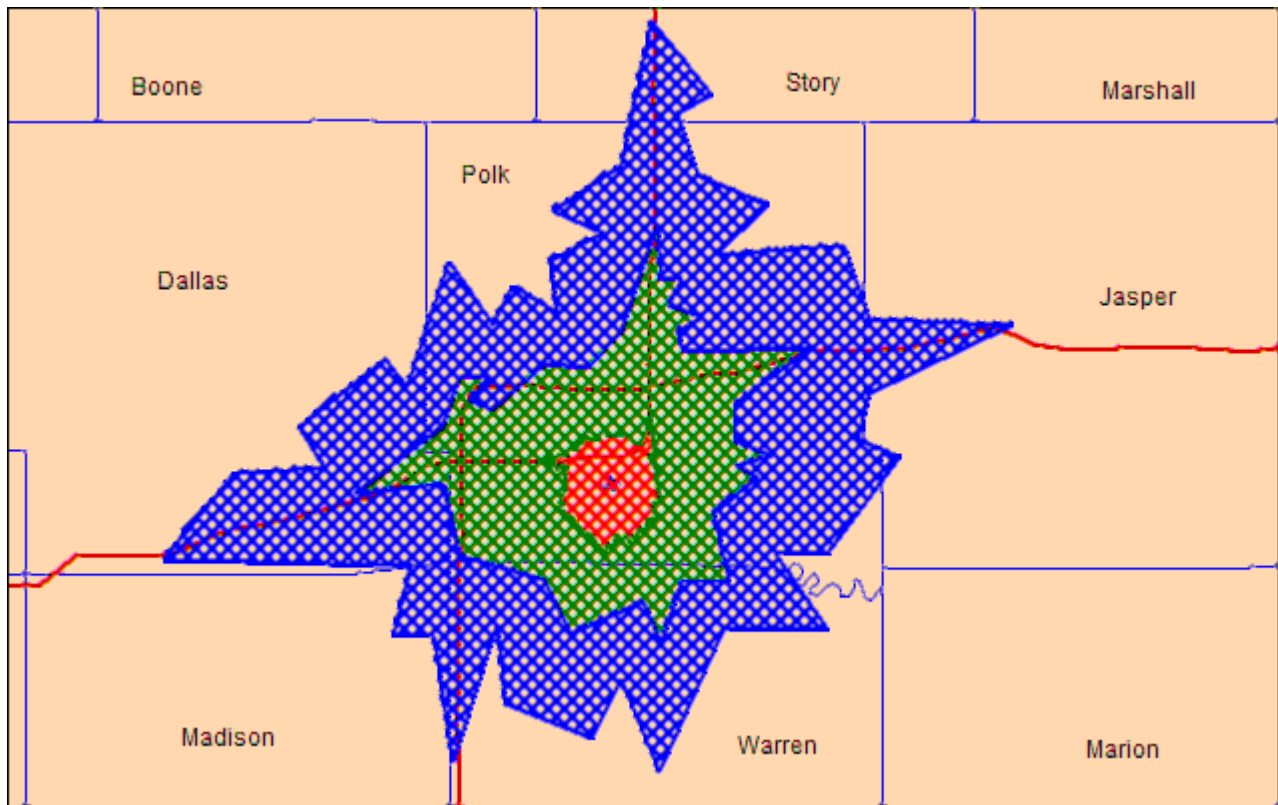
If you are exporting an EMF or WMF image, the **Use Anti-Aliasing** check box is disabled.

5. In the **Advanced Exporting Options** dialog box, change the settings in the **Anti-aliasing Options** panel: this includes **Filter**, **Mask Size**, and **Threshold**.

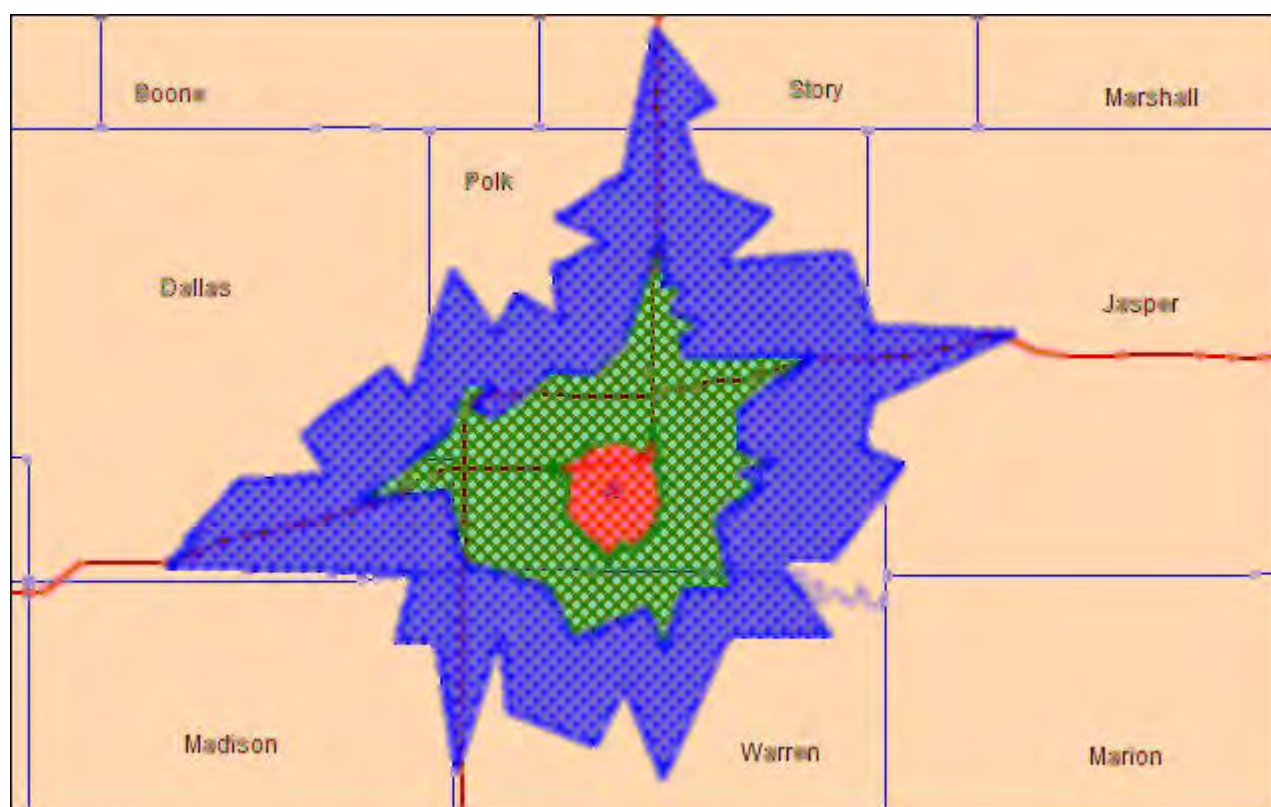
Note: You must select the **Use Anti-aliasing** check box on the **Save Window As** dialog box to enable the anti-aliasing options in the **Advanced Exporting Options** dialog box.

6. Click **OK** to close the dialog box.
7. Click **Save** to close the **Save Window As** dialog box and generate the image.

The next two figures show the results of setting an anti-alias mask. For both images, the **Filter** is set to **Vertical and Horizontal** and the **Threshold** is set to 100.



Anti-Aliasing with **Mask** set to 2



Anti-Aliasing with **Mask** set to 5

Enabling or Disabling Subdivided Printing

To allow print jobs to be broken into multiple, smaller print requests set the **Subdivide Printing** preference. This preference is initialized using a registry setting if it exists.

To use this option, you need to add a registry key to your local machine. We have created an online Knowledge Base document that contains the registration (`.reg`) files inside a ZIP file that you can use to enable or disable this option automatically. You will need to save the ZIP file locally, open the ZIP file and double-click the appropriate registry file to add this option to the registry. Adding registry keys to your computer requires Administrator rights, or at least write access to your computer's registry. If you do not have this type of access, we recommend you see your System Administrator for instructions.

1. On the **PRO** tab, click **Options**, and **Output Settings** to open the **Output Preferences** dialog box.
2. On the **Printing** tab, select the **Subdivide Printing** check box to break a print job into multiple, smaller print request. Clear the check box to print as a single request.
3. Click **OK** to close the dialogs and save your settings.

Note: Subdivide Printing is especially useful if printing large raster and/or translucent maps to large paper sizes.

Setting Redistrict/3DMap Printing Options

In this section we review the options you have in printing Redistrict browsers and 3DMaps. These options that display in the **Print** dialog box depend upon the type of window or map you are trying to print. Not all options display, whenever you are in the **Print** dialog box.

Redistrict Window Print Options

The **Browser Print Options** dialog box only displays when you are printing a Redistrict window.

To use the Redistrict window print options:

1. In the **Print** dialog box, click the **Options** button. The **Browser Print Options** dialog box displays.
2. Select from these options and click **OK** to save them.
 - **All** - Click this button to print all of the rows and columns in your Redistrict window.
 - **From/To** - Click this button to specify the print range of the rows and columns in your Redistrict window.

3D Map Print Options

Use these 3D Map Print Options to ensure that you get the printing results you want. The **3D Map Print Options** dialog box only displays when you are printing a 3D map.

Select from these options and click **OK** to save them.

- **Fit to Page** - Click this button to fit the current 3D map to the page size you have selected in your preferences or in your **Print** dialog box.
- **Custom** - Click this button and enter your own custom width, and height entries in the fields provided.

Troubleshooting

General Printing Tips and Tricks

Compress the Size of Raster Maps when Printing to PDF Tip

Use one of the image compression options with the MapInfo PDF Printer to select how to compress black and white or color images, or select to remove duplicate images, downsample high resolution images, and disable PNG/JPEG printing. On the **Print** dialog box (on the **HOME** tab, in the **Output** group, click **Print** or **Create**), click the **Properties** button. In the **MapInfo PDF Printer Properties** dialog box, select the **Image Compression** tab.

Save New Defaults and Save Time Printing to PDF

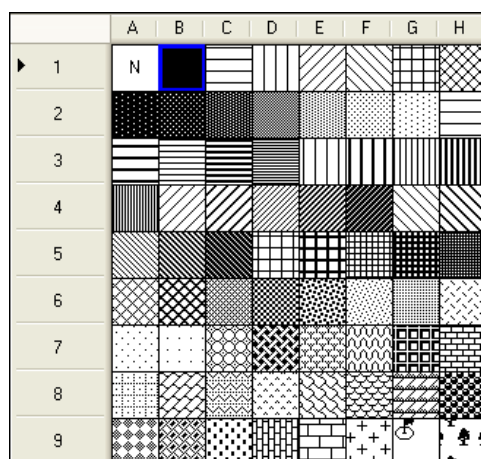
Don't select the same setting over and over again when printing to PDF. Save your setting once as the default setting. From the **Start** menu, select the **Control Panel**, and click **Printers and Faxes**. In the **Printers and Faxes** screen, right-click **MapInfo PDF Printer** and select **Printing Preferences**. Make your favorite setting and click **OK** to apply it as a default when you print to PDF. As an example, turn on **Enable Postscript Simulation** in the MapInfo PDF printer.

Embedding MapInfo Pro Graphics Tip

When you embed a MapInfo map in another application (such as Word or PowerPoint), click outside the map before you use the **Print** or **Print Preview** commands. This allows the container application to take over previewing or printing properly. This is particularly true if you have just made changes to the map you are printing.

Need for Speed When Using Fill Patterns?

Note that fill patterns on the first row of the **Region Style** dialog box (see next figure) are Windows standard and tend to print faster. The other patterns are bitmaps MapInfo has created for your use. You might want to consider this when you are selecting fill patterns.



1 Use the fill patterns from the first row for faster printing results.

Speed Still an Issue?

If you want to improve printer speed, and your printer has **Fast**, **Normal**, **Best** print quality options, we suggest you select **Fast**.

If your image is large and you are printing at a resolution of 600 DPI or greater, your image may exceed this limitation. To print the image, reduce the resolution of the printout or shrink the size of the image.

Translucent Raster Maps?

If your map contains translucent layers, then the output converts to a raster image to maintain the translucency during the printing process. This also converts vector graphics and text to raster. To maintain text and raster in the output, you must disable the translucency in the map. However, if you wish to maintain translucency while printing, ensure the map has **Enhanced Rendering** turned on.

Printing Globally? Spool Locally!

Try spooling print jobs locally rather than at the plotter. This allows the computer to rasterize your output rather than the printer, which can be more efficient.

1. To set up local print job spooling, on the **Start** menu, point to **Settings, Control Panel**, and click **Printers**.
2. Right-click the printer and choose **Properties** to display the printer's properties.
3. Click the **Advanced** tab to display the advanced property options.
4. Click the **Spool Print Documents** button and **Start printing after last page is spooled** button.

Note: If you do not have administrative rights to your computer, you may not be able to use the spooling option. Contact your IT department if you want to make this change to get their support.

5. Click **OK** to save your changes.

Want to improve on what you see in Adobe Acrobat?

Adobe Acrobat has display settings that may affect how you see text, images, lines, and translucency in your PDF. You can change these settings in Acrobat on the **Edit** menu, by pointing to **Preferences** and then selecting **Page Display**. Experiment by selecting and unselecting the **Smooth line art**, **Smooth images**, and **Enhance thin lines** settings to see how they affect your printout.

Troubleshooting Printing Problems

There are many variables that affect printing and plotting with any application, and MapInfo Pro is no exception. MapInfo Pro uses printer drivers that are installed with the Windows operating system. This section addresses specific printer/plotter issues that have been uncovered by users and partners.

Gaps that Display at the Block Boundaries when Printing

Issue: During testing we discovered that the output of some printer drivers resulted in gaps that display at the block boundaries. Therefore, we did not enable this option by default. Since these gaps may affect the quality of your final output, we are giving you the ability to enable this option if or when you need it.

At this time, we do not have a workaround to remove these gaps. If you have both a postscript and a non-postscript version of your printer driver, we recommend you try both to see which version gives you better results.

Message: Unable to print because printer dimensions are too large

Issue: When you are printing a large map, it is possible for very high resolution or very large paper dimension print requests to exceed MapInfo Pro's internal pixel limitations, which cause the print to fail. If the printer width or height is larger than 32,767 pixels, MapInfo Pro does not allow you to print the file.

Fix: Decrease the print resolution or page size and consult the *MapInfo Pro Printing Guide* to maximize your printing capability.

Message: The output may get clipped because it is greater than 28,000 pixels

Issue: If the printable size (pixel width or height) is between 28,000 and 32,767, MapInfo Pro prompts you to see if you want to continue.

Fix: Decrease the print resolution or page size and consult the *MapInfo Pro Printing Guide* to maximize your printing capability.

Message: Cannot Print

Issue: You may be trying to print one or more of the following:

- Large format (large page size) maps or layouts containing raster or grid layers that may be translucent or transparent. In this case, many times the maps or layouts did not print at all, or if they did print, the translucent or transparent layers did not print properly.
- Maps made up of multiple pages that contain borders. In this case multiple page maps with a border around the entire map would print with borders around each page instead.
- Maps that contained labels that span more than one page. In this case, the labels would not print at all or would not print properly.

These issues are caused by the demand these print requests placed on the system resources in your computer.

To resolve these issues, use the **Subdivide Print** preference to break down a print request into smaller blocks and reduce the demand on your system's resources. This preference limits the size of each block to 8192 x 8192 pixels and each block is sent individually to the printer driver. This change may allow you to print large and complex images that you could not otherwise print. To locate this preference, on the **Options** screen, click **Output Settings** to display the **Output Preferences** dialog box. On the **Printing** tab, select the **Subdivide Printing** check box to break the print job into multiple, smaller print requests. Clear this check box to process the print job as a single request.

Printing to HP Designjet Plotters

When testing with HP Designjet large format plotters we found that:

- If you select **Optimize for Images** and **Maximum Quality**, the plotter reduces the output resolution to 600 dpi.
- If you select **Optimize for Drawings/Text** and **Maximum Quality**, you can increase the output resolution to 1200 dpi.

For example: By setting a paper size of 50 x 50 inches and using the **Optimize for Images** option with the **Maximum Quality** setting, you can successfully output an image of 30,000 pixels.

Troubleshooting when Saving to PDF

There are different variables and settings available depending on the PDF printer driver that you are using. This section addresses issues for the PDF printer driver that installs with MapInfo Pro.

My Document does not Append to an Existing PDF File

Issue: My document does not append into an existing PDF file after selecting the **Concatenate** option when printing to PDF.

You can append a document into an existing PDF file instead of overwriting the PDF file (by default a *.pdf file is overwritten if it already exists). To do this, on **HOME** tab, in the **Output** group, click **Create** to open the **Print** dialog, which is preset to use the MapInfo PDF Printer. In the **Output File Name** dialog, select the PDF already created and then check the **Concatenate** check box. The PDF Printer will then append your document to the existing PDF file.

Fix: Ensure that the existing (target) PDF file that you are appending into is closed before using the **Concatenate** option.

Disk Space an Issue?

Issue: When I print my document to PDF, I have space issues.

Fix: Make sure you have plenty of temporary disk space, particularly if you are printing large or complex maps or layouts, and especially if they contain raster images and/or translucency.

Old Driver Works, New Driver Does Not

Issue: I cannot print to PDF using my new printer driver.

Fix: When in doubt, if an older driver worked and the new one does not, go back to the older driver.

Difficulty Printing Text Strings for Different Languages

Issue: When I print my document to PDF the Unicode text strings and the strings for different languages are not printing correctly.

Fix: Enable the **Multi-language support** check box. In the **Print** dialog box (on the **HOME** tab, in the **Output** group, click **Print** or **Create**), click the **Properties** button. In the **MapInfo PDF Printer Properties** dialog box, select the **Advanced Options** tab and then select the **Multi-language support** check box.

Seeing Black Boxes Instead of Symbols

Issue: When I print my document to PDF I see black boxes instead of symbols.

Fix: If you are printing to the MapInfo PDF Printer, try turning on Enable Postscript Simulation. In the **Print** dialog box (on the **HOME** tab, in the **Output** group, click **Print** or **Create**), click the **Properties** button. In the **MapInfo PDF Printer Properties** dialog box, select the **Advanced Options** tab and then select the **Enable Postscript Simulation** check box.

Message: An unknown error occurred while exporting Geographic and/or Attribute data to PDF

Issue: An error occurs when printing a GeoRegistered PDF or exporting PDF data, because MapInfo PDF Printer driver does not support the GeoRegistration or PDF Attribute data export along with PDF security options or encryption.

Fix: To prevent an error, In the MapInfo PDF Printer dialog:

1. On the **HOME** tab, in the **Output** group, click **Print** to open the **Print** dialog.
2. In the **Name** field, select **MapInfo PDF Printer** and then click **Properties**.
3. On the **Destination** tab, clear the **Preview document before proceeding** and **Prompt for destination options**.
4. **File system** should be selected as destination.
5. Beside **File system**, click **Options** and set the following:
 - **Destination file** should be selected to prompt for file name.
 - **Default directory** should be left blank.
 - **Default filename** should be left blank.
 - **Overwrite option** should be selected as anything but Append to existing file.
 - **Print to** should be set as Do Not Print.

Printing Enhancements by Version

MapInfo Pro 15.2.2

Layout Window Enhancements

The following enhancements have been made to the **Layout** window:

- Improved appearance of printed legend samples that have transparent fill patterns from a translucent layer.

MapInfo Pro 15.2

Layout Window Enhancements

The following enhancements have been made to the **Layout** window:

- Layouts can have multiple pages
- Unicode support, which allows for text from multiple languages
- Additional shapes are available: symbols, polylines, and polygons
- Empty frames may be added to the layout
- Images, text, and symbols can be rotated
- A scale bar can be added to the layout

MapInfo Professional 12.5

New Layout Window

MapInfo Professional 12.5 has a new **Layout** window. Printing and exporting layouts from this window has much better quality and it supports working with labels. How labels look in the output is now identical to what you see in the layout, so labels in the embedded map frames within a **Layout** window look the same on the screen, in printouts, and in exported files. The **Layout** window maintains text and vector whenever possible, which minimizes rasterization and improves the output quality.

MapInfo Professional 11.0

Saving Preferences for Georegistration Coordinate Units

You can select to store the bounds and coordinate systems of the map or layout view in your PDF file. This type of file is called a Georegistered PDF. You can save preferences to set the georegistration coordinate units to either **Use Map Units** or **Use Degrees**. For more information and instructions on how to do this, see *Saving Preferences for Georegistration Coordinate Units* in the *Help System*.

MapInfo Professional 10.5

New in this release are polygon mode printing, printing to an offscreen bitmap (OSBM), subdivide printing, and printing to a PDF file.

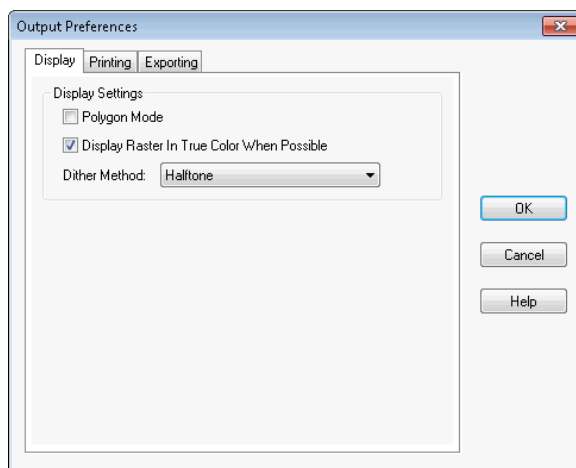
Polygon Mode Printing

This release of MapInfo Professional introduces a new way of drawing complicated polygons, such as those containing holes or many nodes through a User Interface. This was due to an issue with printing such objects using an Adobe PDF printer driver. It left visible seams and gaps in the image when the PDF was printed. These seams and gaps were not visible on screen nor when printed using other printer drivers.

Printing with the new method means that large polygons are now rendered as-is not broken into smaller polygons, as the older method does. Additionally, the new method uses different calls that specifically support drawing polygons with holes. The older method manipulates the polygon with holes to draw as a single polygon, which caused seams and gaps to appear in the PDF

Note: Because this issue does not affect all users of MapInfo Professional who print maps, we continue to provide the original polygon drawing method.

Polygon Mode may be set for each of three types of drawing: on-screen, printing, and exporting. On the **PRO** tab, select **Options**, and click **Output Settings** to open the **Output Preferences** dialog box. Select the **Polygon Mode** check box on any of the **Display**, **Printing**, and **Exporting** tabs.



Note: The setting is independent to output method and is not saved on per window basis. This setting will not affect any other option's User Interface.

Printing to an Offscreen Bitmap (OSBM)

The **Print using Offscreen Bitmap (OSBM)** printing method renders a print job to offscreen bitmaps prior to sending it to the printer or plotter. It is used when printing maps and layouts containing translucency and/or anti-alias content, particularly for raster images. When printing, on the **HOME** tab, in the **Output** group, click **Print** to open the **Print** dialog box. Click **Advanced** to open the **Advanced Printing Options** dialog box. Select the **Print using Offscreen Bitmap (OSBM)** check box.

This printing process generates an Offscreen bitmap of your MapInfo Professional image before sending it to the printer. Offscreen bitmap is invoked depending upon the type of translucent content in the map and enhanced rendering state of the window. However, setting OSBM from this window means that while printing Offscreen bitmaps (OSBM) will be selected regardless of the translucency and anti-alias settings.

Setting Print to an Offscreen Bitmap as your Default

You can set this option as a default on the **PRO** tab, select **Options**, and click **Output Settings** to open the **Output Preferences** dialog box. On the **Printing** tab, select **Print using Offscreen Bitmap (OSBM)** to sets the default for all new windows.

Subdivide Printing

In earlier versions of MapInfo Pro, there was an optional registry setting, called **SubdividePrinting**, to allow print jobs to be broken into multiple, smaller print requests. This was especially useful if

printing large raster/ translucent maps to large paper sizes. Now that option has been added as a preference. The preference is initialized using the registry setting if it existed.


On the **PRO** tab, select **Options**, and click **Output Settings** to open the **Output Preferences** dialog box. On the **Printing** tab there is a check box for **Subdivide Printing**. If checked, the print job is broken into multiple smaller print request. If unchecked, the print is done in a single request.

Printing to PDF

MapInfo Professional lets you save a map to a layered PDF file. Since Acrobat 6.0, PDFs are capable of holding multiple pages of information in the same space through the use of Optional Content Groups (OCG), which are more commonly known as layers. Layers in PDFs are very similar to MapInfo Professional map layers.

Your PDF now displays layers in the same order as shown in the MapInfo Professional **Layer Control** window, and it displays translucency. The MapInfo PDF Printer supports GeoRegistration, which stores the bounds and coordinate systems of the map view in the PDF file. The PDF file also stores the attribute data of the records on the map.

New in this release when saving to a PDF file:

- **Print to PDF** – On the **HOME** tab, in the **Output** group, click **Print to PDF** to save your map, browser, or layout to a PDF file. This option is similar to **Save As**, and gives you the option to concatenate PDF files.
- **MapInfo PDF Printer tool** – The Main menu includes a new MapInfo PDF Printer  tool, which is the same as on the **HOME** tab, in the **Output** group, clicking **Print to PDF** to save your map, browser, or layout to a PDF file.
- **Translucency** – You can create a layered PDF that includes translucent layers in MapInfo Professional 10.5.
- **PDF Preferences** – The MapInfo Professional **Print** dialog box (on the **HOME** tab, in the **Output** group, click **Print**) now includes a **PDF** button that displays after selecting MapInfo PDF Printer from the Name list. This button opens the **PDF Preferences** dialog where you can make the following settings:

Layered PDF

Select to save layers for a map, as shown in the MapInfo Professional **Layer Control** window, to the PDF file. When saving a **Layout** window, each frame, such as map frame and legend frame, becomes a layer in the PDF.

Georegistered PDF

Select to store the bounds and coordinate systems of the map or layout view in the PDF file.

Add Attribute data to PDF

Select to store the attribute data of the records on the map in the PDF file.

Automatically open the PDF

Select to have the PDF file open after it is generated.

Selecting the Layered PDF option in the **PDF Preferences** dialog box enables the Direct to Device option, and disables using OSBM and EMF.

If you select the Print using EMF or Print using the Offscreen Bitmap (OSBM) output method and later on select the Layered PDF from the **PDF Preferences** dialog box, then the output method forcibly sets to Direct to Device. However, disabling the Layered PDF option resets the print output method back to your original selection, EMF/ OSBM.

- **Context Sensitive Help for the MapInfo PDF Printer** – This version of the MapInfo PDF Printer includes documentation in the form of a *Help System*. To access this help system, on the **HOME** tab, in the **Output** group, click **Print**. In the **Print** dialog box, click **Properties**. This opens the **MapInfo PDF Printer Properties** dialog box, which has a **Help** button on each tab.

MapInfo Professional 10.0

MapInfo Pro lets you save a map to a layered PDF file, see [Printing a Layout to a Layered PDF](#) or [Printing a Map to a Layered PDF](#).

Saving to a File (Exporting)

Saving a Window to an Image File

You can save your **Map**, **Layout**, or **Browser** window as an image in Graphic Interchange Format (GIF) or in Tagged Image File Format (TIFF, TIFF CMYK, TIFF LZW, or TIFF CCITT Group 4).

When saving a **Layout** window, MapInfo Pro maintains the printer resolution of the layout regardless of the file format you export to. To accomplish this, MapInfo Pro creates an image at the printer resolution and then converts that image to the resolution of the export format. This ensures that what you see in the **Layout** window is what you see in the image you export to. The same transparency and raster options are available when you print your layout as when you export your layout.

Note: You can customize your experience when saving to an image file by using MapInfo Pro preferences. These are settings made on the **PRO** tab by selecting **Options** and then clicking **Output Settings**. Under the **Exporting** tab, select specific settings that MapInfo Pro will use when exporting files. For more information, see [Setting Your Output Preferences](#).

To save your window as an image file:


1. Activate the **Map**, **Layout**, or **Browser** window that you want to save by clicking on the window.

2. On the **HOME** tab, in the **Output** group, click **Save Image**.
3. In the **Save Window to File** dialog box, type the name of the file in the **Filename** field.
4. From the **Save as type** drop-down list, select the file type to save to: **Tagged Image File Format (*.tif)**, **TIFF CMYK (*.tif)**, **TIFF CCITT (*.tif)**, **TIFF LZW (*.tif)**, or **Graphic Interchange Format (*.gif)**.
5. Click **Save**.
6. In the **Save Window As** dialog box, select either **Same as Window** to save an image of the window, or **Custom** to set the width, height, and resolution of the image.

For information about the **Use Anti-aliasing** check box, see [Understanding the Anti-Aliasing Export Preferences](#).

The **Create a Geographically Referenced Tab File** check box creates registration points based on the current map view and saves them as a .TAB file.

7. Click **Save** to create the image.

The output size is the same as the printer page size set in the **Page Setup** dialog box (on the **HOME** tab, in the **Output** group, click **Page Setup** .

The export image includes content that is in the margins of the layout (unlike printing, which clips out items in the margins). However, if the content goes beyond the page limits, then it is not included.

Normally, what you export looks identical to what is in the **Layout** window. However, some graphics and text may become blurry when you export a layout. To correct this, on the **PRO** tab, click **Options**, and **Output Settings**. On the **Output Preferences** dialog box, under the **Exporting** tab, select the **Clarify Text** check box. This corrects the issue, but may cause some labels on the map to look slightly different in the export from what is in the layout.

Saving to a GeoTIFF

MapInfo Pro includes the capability of exporting **Map** windows to GeoTIFF (*.tif) export format. GeoTIFF files are designed to connect a raster image to its location on the earth. Georeferencing information is written directly to the *.tif file so that it can be used in other applications. This section explains the requirements for exporting maps to GeoTIFF format. Using GeoTIFF format has the following requirements:

- The window you are exporting is a **Map** window.
- The Map window's projection contains an EPSG code. Projections that do not have an EPSG code are not supported.
- The **Map** window must not be rotated, or contain a raster image that causes a rotation.

To save a **Map** window to a GeoTIFF format file, do the following:

1. Open the desired layers in a **Map** window, if you do not have your map open already.
2. Make the **Map** window active.

3. On the **HOME** tab, in the **Output** group, click **Save Image** to open the **Save Window to File** dialog box.
4. In the **Save in** box, select the destination folder of the exported file.
5. In the **Save as type** drop-down list, click the arrow to see the file format choices. Select **GeoTIFF (*.tif)**.

GeoTIFF is not available as an export format for other types of windows (such as **Browser**, **Legend Designer**, or **Redistricter**) or **Map** windows that use unsupported projections.

6. In the **File name** box, enter a name for the exported file.
7. Click **Save** and continue with the normal **Save Window As** process.
8. In the **Save Window As** dialog box, either keep the default window size for your image (**Same as Window**) or select a custom image size (**Custom**).
9. Click **Save** to create the image.

Supported Projections and GeoTIFF

When you save a **Map** window to GeoTIFF format, the file is saved in the current projection of the **Map** window. You cannot use the **Save Window As** command to save the **Map** window to a different projection. Instead, you must change the **Map** window projection before you use the **Save Window As** command. You can select a projection in the **Choose Projection** dialog box.

To change the projection, on the **Layers** or **Explorer** windows, right-click on the map name and select **Map Options**. In the **Map Options** dialog box click **Projection**. In the **Choose Projection** dialog box, select the projection from the **Category** and **Category Member** lists.

The **Map** window projection must have an EPSG code. You can see whether a projection has an EPSG code in the **Choose Projection** dialog box. To do this, on the **Layers** or **Explorer** windows, right-click on the map name and select **Map Options**. In the **Map Options** dialog box click **Projection**. In the **Choose Projection** dialog box, select the projection from the **Category** and **Category Member** lists.

Note: The `MAPINFOV.PRJ` file entries that use EPSG codes contain a "`\P####`" code. For more information see [Working with Coordinate Systems and Projections](#).

If you attempt to save a **Map** window using a projection that is not supported by the GeoTIFF format, that is, a projection that does not have an EPSG code, the GeoTIFF format will not be available as an export format. In addition, the **Save Window As** dialog box displays the following message at the bottom of the dialog box:

GeoTIFF option not available when Current Map Projection does not have an EPSG code.
In order to save to GeoTIFF, you will need to change your map projection to one that has an EPSG code.

Image Rotation and GeoTIFF

In **Map** windows that contain a raster or grid image, the image must not cause the map projection to rotate the coordinates if you wish to create a GeoTIFF for this **Map** window. Rotation can occur

if the image is not registered precisely. To work around this, you can force Image Reprojection to be enabled.

To do this, on the **Layers** or **Explorer** windows, right-click on the map name and select **Map Options**. In the **Map Options** dialog box click **Image Processing**. In the **Image Processing** dialog box, select **Always** under **Reprojection Using**.

If Image Processing is set to **Always**, then it is possible to use raster layers for GeoTIFF export.

Saving Raster and Grid Images to GeoTIFF

If you attempt to save a **Map** window that contains a raster or grid image that causes a rotation in the **Map** window, the GeoTIFF format will not be available to save to. In addition, the **Save Window As** dialog box displays the following message at the bottom of the dialog box:

GeoTIFF option not available when Map projection is rotated due to raster or grid images.

Turn on Image Processing. On the **Layers** or **Explorer** windows, right-click on the map name and select **Map Options**. In the **Map Options** dialog box click **Image Processing**. In the **Image Processing** dialog box, select **Always** under **Reprojection Using**. Save the **Map** window to GeoTIFF format again.

Cropping Images When Saving to a File

When MapInfo Pro exports a window (by saving or printing to a file), it does not clip objects that extend beyond the edges of the windows, but it does export information about where the clipping is.

Other programs always honor the clipping of bitmap files. As for other formats, the behavior varies depending on the program that is used to display and print the file. Many programs, such as drawing programs, "explode" the file into individual objects. A file containing several country boundaries would explode into several polygon objects, one for each country. Programs like these usually ignore the clipping information that MapInfo Pro stores in the file.

Other programs, such as word processing programs and spreadsheets, typically open files as one compound object, without trying to explode them into component objects. These programs usually honor the clipping information and clip the contents appropriately.

For example, if you are exporting a Map window that displays part of Germany, but not all of it, the exported file contains the entire image of Germany. It also contains information about where MapInfo Pro clipped that image in its Map window. But when you open the exported window in your target application, a drawing package for example, the image of Germany may not be clipped.

Printing as Encapsulated Postscript (EPS)

If the available **Save Window As** formats are not appropriate for your needs, then you may want to send your output to an encapsulated postscript (EPS) file. This file type is widely used by service bureaus and print shops. There is not a set export or save command for EPS files. You must set up a postscript printer driver and print the map or layout to a file.

Printing to an Encapsulated Postscript (EPS):

1. From the Windows Control Panel, select **Printers**.
2. In Printer Setup choose **Add Printer**. The Add Printer Wizard displays.
3. Follow the wizard for the setup. Choose a postscript printer from the printer list, and select FILE as the available port. Enable the option to specify EPS.
4. Once the postscript driver is installed on your system, use that printer to print the map or layout to a file from MapInfo Pro.
5. On the **HOME** tab, in the **Output** group, click **Print** to open the **Print** dialog box.
6. Under printer name, select the postscript printer. Click **OK**.
7. The **Print to File** dialog box displays. Give your file a name and choose **Save**.

GELink Utility for Google Earth

GELink gives you a way to export and display MapInfo Pro raster and vector map data on top of detailed Google Earth™-hosted aerial photos from all over the world. You can export these maps as raster images (in .jpg format) or in Google data format (known as .kml).

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro Productivity Guide*.

What are Raster and Vector Maps?

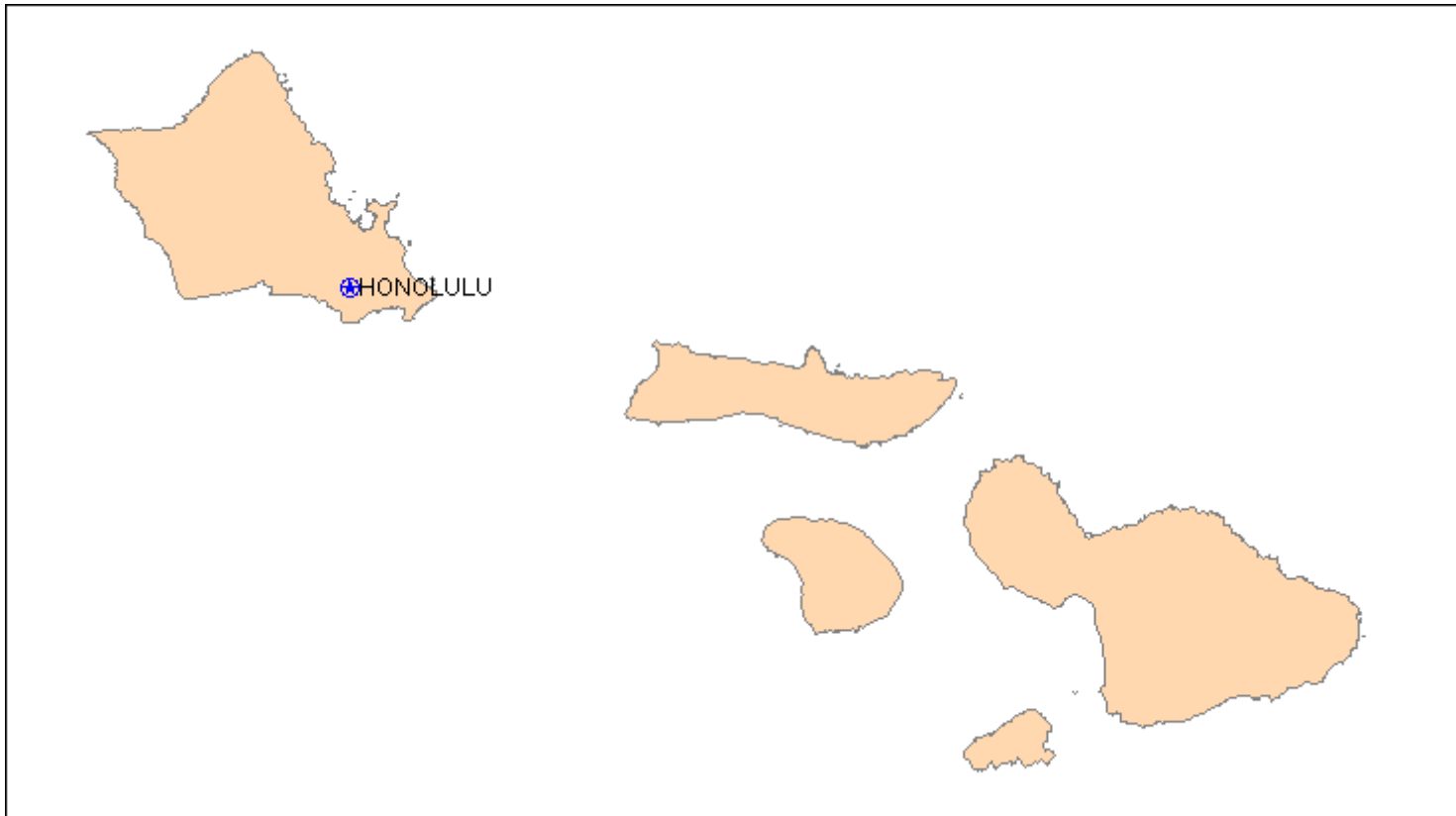
Raster maps are made up of columns and rows of pixels that can give you a high resolution picture of a particular geography. This is an example of a raster map.



Raster Map of a Section of the Hawaiian Islands

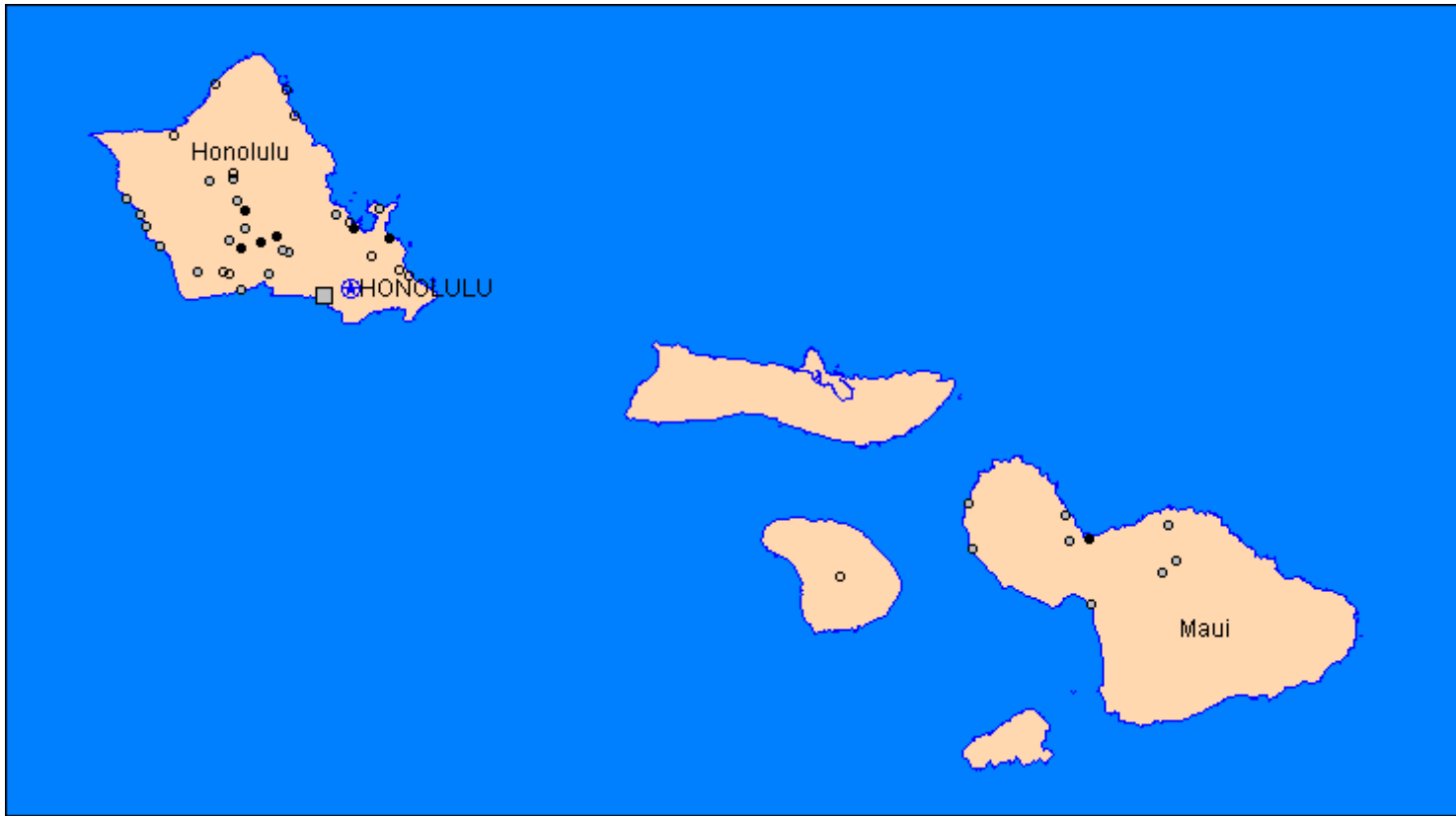
Raster maps can make visualizing your data more concrete because you can see it in relation to recognizable landmarks.

Vector maps are made of lines, text, and shapes that represent objects or groups of objects such as regions, landmarks, and streets. These types of maps can give you a sense of spatial relationship by allowing you to control which data displays and how it displays. With vector maps you can move the objects, shade them and place other data within the objects to provide more insight into the information you are depicting. The next figure is a vector map that shows an outline of the same area.



Simple Vector Map

When we add the ocean, cities, and labels, the same map starts to provide perspective.



More Complex Vector Map

You can export both types of maps from MapInfo Pro using the Link Utility to the Google Earth application.

Accessing the Link Utility for Google Earth

To access the Link Utility for Google Earth, add the **GELink** tool to the Tools Manager.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro Productivity Guide*.

Exporting a Map to Google Earth

Thematic maps and style overrides must be sent to the Google Earth application as a raster image.

To display a view of your point, line, or region thematic map on a Google Earth map:


1. Create the thematic map you want to display using the Link Utility. Refer to the *MapInfo Pro User Guide* for assistance.
2. Display the view you want to export in the Map window. The limits of your map view will represent the limits of your exported map.




Thematic Map before Export

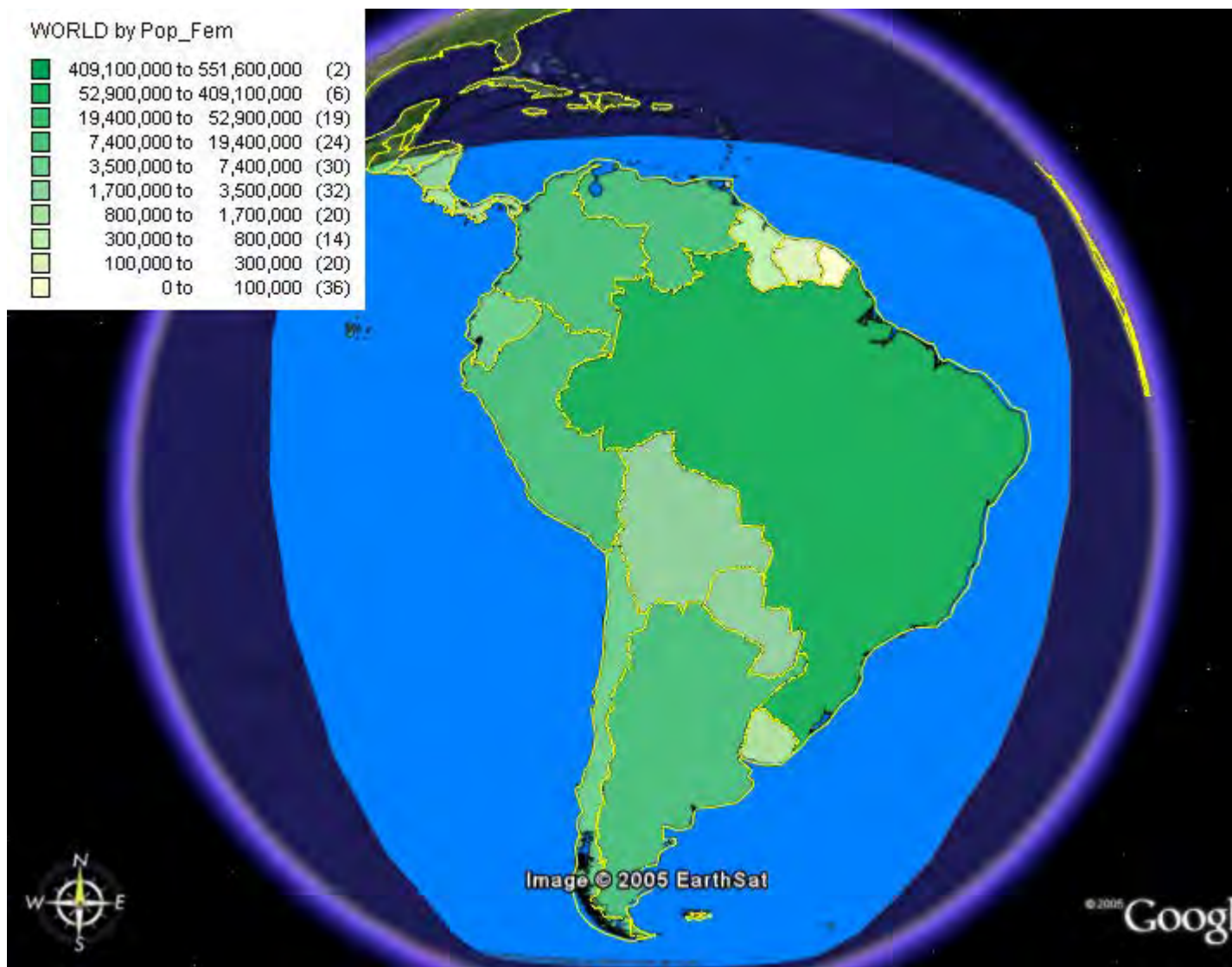
- 3. On the **HOME** tab, in the **Tools** list, right-click on **GELink** and click **Export Map Image or Current Selection to Google Earth**. The **Export to Google Earth** dialog box displays.

Note: Since you did not select a particular object in this image to export, the utility assumes you want to export the whole image as a raster map.

Output Path	Use the  button to select a folder or leave the current entry as is to accept the default location.
File Name	Type a new name for the file you are creating or accept the default entry.

Place Name	Indicates the name that displays in the Places list representing the map you are exporting. You can type over this entry or you can accept the default.
Specify a file containing the copyright text	Select the check box beside this option and use the  button to find the file that contains the copyright text.
Send to Google Earth Now	Select this option to save the raster file locally rather than displaying it in Google Earth.

4. Complete the entries in this dialog box. Click **OK**. If you did not select the Send to Google Earth Now option, the Google Earth map displays with the thematic map view you exported on it.



Thematic Map Exported to Google Earth with Legend

You can also export WMS and WFS images using this utility.

Enhancing the Display of your Exported Map

In the **Places** list, the **MapInfo Saved View** entry represents the exported thematic map.



When you export a MapInfo Pro map to the Google Earth environment, it displays under the Temporary Places section of the Places list. As you add new views, Google Earth stacks them in this list, placing the most recent map at the top of the list.

You can use the check box beside the **MapInfo Saved View** and **Thematic Legend** entries to display or hide the exported map or legend beside it. For example, if you add a new map, you may want to hide the previous map to see if it displays better.

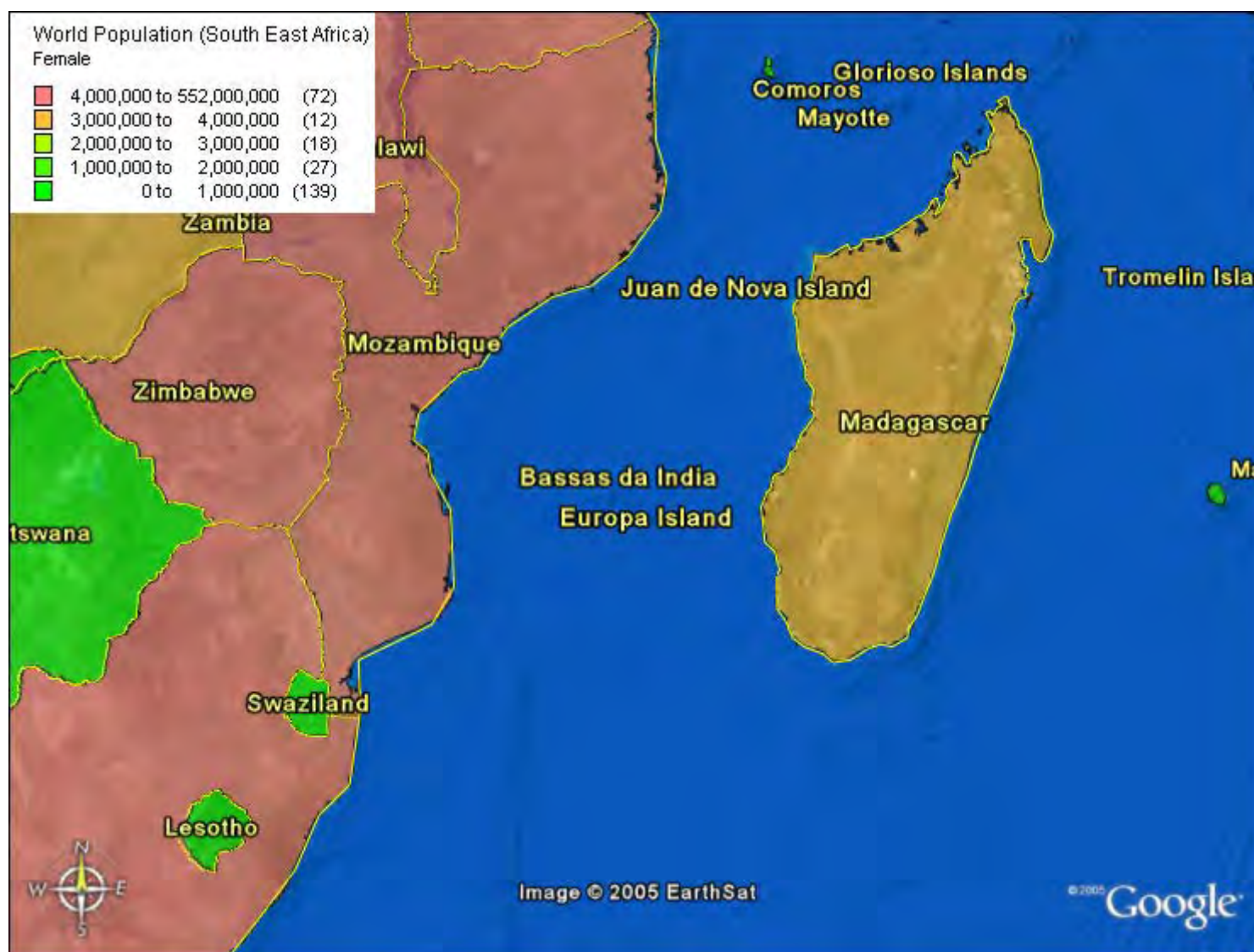
The horizontal scroll bar at the bottom of the list allows you to set the transparency of the thematic image. To change the transparency of the map and not the legend, highlight the **MapInfo Saved View** entry and use the scroll bar to get the desired effect.



Thematic Map Exported to Google Earth with Transparency Change

Exporting your Map Selection to Google Earth

When you want to export a map selection, you can export it as a vector map into .KML format. If you try to export a selected map object as a raster, the utility ignores the selection and exports the whole view instead.



Population Map: The labels and borders in this map are supplied by Google Earth. The legend was created in MapInfo Pro.


You can export your map selection as a vector map using the Google Maps .kml format. When you use this format, you preserve all of the data associated with those objects and can access that metadata in Google Maps. KML is an object description language similar to GML or XML.

To export the currently selected objects as .KML to Google Earth:

1. Display the map in MapInfo Pro.
2. Select the map object you want to export and on the **HOME** tab, in the **Tools** list, right-click on **GELink** and click **Export Map Image or Current Selection to Google Earth** to display the **Export to Google Earth** dialog box.

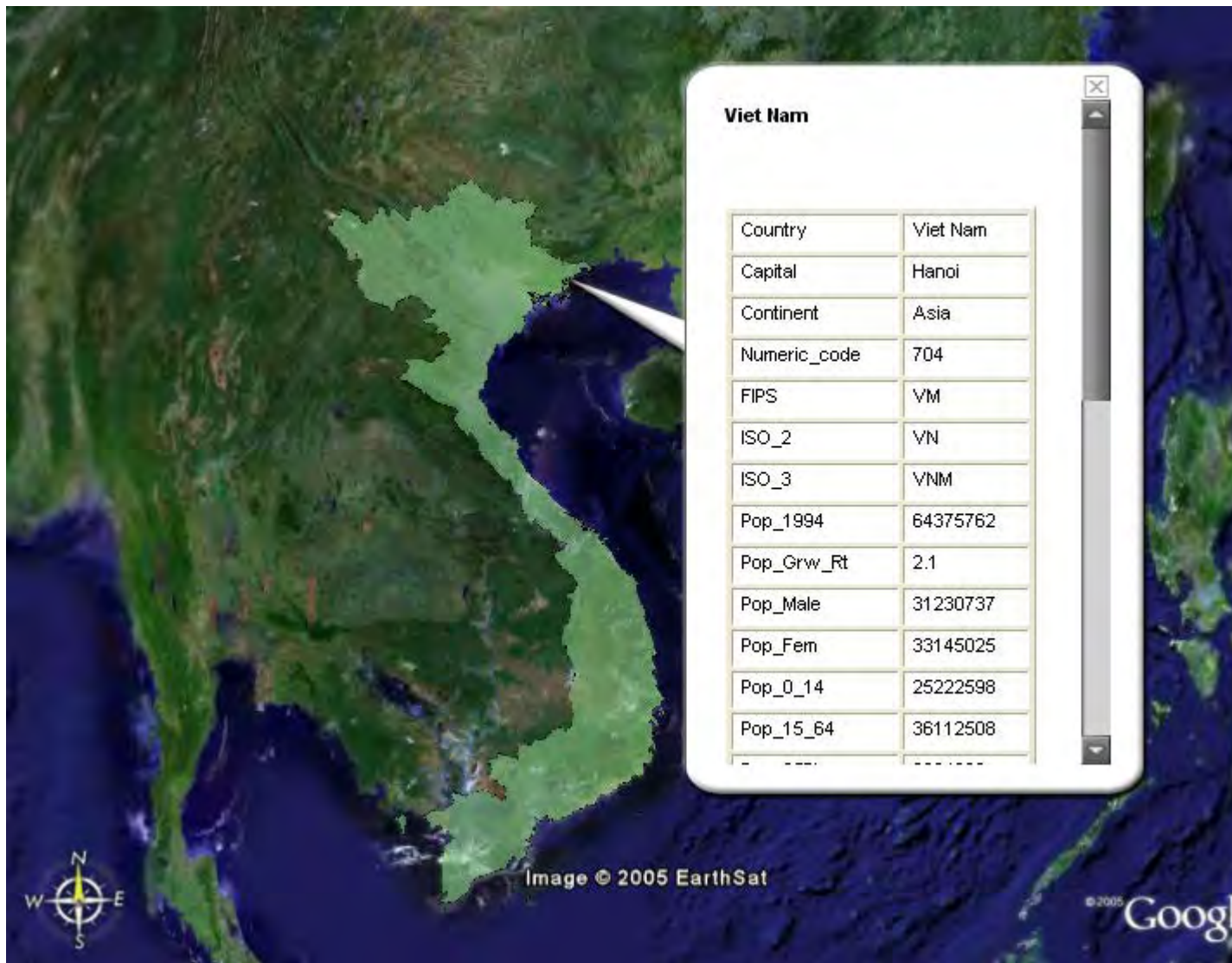
Note: This dialog displays when a Map window is the active window and you have selected an object in it. If you do not select any objects in the Map window, MapInfo Pro assumes that you want to send the map as registered raster image.

- To export the selected objects, click **Export selected objects (.KML)**. Click **OK**. The **Export Map Objects to Google Earth** dialog box displays.

Output Path	Use the  button to select a folder or leave the current entry as is to accept the default location.
File Name	Type a new name for the file you are creating or accept the default entry.
Description	Description of the layer.
Select the Source for the Place Name	Select the first button and type a place name in the first field or accept the MapInfo Saved Objects text as the place name for each object you are exporting. Select the second button and select the column name to provide the place name for each object you are exporting.
Follow Terrain	Select this button to position the selected objects in relation to the map terrain.
Height Value	Select this button and type the altitude (in meters) at which you would like to display the data field from the MapInfo Pro table. The utility uses the number in this table to create the altitude for each record. This field can only be populated by numeric fields.
Height Field	Select this button and choose the column that contains the height for each object you are exporting.
Extend Objects to Ground	Select this check box to display the map as specified in the settings above. Once you set an altitude value for a object, you can select the Extend Objects to Ground check box. When single-point objects display, a single line appears from the earth's surface to the object. When you display a line or a region, a geometric shape is drawn from the earth's surface to the line or region.

Choose Columns	Click this button and use the Choose Columns list to select a subset of the attribute columns for display. When you click OK , the utility uses the columns you selected. If you select Cancel , the utility uses the previously selected columns. See Choosing Columns to Display in Google Earth for complete instructions.
Send to Google Earth now	Click this button to save the raster file locally rather than displaying it in Google Earth.

4. Click the **OK** button to export the map with all of your selections in the Google Earth application.
5. In the Google Earth application, you can display the data associated with a particular area of the superimposed map. Click the **Place Name** and then double-click the region on the map. A data box displays.



Map with Data Box

Choosing Columns to Display in Google Earth

When you export map objects as a KML object to Google Earth, you can choose the data columns to be exported using the Choose Columns button. This might shorten the amount of time it takes to display the map when not all of the data in a map needs to be exported.

To select objects you want to export:

1. Open the data and select an object you want to export using MapInfo Pro.
2. Click **Google Earth** to display the **Export to Google Earth** dialog box.

Note: This feature only applies to the KML option because it is a vector image that can retain the data associated with it when you export it. This feature is not available if you select the raster image option.

3. Click **Export** selected objects (KML) and click **OK** to display the **Export Map Objects to Google Earth** dialog box. The **Choose Columns** button displays at the bottom.
4. To choose columns to send to Google Earth from the selected vector data, click **Choose Columns**. The **Choose Columns** dialog box displays.

The tool "remembers" the selections you make for this table in this dialog box from export to export as long as the Link Utility is loaded or MapInfo Pro is open. If you unload the tool, change tables, or close MapInfo Pro, the column selection reverts to All Columns.

Note: If you make no selections in this dialog box, no data is sent to Google Earth.

5. Highlight the columns you want to send to Google Earth and use the **Right Arrow** button to move them to the **Selected Columns** list. Click **OK** when you have selected all of the columns you want to export.

To remove a column from the **Selected Columns** list, highlight it and use the **Left Arrow** button.

Note: Use the **Shift** key to select multiple contiguous columns and the **Ctrl** key to select multiple non-contiguous columns.

6. Click **OK** in the **Export Map Objects to Google Earth** dialog box to begin the export process. MapInfo Pro only exports the columns you selected

Adding a Custom Copyright Message to Exported Raster Maps

When you export data from MapInfo Pro to Google Earth, you should credit the data company that provided the information. We have added functionality that allows you to do this from within the Link Utility for raster maps.

Note: You must download the Google Earth application and load the Link Utility for Google Earth tool in the Tools Manager before you can export your maps to the Google Earth process.

Adding a Custom Copyright Message

To add a custom copyright message to a raster map in the Google Earth window:

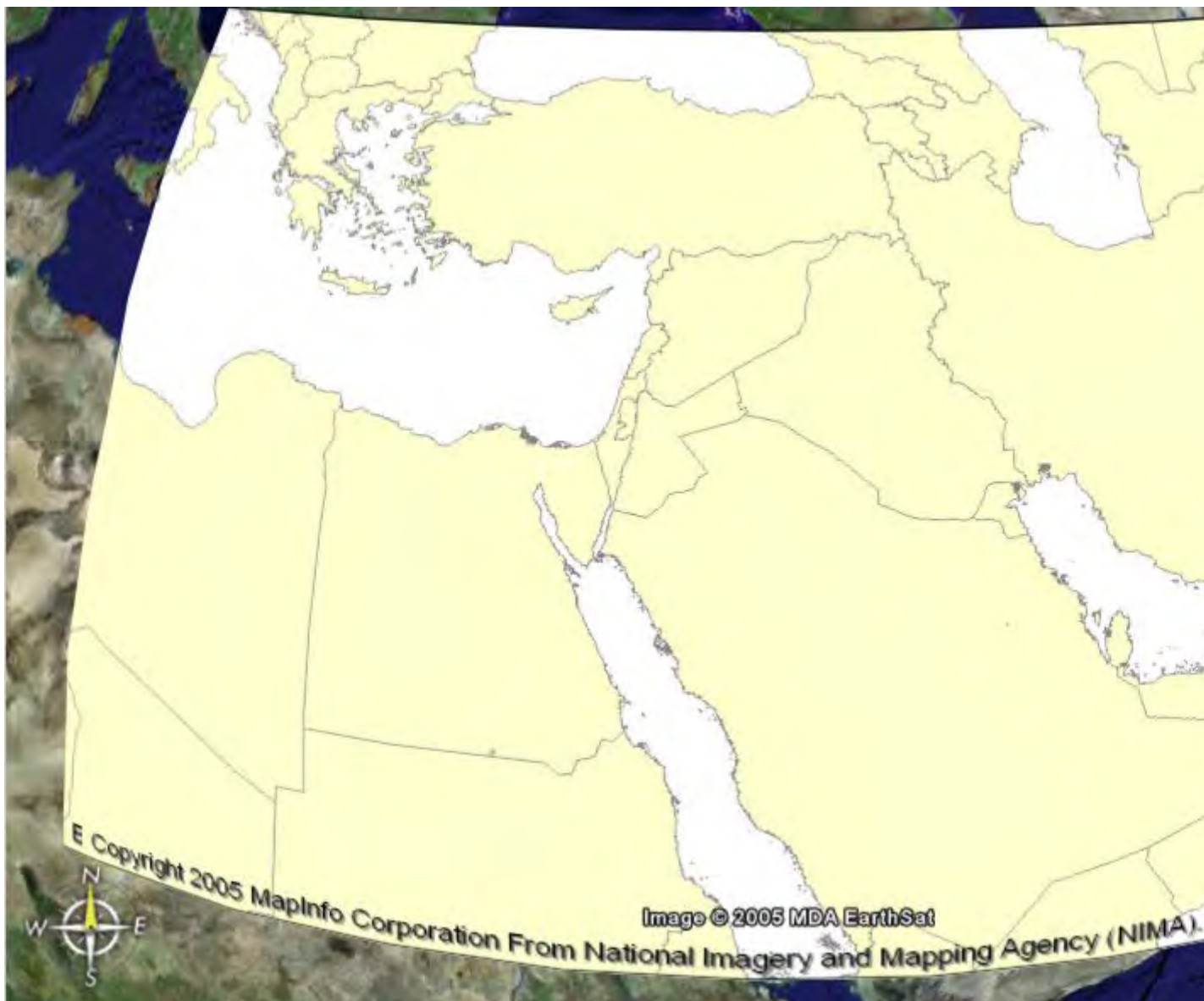
1. Open the data you want to export using MapInfo Pro.
2. Click **Google Earth** to display the **Export to Google Earth** dialog box.
3. Click **Export Map window as raster image (.JPG)** and click **OK** to display the **Export Map Image to Google Earth** dialog box. The **Specify a file containing the copyright text field** displays at the bottom.

The **Send to Google Earth Now** check box allows you to save the raster file locally rather than displaying it in Google Earth.

4. Select the check box beside the **Specify a file containing the copyright text** field and use the button to find the file that contains the copyright text.

Note: You may need to create this text file yourself.

5. Select the **Send to Google Earth now** check box and click **OK** to display the copyright data you selected on the Google Earth map you prepared.



Google Earth Map Containing Your Copyright Information

Important Google Earth™ Licensing Information

Google, Inc. provides three product levels to Google Earth, which you should investigate before using the Link Utility. For the most timely and complete Google Earth licensing options, please consult Google's web site and license agreement.

Please choose the Google Earth product that meets your organization's needs. Precisely does not authorize or license any of these products for your use.

Third-Party Data Licensing

When you use licensed data within MapInfo Pro to create files for export to Google Earth, make sure you have the appropriate rights from Precisely or the data provider to share those exported files with third parties.

Note: Depending on the data you use, you may be responsible for displaying a copyright on any maps that result from exporting maps from Precisely software. Additionally, you may be required to purchase additional data licenses.

Saving a Raster Reprojection to MWS for MapXtreme

Raster reprojection occurs when you open a registered raster image inside of a vector **Map** window with a different projection, or when you change the projection of a **Map** window. During the raster reprojection process, MapInfo Pro recalculates the pixel values of the source image to make them display correctly in the destination image. You could save this reprojection to .WOR-type workspaces and to the XML-format based MapInfo Workspace (.MWS) files used in MapXtreme.

To support this interoperability, we have created the RasterConditions XML element for raster reprojection. This element has 6 attributes, which are described below. Since not all of these attributes correlate to MapInfo Pro attributes, the missing MapInfo Pro attributes are set to the default values used in MapXtreme:

- **dither** - This attribute is set to **halfTone** (the other supported value for MapXtreme is **errorDiffusion**)
- **trueColor** - This attribute is set to **true** (the other supported value is **false**)
- **optimizeRasterLayers** - This attribute is set to **screen** (the other supported value is **printer**)
- **optimizeVectorLayers** - This attribute is set to **screen** (the other supported value is **printer**)

There are two attributes that are relevant to raster reprojection in MWS files that are initialized from a **Map** window and are directly translated to MapXtreme:

- **rasterReprojectionResampling** - This attribute can have values of **cubicConvolution** or **nearestNeighbor**.
- **rasterReprojection** - This attribute can have values of **none**, **always**, or **optimized**.

MapInfo Pro writes the RasterConditions element to the MWS workspace and defines all six attributes. This enables MapXtreme to open and display MapInfo Pro MWS files.

To save a MapInfo Workspace (.MWS) to use in MapXtreme:

1. On the **HOME** tab, in the **File** group, click **Save Workspace**, and select **Save Workspace As** from the drop-down list.
2. In the **Save Workspace** dialog box, type a name for the workspace and select the directory location to save it to.
3. From the **Save as type** drop-down list, select **MapInfo Workspace Format (.mws)**.

There are two MapInfo workspace formats, WOR and MWS. A .wor file is written using MapBasic and a .mws file is written using XML. The MWS format contains more information about the data sources than the WOR format does.

4. Click **Save**.

When you start your next session, you can open this workspace right from the **Quick Start** dialog box and continue where you left off.

Note: You can change the directory path that MapInfo Pro uses for opening or saving workspaces as a directory preference: on the **PRO** tab, click **Options**, and **Directories**.

11 - Configuring Preferences

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Summary of Preferences

Here is a brief description of the preference that may be set in MapInfo Pro.

System

- **System Settings** - Controls paper and layout units, what information is copied to the clipboard, the number of Undo objects permitted, and how MapInfo Pro handles 2-digit years.
- **Directories** - Specifies default directories for opening and saving tables, workspaces, MapBasic programs, import files, ODBC SQL queries, theme templates, saved queries, and new grids files. Also specifies the directories MapInfo Pro searches for tables without fully qualified paths referenced in workspaces or MapBasic programs.
- **Performance** - Sets how much of the operation to perform in parallel using more than one CPU or processor core when processing objects; when buffering an object in a table or selection, and with overlay operations.
- **Styles** - Sets the default object styles for region, line, symbol, and text objects.
- **Address Matching** - Controls the house number placement when specifying street addresses.
- **Notifications** - Sets the frequency of notifications and product updates when a new session of MapInfo Pro is initiated. A notification, typically, is a pop-up that will appear showing links to product updates or information. Clicking a link will redirect you to the hyperlink address on your web browser.
- **Startup** - Controls whether the program saves `MAPINFOPRO.WOR` upon exiting and loads it upon start up; whether queries are saved in workspaces; and the display of the **Quick Start** dialog box upon startup.
- **Web Services** - Sets refresh, timeout values, server options and other default settings for Proxy Servers, WMS, WFS, WMTS, Geocode server, Drivetime server, and Map Tile server web services.
- **Application** - Set whether to save or load ribbon customizations and commands on the ribbon, and whether windows have ribbons on them.
- **Custom Colors** - Allows you to create your own colors. You can either select the colors from a color palette or select the RGB values for the color.
- **Image Processing** - Sets the rules for raster reprojection allowing you to choose whether reprojection is allowed, when, and allows you to select resampling options.
- **Workspace** - Select to auto save workspaces at regular intervals, so that you do not need to remember to save. Include the state of the windows, such as location and size, and include tool windows.

Window

- **Map Window** - Sets the default **Map** window options; moving duplicate nodes; snap tolerance; units for distance and area; display of scroll bars in the **Map** window; display of degrees in either decimal or degrees, minutes, seconds form; and the display of InfoTips.

- **Layers** - Sets what to show in the Layer Control window (or panel in the Explorer window), such as all maps, only active maps, or a collapsed list. Select to show a confirmation before removing layers, tooltips in the layer list, and icons for styles or layer types.
- **Browser Window** - Sets the color to use for the background on alternating rows in the **Browser** window.
- **MapBasic** - Sets whether to execute commands in the **MapBasic** window when pressing the **Enter** key, and enables syntax highlighting.
- **Explorer** - Sets what to show in the **Explorer** window, such as maps, windows, tables, and connections, and to remember the height of each of these sections in the window.
- **Task Manager** - Sets a notification for when tasks complete.
- **Legend Window** - Sets the legend frame default settings as well as swatch size and view preferences.
- **Window List** - Sets to show commands in the window groups (on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Windows** from the list).

Devices


- **Printer** - Controls which printer information is used for all new windows. This printer can be the Windows default printer, or a printer you designate as your MapInfo Preferred printer. This choice can be overridden on a per window basis using either the **Print** or **Page Setup** dialog boxes.
- **Output Settings** - Controls the on-screen display of a raster file, the printer output, and exporting choices.

Add-Ins

Additional preferences may be available if you purchased utilities that add on to MapInfo Pro.

Setting Your Preferences

To set a preference:

1. On the **PRO** tab, click **Options**, and choose an option to open its preference dialog box. For example, choose **Map Window** to open the **Map Preferences** dialog box.
2. Set your preferences and click **OK** to save them.
3. Click the back arrow  to leave the **PRO** tab.

What follows in this section are details to assist you in setting your preferences.

Setting Your System Preferences

Use the **System Settings Preferences** dialog box to control the default settings that affect how MapInfo Pro interacts with your system.

To set your system settings preferences:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.

Note: For details about this dialog, see [System Settings Preferences Dialog Box](#).

2. Select your system preferences for MapInfo Pro.
3. Click **OK** to close the dialog and save your settings.

Setting Your Default Units

You can set the default paper and layout units, distance units, and area units as a software preference.

To set your default units:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.
2. In the **Units** panel, select from the following drop-down lists:
 - **Paper and Layout Units** - Specifies the units when you measure the size of objects in a layout and the size of paper in the **Print** dialog boxes. Choose a unit of measurement from the drop-down list. The default is set to **inches**. You can choose: inches, picas, points, millimeters, and centimeters.
 - **Distance Units** - Specifies the default distance units you want to use for all subsequently created maps. Options include: US Survey feet, yards, rods, chains, miles, nautical miles, millimeters, centimeters, meters, and kilometers.
 - **Area Units** - Specifies the default area units you want to use for all subsequently created maps. Options include: square inches, square links, square feet, square yards, square rods, perches, square chains, roods, acres, square miles, square nautical miles, square millimeters, square centimeters, square meters, hectares, and square kilometers.
3. Click **OK** to close the dialog and save your settings.

Setting Your Undo Options

To set your undo options in MapInfo Pro:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.
2. • **Number of Undo Objects** - Enter the number of objects (0 to 800) that can be undone. For example, if you specify the number 50, and then you perform a single editing operation that affects more than 50 objects, you will not be able to undo the operation. The number of undo objects can also affect the performance of MapInfo Pro.

The default is 10 objects. You can set it from 0 to 800. Setting the number of objects to 0 deactivates the system. After you use the **Undo** option, the system toggles to **Redo**.

Note: You cannot use the **Undo** capability for the following operations: Revert, Save, Save As, or Modify Table, or any operations whose effects are primarily cosmetic.

- **Memory Size for Undo** - Indicates the memory size in bytes for **Undo** operations. Maximum is 10,000,000 bytes. The default is 1,000,000 bytes; increasing this entry may result in slower response time.

For **Undo** to be available on the **HOME** and **SPATIAL** tabs, the selected object(s) must be smaller in size than this setting.

3. Click **OK** to close the dialog and save your settings.

Setting Color Defaults Options

This setting is not available in the 64-bit versions of MapInfo Pro.

Setting Encode Workspaces and Tab Files

Select to use characters from any language, so MapInfo Pro can open tables, files, or workspaces with Unicode characters in the file name or path name regardless of the locale of MapInfo Pro or which localized version of MapInfo Pro you are running.

Disable this option to share MapInfo tables with version of MapInfo Pro that are older than version 15.2, to share data with applications that do not support the UTF-8 character set, or when you use data from only one language. Workspaces and tables are written with the current system character setting (charset).

When enabled, this option writes workspaces using the UTF-8 charset. New Tab files or Tab files being re-written, such as save copy as, pack table, update friendly name, or update metadata, use the UTF-8 encoding. The !charset in the .tab file remains the same – it represents the data in the table and not the charset of the .tab file itself. MapInfo Pro writes a UTF-8 Byte Order Mark (BOM) at the beginning of the file, so that other applications recognize the encoding.

When **Encode Workspaces and Tab Files** is enabled and you are opening an Excel or Access file for import into MapInfo native TAB format, the resulting tables (TAB files) are in UTF-8 format. When opening an instance of an Excel, ASCII, CSV, or Lotus 1-2-3 data type and **Create Copy in MapInfo Format** is checked on the Open Table dialog, the resulting table is in MapInfo Extended format with a default character set (charset) preference set to NativeX (MapInfo Extended). When reading from or writing to a .QRY file, the file opens using the UTF-8 character set.

Click **OK** to close the dialog and save your settings.

Setting True Color Cursors

Check to display 32-bit per pixel cursors. This is the default setting, which displays visually optimal cursors.

Clear to display 1-bit per pixel cursors, which display in black and white. You would do this when working in a Citrix XenApp environment, so that there is no delay rendering cursors.

Click **OK** to close the dialog and save your settings.

Setting Your Date Window for Two-Digit Years

MapInfo Pro converts two-digit input into four digit years using the current century for the dates (so that 14 becomes 2014). If your data includes dates in the 1900s, then you can turn on date windowing to select a pivot year below which to use the previous century. If you specify the number 50 as the pivot year for your data, then the years entered as 00-49 become 2000-2049 and years entered as 50-99 become 1950-1999.

To turn on date windowing:

1. On the **PRO** tab, click **Options**, and click **System Settings** to open the **System Settings Preferences** dialog box.
2. Select **Set date window to** and enter a number from 0-99 that will be the pivot year below which to use the previous century.

The number you enter is shown in the example, which illustrates how the date will display with the prefix 19 or 20. If you enter the number 14, then the example display as:

Years entered as 00-13 become 2000-2013

Years entered as 14-99 become 1914-1999

3. Click **OK** to close the dialog and save your settings.

If you select the **Turn date windowing off** option, then MapInfo Pro uses the current century for two-digit dates.

Setting Your Copy to Clipboard Preferences

By default, MapInfo Pro copies text, bitmaps, metafile items, and Map objects to the Clipboard. You can choose which of these objects copy to the Clipboard as a software preference.

To set how you would like to copy objects to the Clipboard:

1. On the **PRO** tab, click **Options**, and click **System Settings** to display the **System Settings Preferences** dialog box.
2. Select the check boxes for those objects you want to copy to the Clipboard, or clear check boxes for those objects that you do not.
 - **Copy Text to Clipboard** - Check to specify that you want text copied to the Clipboard.
 - **Copy Bitmap to Clipboard** - Check to specify that you want Bitmaps copied to the Clipboard.
 - **Copy Windows Metafile (WMF) to Clipboard** - Check to specify that you want metafiles copied to the Clipboard.
3. Click **OK** to close the dialog and save your settings.

Setting Your Clipboard to Copy Maps in to Word, Excel, or PowerPoint

To copy a map to the Clipboard and then past it in to a Microsoft Office document, such as Word, Excel or PowerPoint, you must first customize the Clipboard behavior so that only specific types of metafiles copy to the Clipboard.

1. On the **PRO** tab, click **Options**, and click **System Settings** to open the **System Settings Preferences** dialog box.
2. In the **Copy to Clipboard** group, check the **Copy Enhanced Metafile (EMF) to Clipboard** check box.
3. Choose one of the following:
 - **Copy EMF to Clipboard** - Choose this if you expect to bring your maps into an application that supports only EMF, such as Microsoft's Office 2003.
 - **Copy EMF+ to Clipboard** - Choose this if you expect to bring your maps into an application that supports EMF+, such as Microsoft Office 2007 or 2010.
 - **Copy EMF+ Dual to Clipboard** - Choose this (a combination of EMF and EMF+) to use your maps in applications that may or may not support EMF+, such as when you have Microsoft's Office 2003 and Office 2007 on the same machine.

Note: EMF+Dual format will produce a larger file than EMF+. But it provides better compatibility with older application that do not support EMF+.

4. Click **OK** to close the dialog and save your settings.

Setting Your Image Resolution for Exporting

You can control the resolution of a window when exporting it using a software preference. MapInfo Pro uses this preference whenever you copy windows to the Clipboard, export your work to metafile and raster formats, and use the **Save Window As** export process. If you do not set this resolution manually, the product assumes 96 dpi. The maximum setting for this field is 1200 dpi.

To set your image resolution preference:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.
2. In the **Window Export and Clipboard Resolution** box, type a new dpi value between 96 and 1200. The default is 96 dpi, which is the screen resolution.
3. Click **OK** to close the dialog and save your settings.

Setting how to Draw Symbols for MapInfo Pro 4.0 or Earlier

You can indicate how you want to draw symbols from early versions of MapInfo Pro (before 4.0). By default, MapInfo Pro draws these vector symbols using the True Type font. You can change the default to use characters from the MapInfo Symbols font.

To draw vector symbols with characters from the MapInfo Symbols font:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.
2. Select the **Display Pre-Version 4 Symbols Using TrueType Font** check box.
Check this to draw vector symbols with characters from the MapInfo Symbols font. Clear this check box to draw vector symbols (default).
3. Click **OK** to close the dialog and save your settings.

Setting Display Vertical Mapper GRD Files

This setting is not available in the 64-bit versions of MapInfo Pro.

Setting Touch Screen

Use this setting to enable or disable the multi-touch functionality on your touch screen device. The multi-touch is enabled by default, clear **Enable Multi-touch** check box to disable it.

Click **OK** to close the dialog and save your settings.

Setting New Tables

To set your New Tables options in MapInfo Pro:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.
2. • **Format**- Select the file format to use as the default when creating new tables via the **Create New Table Dialog Box** or the **Save Copy of Table as Dialog Box**. The two choices are MapInfo (*.tab) and MapInfo Extended (*.tab). MapInfo (*.tab) is the initial default.

When working with files that have more than 2GB of data, select MapInfo Extended (*.tab), which is the enhanced version of the native MapInfo TAB file format. The extended format expands record and field lengths along with the number of fields per table, so that you can work with more data without using seamless tables.

- **Charset -**

This only applies to MapInfo Extended (*.tab) files. Select the default character set, such as UTF-8 or UTF-16, to apply when creating a new table via the **Create New Table Dialog Box**, the **Save Copy of Table as Dialog Box**, or the **Save Objects to Table Dialog Box** (**Save Cosmetic Objects Dialog Box**). The UTF-16 character set is the default.

Note: MapInfo native files, MapInfo (*.tab), default to the system character set.

3. Click **OK** to close the dialog and save your settings.

Setting Your Startup Preferences

You can set preferences for how MapInfo Pro behaves when you start the software for:

- Showing or hiding the **Quick Start** dialog box.
- Using a default DBMS connection.

- Your `MAPINFOPRO.WOR` workspace properties such as whether printer information and queries are saved to workspaces.

To set your startup preferences for MapInfo Pro:

1. On the **PRO** tab, click **Options**, and **Startup** to open the **Startup Preferences** dialog box.
2. Select from the following preferences:

- **Save MAPINFOPRO.WOR when Exiting MapInfo** - Select this check box to save your setup to the `MAPINFOPRO.WOR` workspace when you exit MapInfo Pro. When you clear this check box, MapInfo Pro does not save the `MAPINFOPRO.WOR` unless you save it explicitly.
- **Load MAPINFOPRO.WOR when Starting MapInfo** - Select this check box to display `MAPINFOPRO.WOR` when you enter MapInfo Pro.

Note: To enable this check box, you must clear the **Display Quick Start Dialog** check box.

- **Save Queries in Workspaces** - Select this check box to save the queries you create during a mapping session in the workspace. If you do not select this check box and the selected map has only one layer based on a query, the query is not saved and the application writes a map definition with an empty layer list. MapInfo Pro cannot support subselects in queries.

Note: The operators `Any` and `All` are not supported in the MapXtreme 2004 or later versions of MapInfo SQL and, therefore, subselects are not supported either. MapInfo Pro cannot map selections with `Group By`, so `Group By` clauses are ignored. MapInfo Pro only translates the `Order By` clause.

- **Save Printer Information into Workspaces** - Select this check box to save the printer name, paper orientation, paper size, and the number of copies from your printer settings into the workspace. This also includes any overrides you might have made to the default printer settings in the Printer preferences. We recommend that you leave this preference on.
- **Restore Printer Information to Workspaces** - Select this check box to restore the printer name, paper orientation, paper size, and the number of copies when you open the workspace. This is useful if you are sharing workspaces with other MapInfo Pro users who are also using the same printers.

Note: If this preference is turned off, or if the printer indicated is not available, the printer settings for the workspace revert to the default printer set in the Printer preferences.

- **Default DBMS Connection** - Select this check box to set a DBMS connection that will open each time you begin a MapInfo Pro session. Click **Set** to select the connection.
- **Display Quick Start Dialog** - Select this check box to display the **Quick Start** dialog box automatically when you start MapInfo Pro. This check box is selected by default. Clear the **Display Quick Start Dialog** check box to prevent it from displaying when you start subsequent MapInfo sessions.

3. Click **OK** to close the dialog and save your settings.

Creating a Startup Workspace

`STARTUP.WOR` is the name you give to a workspace which MapInfo Pro runs at startup. You can create it so that MapInfo Pro automatically opens various tables and windows on startup. When you use `STARTUP.WOR`, MapInfo Pro performs the startup actions regardless of what you did in your previous session or how you have set preferences for `MAPINFOPRO.WOR`.

To create a workspace:

1. Open the tables and windows you want in your workspace. Size and position them as you please.
2. On the **HOME** tab, in the **File** group, click **Save Workspace**.
3. Name your workspace "Startup" and save the workspace into your "home" directory. By "home" directory we mean your private Windows directory.

When you run MapInfo Pro, the following occurs in the order shown:

1. If there is a `STARTUP.WOR` in the MapInfo Pro program directory, it is run.
2. Then, if there is a `STARTUP.WOR` in your home directory it is run. (When there is a `STARTUP.WOR` in both the MapInfo Pro program directory and your home directory, both will run.)
3. Then, if any file names are given on the command line-or if you double-click a document, MapInfo Pro loads those files. MapInfo Pro supports adding workspaces (`.WOR`), running applications (`.APP`), and opening databases (`.TAB`) on the command line.
4. Only if MapInfo Pro did not add a workspace or run a program from the command line, does it then check the **AutoLoad** preference and load `MAPINFOPRO.WOR` from the user's home directory. When the preference is set, and the file is found, it is loaded. Note that if we had a workspace or application on the command line, we skip the AutoLoad.
5. Finally, if MapInfo Pro did not load a workspace or run an application from the command line, and it did not AutoLoad `MAPINFOPRO.WOR`, then MapInfo Pro shows the **Tool** palette.

Workspace Options Settings

Save MapInfoPro.WOR when Exiting

If checked, your work setup will be automatically saved as the `MapInfoPro.WOR` workspace when you exit.

Load MapInfoPro.WOR when Starting

If checked, the `MapInfoPro.WOR` workspace will automatically be loaded when MapInfo Pro is started.

Save Queries in Workspaces

If checked, queries will automatically be saved in workspaces when you exit MapInfo Pro.

Save Printer Information into Workspaces

If checked, printer information will be saved for each window. The workspace will include information that overrides the printer specifications made in the **Printer Preferences** dialog box.

Restore Printer Information from Workspaces

If checked, printer information will be restored for each window when opening a workspace. If the printer designated in the workspace is not available or this option is not checked, then the default printer set on the **PRO** tab, by clicking **Options**, and **Printer** is used.

Setting Your Database Connection Preferences

If you have a favorite database connection setting, we have established a startup preference setting to create that connection automatically at the beginning of your session.

To set your database connection startup preference:

1. On the **PRO** tab, click **Options**, and **Startup** to open the **Startup Preferences** dialog box.
2. Click **Set** to open the **Select DBMS Connection** list.
3. Select an existing entry in the list. Click **OK** to accept the preference.

To establish a new database connection. Click **New** and select the connection type you want to search for.

- If you select **ODBC**, the **Select Data Source** dialog box displays and you can search for the ODBC database from this dialog box. Select the database connection and click **OK** to return to the **Startup Preferences** dialog box.
- If you select **FDO (SQLite)**, the **Select Data Source** dialog box displays and you can search for the SQLite database from this dialog box. Select the database connection and click **OK** to return to the **Startup Preferences** dialog box.

After selecting a DBMS connection, it displays in the **Default DBMS Connection** field and is set to connect each time you open MapInfo Pro.

4. Click **OK** to close the dialog and save your settings.

You can also make a DBMS connection from any of these three dialog boxes: **Open**, **Create New Table**, and **Save Copy As**.

Note: For database versions that MapInfo Pro supports, see the *MapInfo Pro Install Guide*.

Display Welcome Window Settings

Display Welcome Window

If checked, the **Welcome Window** is displayed on application startup.

Workspace Preferences Settings

To display this dialog box, on the **PRO** tab, select **Options** and then click **Workspace**.

Use the **Workspace Preferences** dialog box to change workspace saving and backup behavior.

Auto Save Workspace every

If checked, enables auto saving of the current workspace at the specified time interval.

Autosaved workspaces are saved alongside the workspace, and have a filename of the form: <workspace>_autosave.wor.

Backup On Save

If checked, a backup of the current workspace will be created each time it is saved.

This is saved alongside the workspace with filename <workspace>_backup.wor.

Prompt to Save

If checked, MapInfo Pro will prompt to save the workspace when you close all tables or exit the application, if there is any unsaved edit. Prompt appears depending on the selection from the dropdown.

Automatic

MapInfo Pro will prompt to save when you close all tables or exit the application, in the following scenarios:

- If you have a workspace open with unsaved edits in it.
- If you have only tables open, not workspace, with unsaved edits in it. In this case, workspace is referred to as untitled.wor.
- If you have multiple workspaces open with unsaved edits in it. In this case, workspace is referred to as untitled.wor.

Only when I have an open workspace

MapInfo Pro will prompt to save when you close all tables or exit the application, only if you have a workspace open with unsaved edits in it.

The default behavior of MapInfo Pro is to have the **Prompt to save** check box selected with **Automatic** selection from the dropdown.

Options

These options can change what information is included in a saved file.

Include Window Location, State or Size Changes

If checked, a workspace will be marked as needing to be saved when a document window is moved, resized, floated, docked or hidden.

Include Tool Windows with Workspace

If checked, the location and size of all open Tool windows will be saved along with the workspace.

Define Custom Colors Settings

To display this dialog box, on the **PRO** tab, select **Options** and then click **Custom Colors**.

Use the **Define Custom Colors** dialog box to choose an existing color from MapInfo Pro's pallet to create a new color from. When the new color is saved, it becomes a permanent color on the palette.

Save Colors

Click to save the current palette is for future work sessions. The customized colors automatically replace the original colors on the palette. When the box is clear, any color changes you make are lost when you exit MapInfo Pro.

Note: You might want to record the color settings for the original colors before making changes, because you cannot automatically return to the original colors.

Define

Click this button and the **Pick Color** dialog box displays. Use this dialog box to specify values for **Hue**, **Sat (Saturation)**, **Val (Value)** or **Red**, **Green**, and **Blue** for your new color.

Application Preferences Settings

To display this dialog box, on the **PRO** tab, select **Options** and then click **Application**.

The **Application Preferences** dialog box provides settings to control ribbon customizations, tool windows, and to add ribbons to floating windows.

Ribbon Customizations and Main Window

Ribbon Tab Switching

Controls how to change the Ribbon tab when activating a document window. Choose an option from the drop-down list.

- **None** does not change the Ribbon tab when opening a new document window. The current Ribbon tab remains selected.
- **Last Tab** changes the Ribbon tab based upon the open document window. For instance, with two open Map windows the user can specify a Ribbon Tab for each of them.
- **Automatic** changes the Ribbon tab based upon the type of open document window. For instance, with two Map Windows open, these will maintain the same Ribbon Tab when the user changes one of them. Whereas a different document window, such as a Layout window, can have a different Ribbon tab.

Load State on Startup

Check to load saved main window position, Quick Access Toolbar, and Ribbon customizations on startup.

Save State on Exit

Check to save main window position, Quick Access Toolbar, and Ribbon customizations on exit.

Save Current State

Save current main window position, Quick Access Toolbar, and Ribbon customizations.

Delete State File

Delete the Ribbon customization file.

Tool Windows

Create on Startup

Check to create any (visible or hidden) tool windows that have had their docking position saved.

Save on Exit

Check to save visible or hidden tool window docking position on exit.

Save Current Positions

Save current docking position of visible or hidden tool windows.

Delete State File

Delete the tool window docking state file.

Enable Ribbon on Floating Windows

Map

Check to turn on floating map window ribbon. Uncheck to turn off floating map window ribbon.

Browser

Check to turn on floating browser window ribbon. Uncheck to turn off floating browser window ribbon.

Layout

Check to turn on floating layout window ribbon. Uncheck to turn off floating layout window ribbon.

Redistricter

Check to turn on floating redistricter window ribbon. Uncheck to turn off floating redistricter window ribbon.

User Experience Improvement Program

Participate in the User Experience Program

Check to turn on or clear to turn off your participation in the MapInfo Pro user experience program. When you first run MapInfo Pro after installation you are asked if you would like to participate in the program. You can change your setting here. Your change takes place immediately within the session.

Learn More

Click this link to find out more about the MapInfo Pro user experience program.

Setting Your Directory Preferences

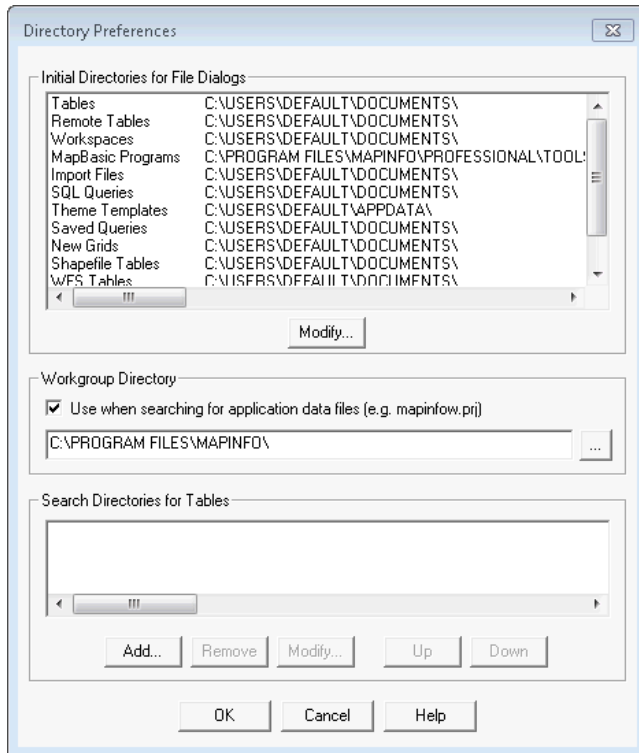
You can specify the default directories in which MapInfo Pro looks for files as a software preference. You can specify directories for:

- Tables
- Remote tables
- Workspaces
- MapBasic programs
- Import files
- DBMS SQL queries
- Theme templates
- Saved queries
- New grids
- Shapefile tables
- WMS tables
- WFS tables
- WMTS tables

The default directories that you set display in the dialog boxes when you open or save files. This includes the four locations that are part of the **Open** dialog box. When you open a file, you can select an icon from the **MapInfo Places Bar** for what you set, such as a **Workspace Directory** icon to display the workspace directory that you set as a preference.

To set your directory preferences:

1. On the **PRO** tab, click **Options**, and **Directories** to open the **Directory Preferences** dialog box.



2. In the **Initial Directories for File Dialogs** list, select a preference and then click **Modify**. The **Choose Directory** dialog box opens.
3. Enter a new directory location and click **OK**.
4. Repeat this process until you have set all of the preferences that you need to.
5. If you are accessing your application data files and other configuration files (Mapinfo.prj, templates, and custom symbols) remotely, select the **Use when searching for application data files** check box and enter the path to the remote location in the field below. This field is usually pre-filled for you.
6. Click **OK** to close the dialog and save your settings.

You can use this preference to search for raster and grid tables. If you open a *.tab file for a raster or grid image and the image file cannot be found an attempt is made to find the image in the same location as the .TAB. If the image file is not found, it will then use the search directories.

Initial Directory Preferences for Files

In addition to the four locations found in the **Open** dialog box, several other preferences can be set in the **Directory Preferences** dialog box. The default directories shown in the following assume that MapInfo Pro was installed to C:\Program Files or show the Windows 7 default user folder (C:\Users\ (user-name) \).

Directory Preference	Default Directory
Tables	<p>The location of Tables Directory in the Open dialog box. The default is:</p> <p>C:\USERS\ (user-name) \DOCUMENTS\</p> <p>To open this dialog box, on the HOME tab, in the File group, on the Open list, click Table.</p>
Remote Tables	<p>The location of Remote Tables Directory in the Open dialog box. The default is:</p> <p>C:\USERS\ (user-name) \DOCUMENTS\</p> <p>To open this dialog box, on the HOME tab, in the File group, on the Open list, click Database Table.</p>
Workspaces	<p>The location of Workspaces Directory in the Open dialog box. The default is:</p> <p>C:\USERS\ (user-name) \DOCUMENTS\</p> <p>To open this dialog box, on the HOME tab, in the File group, on the Open list, click Open Workspace.</p>
MapBasic Programs	<p>The location of the MapBasic tools that install with MapInfo Pro:</p> <p>C:\PROGRAM FILES\MAPINFO\PROFESSIONAL\TOOLS\</p> <p>MapBasic tools are accessed on the HOME tab by clicking Tool Extensions in either the Tools groups or Tool Windows list in the Windows group. From the Options drop-down list, click Run Program.</p> <p>Working with MapInfo Pro Tools</p>
Import Files	<p>The location of Import Files Directory in the Open dialog box. The default is:</p> <p>C:\USERS\ (user-name) \DOCUMENTS\</p> <p>To open this dialog box, on the HOME tab, in the File group, on the Open list, click Import.</p>
SQL Queries	<p>When opening DBMS tables, you can create SQL Queries (file extension .SQL) in Expert Mode in the Open DBMS Table Options dialog box. These queries save to the default:</p> <p>C:\USERS\ (user-name) \DOCUMENTS\</p> <p>Creating Your Own Table Filter</p>

Directory Preference	Default Directory
Thematic Templates	<p>When creating a thematic map, you can save your theme settings to a template to use again. The default location is:</p> <p><code>C:\USERS\ (user-name) \DOCUMENTS\</code></p> <p>To save a thematic map template:</p> <ol style="list-style-type: none"> 1. On the MAP tab, in the Content group, click Add Theme to open the Create Thematic Map wizard. 2. On the Create Thematic Map - Step 3 of 3 panel click Save to save the theme preferences that you just set in the wizard. <p>Creating a Map by a Range of Values</p> <p>Step 3 - Customizing Your Thematic Map</p>
Saved Queries	<p>When creating SQL queries, you can save the query to a template to use again. The default location is:</p> <p><code>C:\USERS\ (user-name) \DOCUMENTS\</code></p> <p>To save a SQL query:</p> <ol style="list-style-type: none"> 1. On the SPATIAL tab, in the Selection group, click SQL Select to open the SQL Select dialog box. 2. Enter the query you want to save and then click Save Template. <p>Querying Your Data in MapInfo Pro</p> <p>Using Templates for Queries</p>
New Grids	<p>When creating a grid thematic map, you can save your grid theme settings to a grid file to use again. The default location is:</p> <p><code>C:\USERS\ (user-name) \DOCUMENTS\</code></p> <p>To save a grid file:</p> <ol style="list-style-type: none"> 1. On the MAP tab, in the Content group, click Add Theme to open the Create Thematic Map wizard. 2. On the Create Thematic Map - Step 1 of 3 panel click Grid, select a template name and then click Next. 3. On the Create Thematic Map - Step 2 of 3 panel, in the Grid File Name box enter a new default location to save grid files to. <p>Creating a Grid Surface Thematic Map</p> <p>Step 2 - Choosing Thematic Values</p>
Shapefile Tables	<p>When opening a Shape file, you can set a location to place the .TAB file. The default is:</p> <p><code>C:\USERS\ (user-name) \DOCUMENTS\</code></p>

Directory Preference	Default Directory
WMS Tables	When connecting to a WMS (Web Map Service), you can set a location to place the TAB file. The default is: <code>C:\USERS\ (user-name) \DOCUMENTS\</code>
WFS Tables	When connecting to a WFS (Web Feature Service), you can set a location to place the TAB file. The default is: <code>C:\USERS\ (user-name) \DOCUMENTS\</code>
WMTS Tables	When connecting to a WMTS (Web Map Tile Service), you can set a location to place the TAB file. The default is: <code>C:\USERS\ (user-name) \DOCUMENTS\</code>

Using Search Directories

Use the Search Directories for Tables and Workspaces to specify search paths that MapInfo will use to look for tables referenced in workspaces or MapBasic programs that do not have fully qualified paths.

To search directories for tables and workspaces:

1. On the **PRO** tab, click **Options**, and **Directories** to open the **Directory Preferences** dialog box.
2. To specify a search path, in the **Search Directories for Tables** group, click **Add**
3. Specify a drive and directory in the **Choose Directory** dialog box and click **OK**.

You can set up to four paths. Use the **Up** and **Down** buttons to change the search order.

Use the **Add** and **Remove** buttons to add or remove paths from the list.

4. Click **OK** to close the dialogs and save your settings.

Choosing the Directories in the Place Bar

MapInfo Pro includes a **Place Bar** that you can use to quickly access specific directories.

To designate what directories are included in the **Place Bar**:

1. On the **PRO** tab, click **Options**, and **Directories** to open the **Directory Preferences** dialog box.

2. The **Initial Directories for File Dialogs** list displays the directory paths. Click **Modify** to add a path to the list.
3. On the **Browse For Folder** dialog box, navigate to the directory that you want to include in the **Place Bar** and then click **OK**.

The **Initial Directories for File Dialogs** list refreshes to show your addition.

4. Click **OK** to close the dialogs and save your settings.

Setting Your Address Matching Preferences

Use the Address Matching preferences to specify the placement of the house number in addresses. The default setting is for house numbers to come before the street name.

To set your address matching preferences:

1. On the **PRO** tab, click **Options**, and **Address Matching** to open the **Address Matching Preferences** dialog box.
2. Click **OK** to save this preference.

Setting the Web Services Preferences

The **Web Services Preferences** dialog box provides access to settings for the Web Feature Service, Web Map Service and Web Map Tile Service timeout values, GetMap pixel limits, and Proxy Server settings in MapInfo Pro. Additionally, you can set geocoding server and routing server options. These options allow you to control the web services preferences.

Note: You can set per-server defaults based on particular WFS, WMS and WMTS servers in the **Override Timeout Values** section of the **Server Information** dialog box.

To access the **Web Services Preferences** dialog box:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. Select the tab you want to set the options for and change the default settings.
3. Click **OK** to close the dialog and save your settings.

Setting the Proxy Server Preferences

To set your proxy server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **Proxy** tab, set your preferences for the server:
 - **Use System Settings** - Click to use the LAN settings in the system registry. This is the default preference.

You can review the current LAN settings in the **Control Panel**. On the **Start** menu, click **Control Panel** and type `Internet Options` in the **Search** box. In the search results, click **Internet Options**. On the **Connections** tab, click **LAN Settings**.

- **Use Direct Connection** - Click to override the system LAN settings and try to connect directly to the Internet (not through a proxy server).
- **Use Proxy Server** - Click to set and use the proxy server settings to connect to the Internet. Ask your system administrator for the settings to use.

If you use a proxy server to connect to the Internet, the proxy server may require authentication in the form of a user name and password. Your system administrator should tell you what these are. If a user name and password are required, you are prompted for them via a dialog when MapInfo Pro attempts to connect to the Internet, such as when drawing a tile server layer. Within a session you only need to specify the username and password once.

- **Settings** - Click to set the proxy server options. See [Setting the Custom Proxy Server Preferences](#) for instructions on completing these settings.

3. Click **OK** to close the dialog and save your settings.

Setting the WFS Server Preferences

MapInfo Pro has software preferences that let you:

- Use a WFS Refresh option to retrieve updated GML information from the web feature service pertaining to the current layers.
- Set the default WFS timeout values (in seconds) for the WFS servers you use. You can set per-server defaults based on particular WFS servers in the **Override Timeout Values** section of the **WFS Services Preferences** dialog box.
- Add, edit, and delete WFS servers.

To set your WFS Server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WFS** tab, set your WFS refresh, timeout, and server options.
 - **Update Mapper Filters with Current Mapper** – Select this check box to use the current filter settings to refresh the **Map** window. If you select this check box and the table has already been refreshed, the current bounds of the front-most **Map** window are used. If the check box is cleared and the table is refreshed, the bounds of the **Map** window (at the initial WFS request) are used.

Note: The original map bounds are used, regardless of the current **Map** window bounds.

- **Connect Timeout** – Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
 - **Send Timeout** – Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
 - **Receive Timeout** – Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
 - Click the **Servers** button to display the **WFS Servers List** dialog box, where you can add, edit, and delete WFS servers.
3. Click **OK** to close the dialog and save your settings.

See Also:

[Setting Your Directory Preferences](#)

Setting the WMS Server Preferences

MapInfo Pro has software preferences that let you:

- Set the default WMS timeout values (in seconds) for the WMS servers you use.
- Set the maximum number of pixels (in width/height) that a map request is limited to.

You can set default values for a specific WMS server in the **Override Timeout Values** and **GetMap Pixel Limits** sections of the **WMS Server Information** dialog box.

To set your WMS Server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WMS** tab, set your WMS timeout values:

- **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
- **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
- **Receive Timeout** - Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.

3. Set your GetMap pixel limits:

- **Max Width** - Max Width specifies the maximum number of pixels for a GetMap request in the X direction.
- **Max Height** - Max Height specifies the maximum number of pixels for a GetMap request in the Y direction.

The GetMap request is designed to retrieve the highest resolution map image as is necessary to render the image on the screen, for a printer, or for an export file. This option prevents the request from going higher than the specified values. Different servers have different limits, so you can set the limit that works best for your environment.

Note: You can also use this option to shorten the WMS map retrieval time, but remember that the resulting image will display at a lower resolution.

4. Click **Servers** to open the **WMS Servers List** dialog box, where you can add, edit, and delete WMS servers.
5. Click **OK** to close the dialog and save your settings.

Unfortunately, servers do not report their limits to us, so if the GetMap request fails, it means that you have entered a value that is too large. There are large GetMap requests when you are printing or exporting windows containing WMS images. This happens because printing and exporting occurs at larger sizes and/or higher resolutions than on-screen display requires.

See Also:

[Setting Your Directory Preferences](#)

Setting the WMTS Server Preferences

MapInfo Pro has software preferences that let you set the default WMTS timeout values (in seconds) for the WMTS servers you use.

You can set default values for a specific WMTS server in the **Override Timeout Values** section of the **WMTS Server Information** dialog box.

To set your WMTS Server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **WMTS** tab, set your WMTS timeout values:
 - **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
 - **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
 - **Receive Timeout** - Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
3. Click **Servers** to open the **WMTS Servers List** dialog box, where you can add, edit, and delete WMTS servers.
4. Click **OK** to close the dialog and save your settings.

See Also:

[Setting Your Directory Preferences](#)

Setting the Geocoding Server Preferences

You can get more information about setting up a geocoding server in [Setting up a Geocoding Server](#). A table must be open to enable the **Geocode using Server** command.

To set the geocoding server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. Click the **Geocode** tab to display the Geocoding server options.

This tab sets the geocoding server timeout and maintenance options.

3. Set any of the following preferences for your server:
 - **Offset From Road** - Use this field to indicate the default distance the geocoded point should be from the road, if applicable.
 - **Offset From Corner** - Use this field to indicate the default distance the geocoded point should be from the corner, if applicable.
 - **Units** - Use this field to indicate the units for the previous entries.
 - **Dictionary** - Use this drop-down list to choose the dictionary option that you want the geocoder to use (Address or User). These libraries exist on the service. Not all dictionary types may exist on all services. There are a maximum of five (5) options:
 - **Select All Dictionaries** - Select this option to use both the user and address dictionaries.

- **Address Dictionary Only** - Select this option to use only the service's address dictionary and not the user's dictionary.
- **User Dictionary Only** - Select this option to use only the user's address dictionary and not the service's address dictionary
- **Prefer Address over User** - Select this option to use the service's address dictionary before the user's address dictionary. This option is the default.
- **Prefer User over Address** - Select this option to use the user's address dictionary before the service's address dictionary.
- **Number of Addresses to Batch** - Use this option to specify how many addresses you want to send to the geocoding service at a time. The number of addresses you send at a time can affect performance.
- **Default Timeout Values** - Use these timeout values to set the communication parameters for the geocoding service. You can override these defaults on a per-service basis locally by editing the service in the Services list and specifying the override.

Note: When you set the time out values locally, you may want to keep in mind the size of your request. The more complicated your request, the more time may be required for connection/sending/receiving.

- **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
- **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
- **Receive Timeout** - Use this setting to indicate the amount of time to begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
- **Mark Multiple Match when Automatic Geocoding** - Select this check box to display a result code of M when you are performing automatic geocoding and there are multiple matches for an address. If you do not select this option, and there are close matches, the system displays an S for street only. For more information, see [Understanding the Geocoding Result Codes](#).
- **Symbol** - Click to set the default symbol style for the points you are creating for geocoding. You can override it during a geocoding operation using **Symbol Style** in the **Common Options** tab.
- **Servers** - Click **Servers** to display the **Geocoding Servers List**, where you can add, edit, and delete MapMarker, Envinsa, or Global Geocoder geocoding servers. This list is the same as you would see when you select the **Servers** button in the **Geocode Using Servers** and the **Find Address** dialog box.

Note: If you are using Precisely Global Geocoding Server, you do not need to enter the server information manually. MapInfo Pro automatically adds it to the servers list.

4. Click **OK** to close the dialog and save your settings.

Setting the Routing Server Preferences

This section describes how to set the Routing Server preferences, which sets the driving region server maintenance options.

For instructions on how to set up MapInfo Pro to work with a routing server, see [Setting up a Routing Server](#)

To set the routing server preferences:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **System Settings Preferences** dialog box.
2. On the **Routing** tab, click **Servers** to open the **Routing Servers List** dialog box.
3. Add, edit, and remove Envinsa Drivetime servers.

Set the server that you will use the most as your default, by highlighting it in the list and clicking **Set Default**. A check mark displays beside the server to indicate it will open by default.

4. Click **OK** to close the dialogs and save your settings.

Setting the Tile Server Preferences

You can configure MapInfo Pro default preferences for the time-outs that are used when requesting tiles from a tile server.

To set up your time-out preferences for when requesting tiles:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **Tile Server** tab, set the following:
 - **Read Timeout** - Set the default value for attempting to read a specific tile from a tile server. The value should be between 1 and 3600 seconds.
 - **Request Timeout** - Set the default value for attempting to request a specific tile from a tile server. The value should be between 1 and 3600 seconds.
3. Click **OK** to close the dialog and save your settings.

Setting the Library Services Preferences

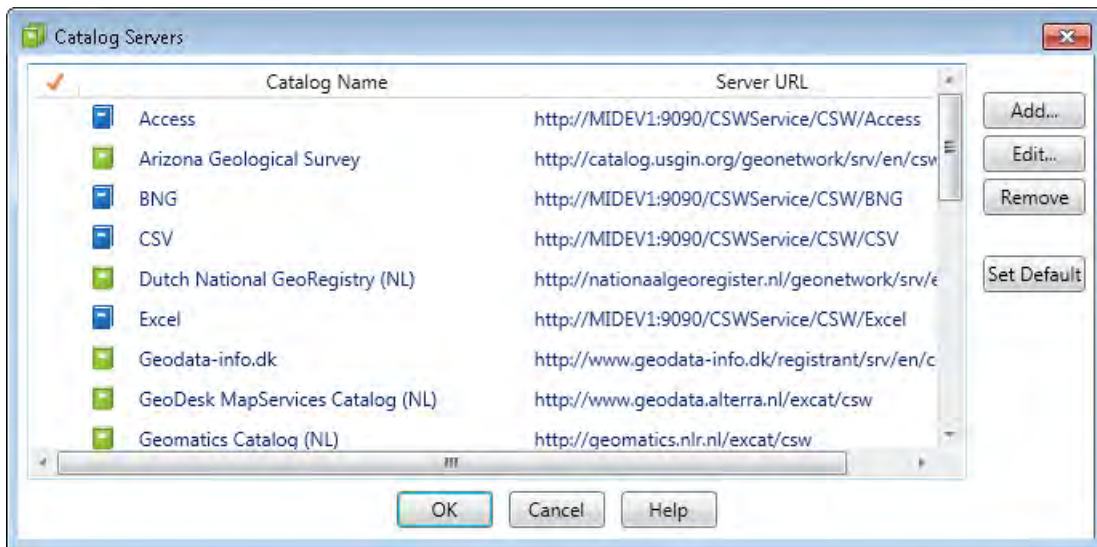
To set your preferences for working with Library Services:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. Click the **Library Services** tab.
3. Click **Server**.
4. In the **Library Service Preferences** dialog box, set a new Server URL (and timeout values) to work with, or change the timeout values for the sever that you are currently working with.
 - **Server URL** - The Internet address for a Library Service server. Enter a valid library service URL and click **Test URL** to validate the URL. MapInfo Pro becomes Library aware, accesses the list of Catalogs the user can view, and populates their list automatically through MapInfo Manager. Supports any MapInfo Manager Library Service URL that requires authentication
 - **Server Status** - This displays the availability of the Server and shows Available, Not Available, or Unknown.
 - **Authentication Timeout** - Use this setting to indicate the amount of time to establish and authenticate the connection with the Library Service. If the request takes longer than this value, a timeout occurs. The default authentication time out is 30 seconds. The value should be between 1 and 3600 seconds.
 - **Get Capabilities Timeout** - Use this setting to indicate the amount of time to send a request to the Library Service. If the request takes longer than this value, a timeout occurs. The default Get Capabilities time out is 60 seconds. The value should be between 1 and 3600 seconds.
 - **Request Timeout** - Set the default value for attempting to request a specific result from the Library Service. The value should be between 1 and 3600 seconds.

Click **OK** to apply your settings.

5. In the **Web Services Preferences** dialog box, chose one of the following:
 - **Catalogs** - Automatically populates the **Catalog Browser** with MapInfo Manager Catalogs. (For MapInfo Pro users who do not use MapInfo Manager.)
 - **Catalogs and Library** - Finds catalogs and allows you to work with MapInfo Manager Library directly from MapInfo Pro. (For MapInfo Pro users who also use MapInfo Manager.)
6. Click **OK** to close the dialog and save your settings.

If your Library Service mode is set to anything other than Disabled, then the **Catalog Servers** dialog box opens the catalog URLs exposed by the MapInfo Manager.



These catalog URLs cannot be edited or deleted. Clicking **View** in the **Catalog Servers** dialog box opens the **Catalog Server Definition** dialog box. You cannot make edits in this dialog box.

MapInfo Manager Authentication Handling within MapInfo Pro

For setting up security and expected MapInfo Manager behavior, consult with your MapInfo Manager administrator and refer to the MapInfo Manager version 1.2 documentation at:

<http://support.precisely.com>

Setting the Custom Proxy Server Preferences

You can configure MapInfo Pro for proxy server use. By default, MapInfo Pro uses your system LAN settings as the default proxy server settings. To set the Web Services Preferences to use a different proxy server, you must know the IP address and port number of the alternate proxy server to properly complete these entries.

To set up your web service preferences to use a different proxy server than those provided in your system LAN settings:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.
2. On the **Proxy** tab, choose **Use Proxy Server** and click **Settings**.

The **Web Services Proxy Settings** dialog box opens. Use these options to configure the proxy server for your internet and intranet use.

3. Enter the IP address of your computer and the port number in the fields provided. If you do not know this information, check the IP Config settings or consult your system administrator.

4. To access local addresses without going through the proxy server, select the **Bypass proxy server for local addresses** check box.
5. To exclude some non-local IP addresses from the proxy server, enter the IP addresses in the text area provided, using a semicolon to separate the addresses.
6. Click **OK** to close the dialog and save your settings.

As a result of these settings, you are prompted for a user name and password when you are attempting to access the Internet to use the Web Map Service or the Web Feature Service features.

Setting up a Geocoding Server

To use MapInfo Pro with a geocoding server, you need MapMarker Java Server 4.0 or later or Envinsa Server 4.0 or later or a Global Geocoding server. To use MapInfo Pro with the Precisely Global Geocoding server, you need to sign up for the service. See [Using the Precisely Global Geocoding Server](#) for details. MapInfo Pro supports any geography that is currently supported by Envinsa. Envinsa supports MapMarker Java Server version 2, 3, and 4. Keep in mind that any Envinsa server only supports the data that is installed.

Before you can access a MapMarker, Envinsa or Global Geocoder geocoding service, you need to connect MapInfo Pro to its server. This process gives MapInfo Pro all the information it needs to access the geocoding service. You need to enter this information only once per service.

Note: If you are using Precisely Global Geocoding Server, you do not need to enter the server information manually. MapInfo Pro automatically adds it to the servers list.

To set up a geocoding server:

1. On the **SPATIAL** tab, in the **Create** group, click **Geocode**, and **Geocode Using Server** to open the **Geocode Using Server** dialog box.
2. Click **Servers** to open the **Geocoding Servers List** dialog box.

Note: Set the server that you will use the most as your default, by highlighting it in the list and clicking **Set Default**. A check mark displays beside the server to indicate it will open by default.

3. Click **Add** to open the **Geocoding Server Information** dialog box to add a new server.
4. Type the service URL and description in the fields provided. You can connect to a MapMarker, Envinsa or Global Geocoder geocoding service by making a selection in the Type of Service drop-down list.

When you select an Envinsa service, enter a user ID and password in the fields provided. Select the **Remember Password** check box to save the password in encrypted format in the server list. This option is selected by default. If you prefer to enter the password each time you access this server, clear this check box.

CAUTION: Anyone knowing this password will be able to use the Envinsa geocoding service.

5. Consider whether the default timeout values are appropriate for the service you are adding. The default values that display in each field are set in the geocoding web services preferences. You can change these global defaults using the instructions in [Setting the Geocoding Server Preferences](#).

To reset these entries for the current server, select the **Override Default Values** check box and enter new timeout values using these definitions:

- **Connect Timeout** - Use this setting to indicate the amount of time to establish an Internet connection to the service. If the request takes longer than this value, a timeout occurs. The default connect time out is 60 seconds.
 - **Send Timeout** - Use this setting to indicate the amount of time to send an Internet request to the service. If the request takes longer than this value, a timeout occurs. The default send time out is 60 seconds.
 - **Receive Timeout** - Use this setting to indicate the amount of time begin to receive a response from a request to the service. The download can take longer than the time out, but the response has to occur within the timeout setting. The default receive time out is 300 seconds.
6. When you have completed these entries, click **Test URL** to ensure that the connection is made. When you click **Test URL** and MapInfo Pro can connect to the service, the **Geocoding Server Details** dialog box opens.

If the URL is valid, the **Engine Info** list displays the service's available, country data, the supported geocoding types (Street, Postcode, Geographic), and the version information.

Click the column headings to sort the entries alphabetically. Click **Close** to return to the **Geocoding Server Information** dialog box.

Note: If you select **Test URL** and no service connection is found, an error message displays.

7. Click **OK** to save the new geocoding server.

Setting up a Routing Server

Before you can access an Envinsa Drivetime service, you need to show MapInfo Pro where to find the Routing server it is housed on. This process gives MapInfo Pro all the information it needs to access the server. You need to enter this information only once per server. To set the routing server preferences, see [Setting the Routing Server Preferences](#).

To add a Routing server:

1. On the **PRO** tab, click **Options**, and **Web Services** to open the **Web Services Preferences** dialog box.

2. On the **Routing** tab, click **Servers** to open the **Routing Servers List** dialog box.
3. Click **Add** to open the **Routing Server Information** dialog box.
4. Type the server URL, the server description, the default user name and password in the fields provided.

Select the **Remember Password** check box to remember the password when you enter the correct user name.

5. Review the default timeout values for the server you are adding. To change these entries, select the **Override Default Values** check box and enter new timeout values.
6. Click **Test URL** to ensure that the connection is available. The **Routing Server Details** dialog box opens.

If the URL is valid, the **Countries** list displays the server's available country data. Click **Close** to return to the **Routing Server Information** dialog box.

Note: If you select **Test URL** and no server connection is found, an error message displays.

7. Click **OK** to return to the **Routing Servers List** dialog box

Set the server that you will use the most as your default, by highlighting it in the list and clicking **Set Default**. A check mark displays beside the server to indicate it will open by default.

8. Click **OK** to close the dialog and save your settings.

MapInfo Pro supports server-side and proxy server authentication. If you use a proxy server for Internet access and your routing server also requires user/password authentication, you authenticate with the proxy server first. As a result, the **Connection** dialog box displays twice—once for the proxy server and once for the routing server.

Setting Your Image Processing Preferences

You can control the reprojection options of your vector and raster maps using the Image Processing Preference. Reprojection, particularly when reprojecting seamless tables or other large raster map layers, can take a long time. This is particularly true if your reprojection is dramatic, as when you are transforming world-wide rasters from Long/Lat to Mercator, for example.

To see the results of this setting, refer to [Reprojecting a Raster based on a Vector Map](#).

To set the raster reprojection options for all registered raster files:

1. On the **PRO** tab, click **Options**, and **Image Processing** to open the **Image Processing** dialog box.

You can also open the **Image Processing** dialog box by clicking **Image Processing** in the **Map Options** dialog box (under the **MAP** tab).

2. Choose a reprojection:

- **Never** - Prevents raster reprojection. This is the default setting which preserves the pre-version 8.5 MapInfo Pro behavior.
- **Always** - Ensures that reprojection is always performed, that is, MapInfo Pro calculates the image's coordinates based on a precise formula and then the pixels are resampled using Cubic Convolution or Nearest Neighbor options.
- **Optimized** - Determines the reprojection of a raster image based on the look of the destination rectangle (a selection of the image) after transformation into the source image space. If it looks as a rigorous rectangle (two sides are parallel to x-axis and two sides parallel to y-axis), then the standard Windows functions stretch the source image in both directions, as it was in pre-version 8.5 MapInfo Pro. If the image fails the rigorous rectangle test, the reprojection is performed using the resampling options.

The **Resampling Method** options enable when you select **Always** or **Optimized**. **Never** is the default reprojection option and reflects the vector reprojection only behavior.

3. If you chose **Always** or **Optimized**, then you can decide how best to resample the image by choosing:

- **Cubic Convolution** provides the best restoration of pixel values because of their separateness. Using this option, a pixel in the destination image is calculated based on the pixel values in a 4x4 pixel window centered at the original pixel in the source image. The coordinates of the original pixel are calculated for every pixel of the destination image based on a special optimized procedure. Pixels are then weighted based on the basic pixel coordinates. In general, we recommend you use the Cubic Convolution resampling method for aerial images and satellite raster images to get a better image quality. The Cubic Convolution algorithm used in MapInfo Pro is based on the work of S.K. Park and R.A. Schowengerdt, *Computervision, Graphics and Image Processing* (1983, Volume 23. Pages 258-272).
- **Nearest Neighbor** replaces the pixel value in the reprojected image with the original pixel value from the source image. This resampling method takes less time to render than the Cubic Convolution method, but may be less precise. In general we recommend you use **Nearest Neighbor** resampling for raster maps, grids, and scanned maps to get faster results.

Note: When you are reprojecting 8-bit palette raster images, such as color .TIFF or .BMP images, MapInfo Pro uses the **Nearest Neighbor** resampling option without regard to the resampling method you choose.

4. Click **OK** to close the dialog and save your settings.

When you choose the **Always** or **Optimized** reprojection, the reprojection process runs in the background and there is nothing to see. However, you can see the differences that **Cubic Convolution** or **Nearest Neighbor** resampling make in the way that the raster displays.

Setting Your Concurrency Preference

MapInfo Pro runs some operations in parallel, using more than one CPU or processor core at the same time. This improves the processing time when buffering an object in a table or selection, and with overlay operations (such as **Split Target**, **Erase Target**, **Erase Outside Target**, **Split Target using Polyline**, and **Overlay Nodes onto Target**). You can turn this off, or specify that a percentage of the processors on your system run concurrent operations.

By default, MapInfo Pro has full concurrency turned on, but you can select the level of concurrency as a software preference:

- **None** – a single processor performs the operation. This option provides the least amount of processing speed.
- **Moderate** – 25% of the processors on your system perform the operation.
- **Intermediate** – 50% of the processors on your system perform the operation.
- **Aggressive** – 75% of the processors on your system perform the operation.
- **Full** – all processors on your system perform the operation. This is the default setting with which MapInfo Pro installs.

To change the default concurrency setting:

1. On the **PRO** tab, click **Options**, and **Performance** to open the **Performance Settings** dialog box.
2. Select a concurrency setting from the **Concurrency Level** list.
3. Click **OK** to close the dialog and save your settings.

When concurrency is set, MapInfo Pro divides the processing to multiple cores that simultaneously perform the operation.

Setting Your Concurrency Preference

MapInfo Pro runs some operations in parallel, using more than one CPU or processor core at the same time. This improves the processing time when buffering an object in a table or selection, and with overlay operations (such as **Split Target**, **Erase Target**, **Erase Outside Target**, **Split Target using Polyline**, and **Overlay Nodes onto Target**). You can turn this off, or specify that a percentage of the processors on your system run concurrent operations.

By default, MapInfo Pro has full concurrency turned on, but you can select the level of concurrency as a software preference:

- **None** – a single processor performs the operation. This option provides the least amount of processing speed.

- **Moderate** – 25% of the processors on your system perform the operation.
- **Intermediate** – 50% of the processors on your system perform the operation.
- **Aggressive** – 75% of the processors on your system perform the operation.
- **Full** – all processors on your system perform the operation. This is the default setting with which MapInfo Pro installs.

To change the default concurrency setting:

1. On the **PRO** tab, click **Options**, and **Performance** to open the **Performance Settings** dialog box.
2. Select a concurrency setting from the **Concurrency Level** list.
3. Click **OK** to close the dialog and save your settings.

When concurrency is set, MapInfo Pro divides the processing to multiple cores that simultaneously perform the operation.

See also, [Concurrency Level](#).

Setting Your Smart Indexing Preference

You can improve processing speed when performing these operations: **Insert**, **Delete**, **Update**, **Objects Combine**, **Objects Erase**, **Objects Intersect**, **Objects Disaggregate**, and **Objects Split**. These operations modify data causing MapInfo Pro to create transaction data that have indexes. To improve processing speed, you can select to remove these indexes before processing operations. MapInfo Pro recreates them after the operation is complete.

By default, MapInfo Pro has auto smart indexing turned on, but you can select how MapInfo Pro manages indexes as a software preference:

- **Auto** - MapInfo Pro decides whether to suspend or recreate indexes. If the table contains more than 1000 rows and more than 0.1% of the total rows are to be updated, then indexes are suspended and recreated later.
- **On** - MapInfo Pro suspends updating the indexes while executing the operation and recreates them when the operation is complete, which improves performance. This can slightly degrade performance in some cases, so we recommend using AUTO.
- **Off** - The operation executes without suspending or recreating indexes.

To change the default concurrency setting:

1. On the **PRO** tab, click **Options**, and **Performance** to open the **Performance Settings** dialog box.
2. Select a smart indexing setting from the **Smart Indexing** list.
3. Click **OK** to close the dialog and save your settings.

See also, [Smart Indexing](#).

Setting Your Notification Preferences

MapInfo Pro updates you when there is a new maintenance patch available for download and news about the product. You can set the frequency of these updates, or turn them off, as a software preference.

Note: On the **PRO** tab, click **About**, and **Check for News** to link to the MapInfo Pro product notifications site where you can see the latest product news and information.

To set the frequency of product updates and notifications from MapInfo Pro:

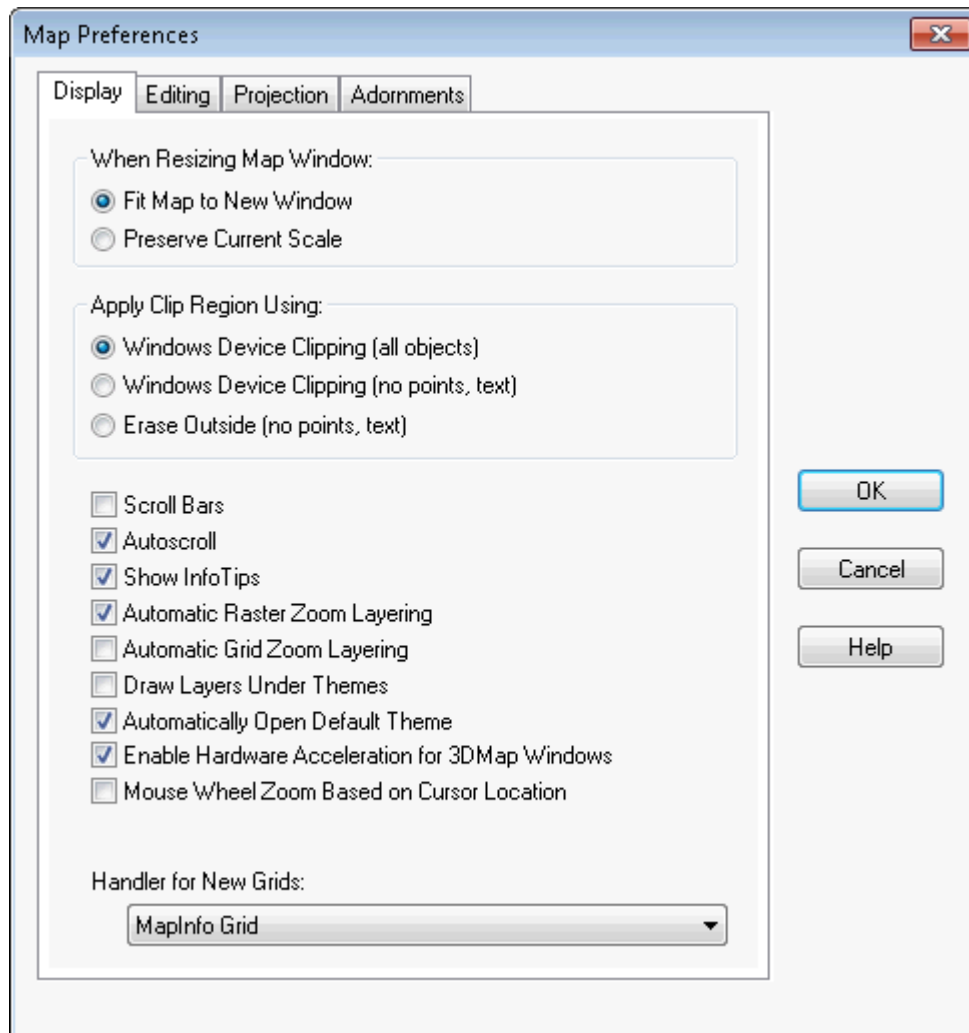
1. On the **PRO** tab, click **Options**, and **Notifications** to open the **Notifications** dialog box.
2. Select from the following options:
 - **Check for a new maintenance patch once in** – Select this check box and type a number (in days) to enable MapInfo Pro to check for maintenance patches and other updates. Clear this check box to disable checking for any new patches.
 - **Update me of news from Precisely once in** – Select this check box and type a number (in days) to receive product updates from Precisely. Clear this check box to disable all checking for updates.
 - **Update Server Request Timeout** – Type a number (in seconds) to determine the server timeout in case MapInfo Pro is unable to communicate with the notifications server.
3. Click **OK** to close the dialog and save your settings.

Setting Your Map Window Preferences

The **Map** window preferences control the default settings for any new **Map** window created in MapInfo Pro. You can override some of these preference settings for the current **Map** window in the **Map Options** dialog box. These include the settings for resizing **Map** windows, specifying distance and area calculations, and displaying coordinates in degrees, minutes, and seconds.

To set map options for the current map, in the **Layers** or **Explorer** window, right-click on the map name and select **Map Options** to open the **Map Options** dialog box..

To set the **Map** window preferences, on the **PRO** tab, click **Options**, and **Map Window** to open the **Map Preferences** dialog box.



There are several tabs of preferences:

- **Display tab** - preferences for resizing a **Map** window, applying clip region use, and various display settings.
- **Editing tab** - a warning message before loss of map information, how to move duplicate nodes in layers, digitizing options, and find selection options.
- **Projection tab** - default projections, display coordinates, and whether to calculate distances and areas using a Spherical or Cartesian calculation.
- **Adornments tab** - default location and style for scale bars.

For more information, see the following topics in the *Help System*:

- *Scrolling through a Map*
- *Specifying Options in a Map*
- *Changing the Default or Preference Setting for Calculations*
- *Centering a Map Using Military Grid Reference System (MGRS) Coordinates*
- *Centering a Map Using United States National Grid (USNG) Coordinates*

- *Setting Default Clip Region Options*

Display tab (Map window dialog box)

The **Display** tab on the **Map Preferences** dialog box has preferences for controlling the default behavior of **Map** windows and for how to clip regions.

The **When Resizing Map Window** options controls the default behavior of **Map** windows when you resize them.

- Click the **Fit Map to New Window** to draw the map to fit the resized window. You see the same view of the map that you saw before you resized the window. This is the default setting.
- Click the **Preserve Current Scale** button to change the view of the map when the **Map** window is resized. As you shrink or enlarge the window, you will see a smaller or larger area of the map.

This setting does not affect **Map** windows that are already open. To override the preference settings for the currently open **Map** window, make different selections in the **Map Options** dialog box.

The **Apply Clip Region Using** choices set how you want MapInfo Pro to clip regions.

- **Windows Device Clipping (all objects)** - The clipping is controlled by the Windows Device Display. All objects (including points, labels, text, and raster and grid images) will be clipped at the Clip Region boundary. This is the default setting.
- **Windows Device Clipping (no points, text)** - Use this method to emulate the **Erase Outside Target** clipping method. All objects are clipped using **Erase Outside Target** except points and labels. Points and labels will be completely displayed only if the point or label point lies inside the Clip Region object. Text objects, raster files, and grid files always display and are never clipped.
- **Erase Outside (no points, text)** - This method uses the **Erase Outside Target** functionality. The Clip Region object is the Cutter object, and all other objects are Target objects for this operation. All objects are clipped using **Erase Outside Target**, except points and labels. In addition, points and labels will be completely displayed only if the point or label point is inside the Clip Region object. Text objects always display and are never clipped.

Other display options are:

- **Scrollbars** - To display scrollbars, select the **Scroll Bars** check box. By default, MapInfo Pro does not display scrollbars in **Map** windows.
- **Autoscroll** - To scroll the layout automatically, select the **Autoscroll** check box.
- **Show InfoTips** - To display one or two word tips when you cursor over a button, select the **Show InfoTips** check box. By default, MapInfo Pro displays InfoTips. Clear the **Show InfoTips** check box to deactivate their display.
- **Automatic Raster Zoom Layering** - To choose the default mode for automatic zoom layering for raster layers, select this check box. Raster zoom layering is turned on by default.
- **Automatic Grid Zoom Layering** - To choose the default mode for automatic grid zoom layering when adding a grid layer to the map, select this check box. Automatic Grid Zoom Layering is turned off by default.

- **Draw Layers Under Themes** - This option sets the default behavior for the **Replace Layer Style** check box in both the **Customize Range Styles** and **Customize Individual Styles** dialog boxes. Select this check box to clear the **Replace Layer Style** check box by default. Clear this check box to select the **Replace Layer Style** check box by default.
- **Automatically Open Default Theme** - This option saves the theme to the table's metadata so that the theme displays each time you open the table. This check box is cleared by default.
- **Enable Hardware Acceleration for 3DMap Windows** - Select this check box to use your video card acceleration capability to display 3DMaps. Clear the box to display the 3DMap without using your video card acceleration capability. Turning the acceleration off reduces performance, but it avoids failure with certain graphic adapters and drivers.
- **Mouse Wheel Zoom Based on a Cursor Location** - Select this check box, so that when zooming a map using a the mouse wheel, the zoom will center where the cursor is located on the map. When this option is not set, the zoom is centered at the center of the map.
- **Handler for New Grids** - Select the output grid file format. By default, MapInfo Pro uses the MapInfo Pro handler (*.MIG). The available formats depend on which grid handlers are installed. When you change the grid file format, the file extension on the grid file name changes to reflect the selected format.

Editing tab (Map window dialog box)

The **Editing** tab on the **Map Preferences** dialog box has preferences for controlling the display of warning messages, how to move duplicate nodes, digitizing tolerances, and how to apply **Find Selection** features.

The **Warn Prior to Loss of** group of check boxes set warning messages before you leave the currently open **Map** window and lose cosmetic objects, map labels, and thematic layers you have created. After the warning, you can save these objects, labels and layers as part of a table or workspace. These check boxes are selected by default. Clear the **Cosmetic Objects**, **Map Labels**, and **Thematic Layers** check boxes to turn off these warnings.

The **Move Duplicate Nodes in** group of choices specifies whether MapInfo Pro will move duplicate nodes when you use the **Reshape** command (on the **SPATIAL** tab, in the **Edit** group, click **Nodes**, and **Reshape**) to edit objects that are adjacent to each other, such as regions.

- Choose **None of the Layers** to prohibit the product from moving duplicate nodes. This is the default setting
- Choose **Same Layer** to move duplicate nodes that are in the same layer when one of the connected nodes is moved.

The **Digitizing Options** group includes a **Display Snap Radius** check box to make the snap radius larger or smaller. If you clear this check box, then the radius does not display when the snap mode is turned on.

Type a new value in to the **Snap Tolerance** and **Auto Node Tolerance** boxes to specify the default tolerance in pixels within which Snap to node and Auto Node features operate. You use these settings when you draw objects. (Click the **S** key to turn **Snap to node** on.) The default is five (5) pixels. Enter a smaller value to obtain a tighter tolerance, and avoid snapping to the nodes of other objects

as you draw. Enter a larger value to obtain a looser tolerance, when you want to snap to a node even though you are relatively far away from it.

For more information about the snap tolerance, see [Using "Snap To" to Select Nodes and Centroids](#).

The **Find Selection Options** include:

- **Zoom on Find Selection** - Select this option to zoom to the selection each time you perform a Find Selection for single and multiple objects. Clear this check box to prevent zooming when performing a Find Selection.
- **Find Selection after Paste** - Select this option to turn on the Find Selection feature in the **Map** window only after you Paste an object. If you have an active **Browser**, and the selection is in that **Browser** window, the **Browser** still scrolls to the selection. Clear this check box to prevent zooming after pasting an object.

Projection tab (Map window dialog box)

The **Projection** tab on the **Map Preferences** dialog box has preferences for controlling the projection of tables and a MapBasic session, and the format in which coordinates display.

Specify the default for:

- **Table Projection** - To set the default projections for the current map, designate a default table projection for creating new tables, importing GML 2.1, MIF, MBI, and IMG files, and for **Choose Projection** options in dialog boxes.

Note: You can override the table projection defaults by clicking the **Choose Projection** button throughout MapInfo Pro except when you use the Universal Translator, ArcLink, or when you import DXF files.

- **Session Projection** - To set the option to designate a default MapBasic projection for returning coordinate values using a **MapBasic** window or **Update Column**. Compiled MapBasic applications are not affected by this preference.

The **Display Coordinates** list has options for changing the format in which coordinates display. You can select:

- **Decimal Degrees** - By default, MapInfo Pro displays coordinates in decimal degrees. MapInfo Pro displays coordinates of objects in the **Object Info** dialog box, and of the cursor location in the status bar if that display option is selected.
- **Degrees, minutes, seconds** - Choose this option to display your map using the degree, minute, seconds format.
- **Military Grid Reference** - Choose this option to display your map using the Military Grid Reference System format. Coordinates are converted to the Military Grid Reference System format using the World Geodetic System (WGS) of 1984 Ellipsoid.
- **US National Grid Reference (NAD 83/WGS 84)** - Choose this option to display your map using the United States National Grid (USNG) reference system format. Coordinates are converted to

the United States National Grid format using the North American Datum of 1983 / World Geodetic System (WGS) of 1984 Ellipsoid.

- **US National Grid Reference (NAD 27)** - Choose this option to display your map using the United States National Grid (USNG) reference system format. Coordinates are converted to the North American Datum of 1927 Ellipsoid.

Note: To override a grid references system preference in individual maps, use the **Map Options** dialog box: in the **Layers** or **Explorer** window, right-click on the map name and select **Map Options**. Change the **Display coordinates** setting. Overrides to the default coordinate setting will be saved to your workspace.

Note: Changes made in either the **Map Options** or **Map Preferences** dialog boxes, causes the format to display in the status bar, but not in the **Object Info** dialog boxes. If you display any **Object Info** dialog box for an object on a map that uses the Military Grid Reference System or United States National Grid, the coordinates will be displayed in decimal degrees.

Choose a **Distance/Area using** setting to specify the default type of distance and area calculation that MapInfo Pro uses for new **Map** windows.

- **Spherical** - The Spherical calculations measure distance according to the curved surface of the Earth. Spherical is the default. The data is first converted to Latitude/Longitude and then a calculation is produced. Lat/Long data will always use spherical calculations.
- **Cartesian** - The Cartesian method performs calculations on data projected onto a flat plane. Cartesian coordinates (x,y) define the position of a point in two-dimensional space by its perpendicular projection onto two axes which are at right angles to each other. Long/Lat projections cannot use Cartesian calculations.

Note: To specify a calculation method for the currently active **Map** window, use the **Map Options** dialog box: in the **Layers** or **Explorer** window, right-click on the map name and select **Map Options**.

For more information about map preferences, see *Setting your Map Window Preferences* in the *Help System*.

Adornments tab (Map window dialog box)

The **Adornments** tab on the **Map Preferences** dialog box has preferences for controlling how to position a new scale bar.

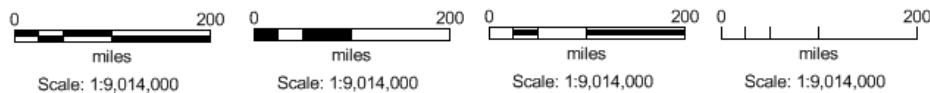
The **Adornment** group of options set the defaults for how to locate a new scale bar on the map.

- **Select a default position** - Select to place adornment in a preset location in the **Layout** window: upper left corner, upper right corner, lower left corner, or lower right corner.
- (Optional) Enter measurement values in to the **X offset** and **Y offset** fields. Use positive numbers.
- **Specify a custom position (from top left)** - Select to place adornment in a specific location in the **Layout** window. Enter measurement values in to the **Move right** and **Move down** fields. Use positive numbers.

- **Background Style** - Click this button to set the background fill style and background border style.

The **Scale bar Adornment** group of options set the default style for a scale bar.

- **Bar Length** - The two values are proportional: the first value is the distance on the paper map, the second value is what the first value represents as a distance on the Earth's surface. Specify the length of the scale bar to a maximum of 34 inches or 86.3 cm on the printed map.
- **Bar Height** - Set the height of the adornment to a maximum of 44 inches or 111.76cm on the printed map.
- **Bar Type** - Select a preset scale bar: Check Bar, Solid Bar, Line Bar, or Tick Bar.



- **Use Automatic Sizing** - Check this check box to set a preference if automatic sizing should be "on" or "off" for new scale bars.
- **Add Cartographic Scale** - Check this check box to include a representative fraction (RF) with the scale bar. In MapInfo Pro, a map scale that does not include distance units, such as 1:63,360 or 1:1,000,000, is called a cartographic scale.
- **Bar Style** - Set from the following:



Click to display the **Region Style** dialog box and select fill color for customizing the scale bar.



Click to display the **Line Style** dialog box and select line options for customizing the scale bar.



Click to display the **Text Style** dialog box and set the font style, such as type, size, and color, for customizing scale bar values.

Scrolling through a Map

You can use the scroll bars in the **Map** window to move the map up, down, right, or left. If the scrollbars have not been turned on as the default (on the **Options** screen, click **Map Window**), then you can turn them on for the window you are working in.

To show the scroll bars on a per-window basis:

1. On the **MAP** tab, click **Options**, and **Map Options** to open the **Map Options** dialog box.
2. In the **Display Coordinates** group, select one of the following:
 - Check the **Scroll Bars** check box to show scroll bars in the **Map** window.
 - Check the **Autoscroll** check box to automatically scroll when using commands when no scroll bars are present in the **Map** window.
3. Click **OK** to close the dialog and save your settings.

Note: Sometimes you may scroll so far that you move your view completely off the map. When this happens, the map appears to be blank. Simply activate **Previous View** or **View Entire Layer** by right-clicking on the map. Either of these will return you to your previous view of the map, and you can reposition the map again.

Specifying Options in a Map

You can change the preferences for your specific **Map** window.

To specify units of measure in a **Map** window:

1. On the **MAP** tab, click **Options**, and **Map Options** to open the **Map Options** dialog box.
2. Choose a calculation method in the **Distance/Area using** group:
 - **Spherical** - Spherical calculations are used for distance methods that attempt to keep the measurement on the curved surface of the earth. The data is first converted to Latitude/Longitude and then a calculation is produced.

Non-earth data cannot use spherical calculations, since the data cannot be converted to Latitude/Longitude.
 - **Cartesian** - Cartesian methods are used to perform calculations on Non-earth data. Cartesian coordinates are a pair of numbers, (x, y), defining the position of a point in a two-dimensional space by its perpendicular projection onto two axes that are at right angles to each other.

Cartesian calculations cannot be used for Latitude/Longitude data, which is not a flat projection.
3. In the **Map Units** group, select the map units to use for the following:
 - Coordinate Units
 - Distance Units
 - Area Units
4. In the **Display Coordinates** group, select one of the following:
 - Check the **Scroll Bars** check box to show scroll bars in the **Map** window.
 - Check the **Autoscroll** check box to automatically scroll when using commands when no scroll bars are present in the **Map** window.

5. Click **OK** to close the dialog and save your settings.

Note: When first opening a **Map** window, it uses the settings from the preferences as the default. When you save the **Map** window in a workspace, it saves this setting, which is then re-stored when you open the workspace.

Centering a Map Using Military Grid Reference System (MGRS) Coordinates

You can center a map using Military Grid Reference System (MGRS) coordinate strings to specify the center point in the **Change View** dialog box. This feature is activated when you select **Military Grid Reference** as your display coordinates in the **Map Options** dialog box.

To center a map using Military Grid Reference (MGRS) System coordinate strings:

1. On the **MAP** tab, click **Options**, and **Map Options** to open the **Map Options** dialog box.
2. From the **Display Coordinates** list, select **Military Grid Reference** and then click **OK**.
3. Right-click on the **Map** window and select **Change View** to open the **Change View** dialog box.
4. In the **Center of Window** coordinate string boxes, enter the coordinates that you want for the center of the **Map** window in Military Grid Reference System format.
5. Click **OK** to close the dialog and save your settings.

The **Map** window re-centers using the coordinates you set.

Centering a Map Using United States National Grid (USNG) Coordinates

You can center a map using United States National Grid (USNG) coordinate strings to specify the center point in the **Change View** dialog box. This feature is activated when you select **US National Grid Reference NAD 83/WGS 84** or **US National Grid Reference NAD 27** as your display coordinates in the **Map Options** dialog box.

To center a map using United States National Grid (USNG) coordinate strings:

1. On the **MAP** tab, click **Options**, and **Map Options** to open the **Map Options** dialog box.
2. From the **Display Coordinates** list, select **US National Grid Reference (NAD 83/WGS 84)** or **US National Grid Reference (NAD 27)** and then click **OK**.
3. Right-click on the **Map** window and select **Change View** to open the **Change View** dialog box.
4. In the **Center of Window** coordinate string boxes, enter the coordinates that you want for the center of the **Map** window in U.S. National Grid Reference System format.
5. Click **OK** to close the dialog and save your settings.

The **Map** window re-centers using the coordinates you set.

Changing the Default or Preference Setting for Calculations

Calculations display based on your **Distance/Area** preference setting. This setting can be overridden by specifying distance, length, perimeter, and area calculations for a particular map in the **Map Options** dialog box (on the **MAP** tab, in the **Options** group, click **Map Options**).

To change the default preference setting for distance and area calculations:

1. On the **PRO** tab, click **Options**, and **Map Window** to open the **Map Preferences** dialog box.
2. Select the **Projection** tab.
3. In the **Distance/Area using** group, choose a calculation method:
 - **Spherical** - The Spherical calculations measure distance according to the curved surface of the Earth. Spherical is the default. The data is first converted to Latitude/Longitude and then a calculation is produced. Lat/Long data will always use spherical calculations.

Note: Non-Earth data cannot use Spherical calculations, because the data cannot be converted to Latitude/Longitude.

 - **Cartesian** - The Cartesian method performs calculations on data projected onto a flat plane. Cartesian coordinates (x,y) define the position of a point in two-dimensional space by its perpendicular projection onto two axes which are at right angles to each other. Long/Lat projections cannot use Cartesian calculations.
4. Click **OK** to close the dialogs and save your settings.

Setting Default Clip Region Options

The default Clip Region options apply to all new **Map** windows.

To set default Clip Region options:

1. On the **PRO** tab, click **Options**, and **Map Window** to open the **Map Preferences** dialog box.
2. Select the **Display** tab.
3. In the **Apply Clip Region Using** group, chose from:
 - **Window Device Clipping (all objects)** - The Windows Device Display (screen or printer) provides the clip region functionality. All objects (including points, labels, text, rasters, and grids) will be clipped at the Clip Region boundary. This is the default mode.
 - **Window Device Clipping (no points, text)** - The Windows Device Display provides the Clip Region functionality. All objects will use Windows Device Clipping except points and labels.

Points and labels will be completely displayed only if the point or label point lies inside the Clip Region object. Text objects, rasters, and grids are always displayed and never clipped.

- **Erase Outside (no points, text)** - This option uses the MapInfo Pro **Erase Outside Target** functionality to produce the clipping. The Clip Region object is the Cutter object, and all other objects are Target objects for this operation. All objects are clipped using **Erase Outside Target**, except points and labels. Points and labels completely display only if the point or label point lies inside the Clip Region object. With this option, text objects, raster, and Grids are never clipped and always display.

4. Click **OK** to close the dialog and save your settings.

Setting Your Browser Window Preferences

Any changes made to the Browser window preferences are applied between sessions.

Changing the Browser Window Background Color

You can choose the color to use for the background on alternating rows in the **Browser** window. This setting makes it easier to distinguish between rows. MapInfo Pro applies this setting to all **Browser** window instances (in a layout, printout, and in all **Browser** windows).

To change the background color for rows in the **Browser** window:

1. On the **PRO** tab, click **Options**, and **Browser Window** to open the **Browser Window Preferences** dialog box.
2. From the **Alternating Row Color** list, select a background color to use.
3. Click **OK** to close the dialogs and apply the color to your **Browser** windows.

MapInfo Pro saves this setting between sessions.

Setting Your Legend Designer Window Preferences

Using software preferences, you can control the default title settings for legend frames in the **Legend Designer** window and the default text style attributes, such as font and size. MapInfo Pro uses your

preferences when there are no metadata keys in the table on which the legend frame is based. If metadata keys are present, then the metadata defaults override your preferences.

To set the **Legend Designer** window preferences:

1. On the **PRO** tab, click **Options**, and **Legend Window** to open the **Legend Window Preferences** dialog box.
2. In the **Legend Frame Defaults** group, set default titles and list names for Legend frames:
 - To set the **Title Pattern**, type the text that you want to display at the top of each legend frame in this box.

By default, the Title is "# Legend", where '#' is the name of the layer on which the frame is based. So, if the frame is based on the States layer, the default title would be "States Legend." You can change this pattern to "Legend of #" or simply "#." To have no default pattern, leave the box blank.

Note: When the # symbol is in the **Title**, **Subtitle**, or **Style Name** field, it is replaced with the layer name. When the % symbol is in the **Style Name**, it is only replaced with the object type. If you want to use the pound (#) symbol and not have it replaced, then put a backslash (\) character before it (\#). If you want to use the percent (%) symbol in the **Style Name** and not have it replaced, then put a backslash (\) character before it (\%).

- To set the **Subtitle Pattern**, type the subtitle text you want in this box. The entry in this box is blank by default, but you can set your own default title pattern for subtitles.
- To set the **Style Name Pattern**, type the text you want to display beside each symbol in this box. The default pattern is the '%' character. The **Style Name** is the text that describes each symbol in a legend frame. The % character is used as a placeholder for the type of object the legend symbol corresponds to: point, line, or region.

You can type in your own default **Style Name**, either using the % character or not. For example, in a legend frame based on the States layer, a **Style Name** that reads "% of #" will display as "Region of States" next to the symbol in the legend. The % character can only be used in the **Style Name** field.

3. In the **Legend Frame Sample Sizes** group, set the default sample sizes for legend frames:
 - **Paper Units** - Specifies the units when you measure the size of objects in a **Legend Designer** window. Choose a unit of measurement from the drop-down list. The default unit is points (pt), because it more accurately matches sample sizes to font sizes for legend text.
 - 1 inch (in) = 2.54 centimeters , 254 millimeters, 6 picas, 72 points
 - 1 point (pt) = 0.01389 inches, 0.03528 centimeters, 0.35278 millimeters, 0.08333 picas
 - 1pica = 0.16667 inches, 0.42333 centimeters, 4.23333 millimeters, 12 points
 - 1 centimeter (cm) = 0.39370 inches, 10 millimeters, 2.36220 picas, 28.34646 points
 - 1 millimeter (mm) = 0.1 centimeters, 0.03937 inches, 0.23622 picas, 2.83465 points

- **Region Sample Width** - Sets the width of a region sample in legend lists. You can specify 8 to 144 points, 0.666667 to 12 picas, 0.111111 to 2 inches, 0.282222 to 5.08 millimeters, or 0.282222 to 5.08 centimeters. The default value is 32pt (points).
- **Region Sample Height** - Sets the height of a region sample in legend lists. You can specify 8 to 144 points, 0.666667 to 12 picas, 0.111111 to 2 inches, 0.282222 to 5.08 millimeters, or 0.282222 to 5.08 centimeters. The default value is 14pt (points).
- **Line Sample Width** - Sets the length of a line sample in legend lists. You can specify 12 to 144 points, 1 to 12 picas, 0.666667 to 2 inches, 4.23333 to 50.8 millimeters, or 4.23333 to 50.8 centimeters. The default value is 36pt (points).

These options apply when creating a map legend using the **Create Legend** wizard. The resulting legend displays in the **Legend Designer** window.

4. Select the **Automatically Increase Sample Size to Match Font** check box to have legend swatches (samples) resize to match the font size of the text. Legend swatches will then resize when you change the font size.

5. In the **Grid and Guidelines** group, set the grid and guidelines display defaults:

The **Legend Designer** window provides controls, in the form of a grid and guidelines, to accurately set the alignment of the contents of the legend. You can change the display and color defaults for these, which take effect the next time you open a **Legend Designer** window.

- **Display Grid by Default** - Select to show an equally spaced grid of lightly marked lines to align legend frames to.
- **Snap to Grid Enabled by Default** - Select enable snapping to the grid of lightly marked lines within the Legend Designer canvas.
- **Grid Color** - Select a color to display the grid of lightly marked lines within the Legend Designer canvas (the grid is for aligning legend frames). The default color is Light Slate Gray (RGB = 119, 136, 153).
- **Guideline Color** - Select a color to display the guidelines within the Legend Designer canvas (guidelines are for aligning legend frames to a position of your choosing). The default color is Blue (RGB = 0, 0, 255).

6. Automatically save legends to workspaces, by checking the **Prompt Save Workspace Prior to Close** check box. Selecting this always saves legends to a workspace along with the rest of your work when closing MapInfo Pro.
7. Click **OK** to close the dialog and save your settings.

Setting Layout Window Preferences

MapInfo Pro lets you set a **Layout Designer** window preference that manages how to deactivate a layout frame. A layout frame is active when you click on the frame, and is no longer active when you

click somewhere else. You can turn off this setting, so that a layout frame remains active when clicking outside of the frame.

To turn off deactivating a layout frame by clicking somewhere else:

1. On the **PRO** tab, click **Options**, and then **Layout Window** to open the **Layout Preferences** dialog box.
2. Clear the **Frame activation can be deactivated by clicking outside of the frame** check box to turn off this option.
3. Click **OK** to close the dialog and save your settings.

When this option is turned off, clicking outside of a frame in the **Layout** window no longer deactivates the frame.

MapBasic Window Preferences Settings

Use the **MapBasic Window Preferences** dialog box to change MapBasic display and execution behavior.

To display this dialog box, on the **PRO** tab, select **Options** and then click **MapBasic**.

Enter Key executes command

If checked, the Enter key executes a MapBasic command, otherwise if unchecked Ctrl + Enter executes a MapBasic command.

Enable Syntax Highlighting

If checked, enable syntax highlighting of keywords, strings, and constants.

Layer Control Options

To display this dialog box, on the **PRO** tab, select **Options** and then click **Layers**.

The **Layers** window displays the list of layers in the open **Map** window or in all **Map** windows depending on what your **Layer Control** options are set to. It indicates whether each layer displays, is editable, selectable, or zoom layered. Layers include data tables, thematic maps and the Cosmetic layer. Layers are stacked in a **Map** window. The order of layers in the **Layers** window is the order of the layers in the **Map** window. For instance, when boundary layers are placed below point layers, the points remain visible. The Cosmetic layer is always the topmost layer. When there are more layers than can be displayed in the dialog box at one time, a scroll bar appears on the right.

*Maps to show in list***List all maps**

This displays all layers for all maps in the **Layers** window.

List only the active map

This displays only the layers for the active map in the **Layers** window. Inactive map layers do not display.

Collapse list to save space

The **Layers** window lists all the layers in all the maps in the workspace. The list is automatically expanded or collapsed as you switch from **Map** window to **Map** window, so that only the active **Map** window is expanded.

*Other Settings***Confirm removal of layers**

Check to enable a confirmation prompt that displays when deleting a layer from the **Layers** window list.

Show ToolTips when cursor is over layer list

Check to display table names, .TAB file paths, and zoom range information in ToolTips as you move the cursor over the layer list.

Show icons for styles and layer types

Check to show the layer type icons in the layer list. These are the icons that indicate the types of items in the layer, such as points, lines, regions, theme range, or raster images.

Show Friendly Names

Check to enable assigning a friendly name to a layer on the **Layers** and **Explorer** windows. By default, this is enabled. This option does not affect titles on existing legends, and does not affect friendly names persistence in workspaces.

Map legend titles default to the friendly names (friendly names also display in the **Create Legend – Choose layers** dialog). For thematic legends this does not happen when the title is updated during theme creation (or when **Title AUTO** is set in the MapBasic Set Legend statement).

Use Description Field for Friendly Name

Check to enable specifying a default friendly name to any TAB file by utilizing the TAB file's **Description** field, which is part of the Tab file's **Definition** section.

Once turned on, you can edit a TAB file in a text editor and add a layer name to the **Description** field, such as **Description "Lakes and Waterways"**.

Window List Preferences Settings

To display this dialog box, on the **PRO** tab, select **Options** and then click **Window List**.

Use the **Window List Preferences** dialog box to control the default settings for the **Window** group on the **HOME** tab.

Show Tools

Select to show tools in the **Window** group. When unselected, only the document windows are shown grouped by document type (such as maps, layouts, browsers, and legends).

Task Manager Settings

To display this dialog box, on the **PRO** tab, select **Options** and then click **Task Manager**.

Use the **Task Manager Preferences** dialog box to configure **Task Manager** behavior.

Show Window when Task Starts

If checked, the task window is displayed when a task starts.

Show Notification when Task Completes

If checked, a notification bubble will occur when a task is completed.

Display Task Id before Task Name

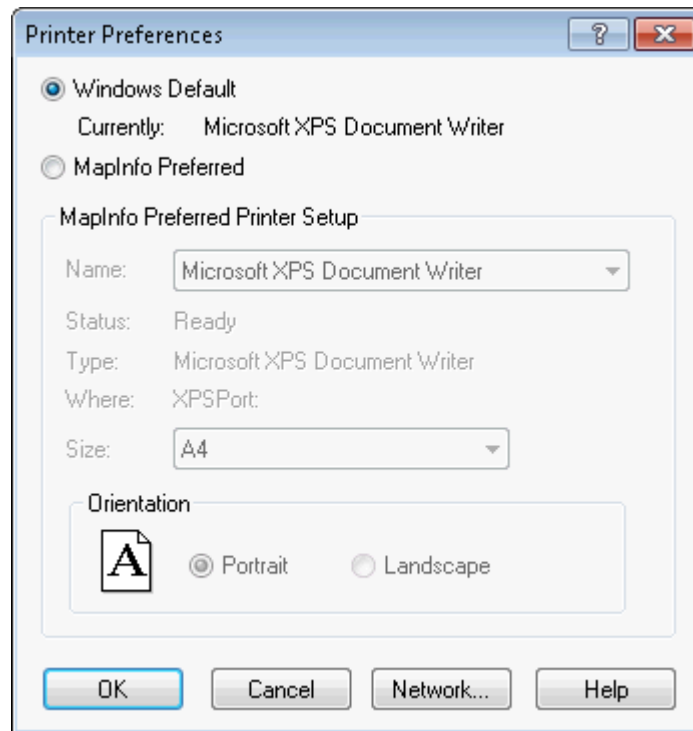
If checked, Task Id is displayed before Task Name in the task window.

Setting Your Printer Preferences

You can use the printer preferences to select a printer for MapInfo Pro output, which can be separate from your default Windows printer.

To set your printer preferences:

1. On the **PRO** tab, click **Options**, and **Printer** to open the **Printer Preferences** dialog box.



2. Choose either:

- **Windows Default** - This displays the path to the default printer specified for your operating system. This is the default setting.
- **MapInfo Preferred** - This lets you set a different default printer when printing while using MapInfo Pro. This can be a printer or a plotter.

3. If you chose **MapInfo Preferred**:

- Select the name of the printer, from the **Name** drop-down list, to use as the default printer.
- Select a paper size from the **Size** drop-down list, which pre-fills with the paper sizes available for the printer.
- Specify the direction that the paper faces (the orientation). **Portrait** indicates that the paper is taller than it is wide (as shown in the previous figure); **Landscape** indicates that the paper is wider than it is tall.

4. Click **OK** to close the dialog and save your settings.

If you selected **Save Printer Information to Workspaces** in the startup preferences, then MapInfo Pro saves the printer information and settings to the workspace. To set this preference, on the **Options** screen, click **Startup**.

Setting Your Output Preferences

MapInfo Pro has output preferences that control raster and grid file color settings for on-screen display, printed output, and file export settings. You can also specify how you want to handle transparency in vector and raster files in both your printed output and exported files. Other printer settings enable you to specify an output method, map scaling, and whether to print a border around a **Map** window.

These output preferences become the default settings in MapInfo Pro. These preferences are the default settings in the **Advanced Printing** dialog box for example. You can override the default settings by changing them, in the **Advanced Printing** dialog box for example, and then saving your map in a workspace.

Note: You can get additional printer advice in the *MapInfo Pro Printing Guide*, which is located in the `Documentation` subfolder of your installation directory.

To set output preferences: On the **PRO** tab, click **Options**, and **Output Settings** to open the **Output Preferences** dialog box.

There are several tabs of preferences:

- **Display tab** - set the on-screen display options for raster or grid files.
- **Printing tab** - set the printing options for **Map** windows, **Layout** windows, and all other output file types. (You can reset these preferences by overriding them for your map.)
- **Exporting tab** - set the export options for **Map** windows, **Layout** windows, and all other output file types. (You can reset these preferences by overriding them for your map.)

The following sections explain the display settings, the printing options, and window export options in **Output Preferences** dialog box. Some of the options appear in more than one dialog so we have grouped all of the same explanations together.

Display tab (Output Preferences)

The **Display** tab sets the on-screen display options for raster or grid files.

- **Polygon Mode** - Select this check box to display the rendering that draws the object as a single request with all nodes. **Polygon Mode** has three preferences based on three types of drawing: on-screen, printing, and exporting. You can select **Polygon Mode** separately for display, printing, and export on the **Display**, **Printing**, and **Exporting** tabs. When **Polygon Mode** is off, MapInfo Pro renders with special processing.

Note: Printing to PDF files may produce extra hairlines in the output when **Polygon Mode** is off.

- **Display Raster in True Color When Possible** - Select this check box to display your 24-bit raster or grid file images in true color (make sure your display settings are set to greater than 256 colors). Clear this check box to display images using 256 colors. This box is checked by default.
- **Fast Symbol Rendering** - MapInfo Pro optimizes how point symbols render on the screen by drawing a point symbol only once at a specific location when rendering a layer. This preference is enabled by default. Disable to see symbols rendered at the same location, such as when using the Dispersed Groups font that comes with MapInfo Pro or when using rotated symbols.
- **Dither Method** - Select this check box when it is necessary to convert a 24 image to 256 colors, use either halftone or error diffusion. This option is used when printing raster and grid images. Dithering occurs when **Print Raster In True Color When Possible** is off or when the printer color depth is 256 colors or less. Select a dither method from the drop-down list:
 - **Halftone** dithering calculates a series of half tone differences in color between high-contrast elements in your image to create a smooth transition of color. This option is selected by default for display, print, and export options.
 - **Error diffusion** dithering calculates an interim color between contrasting colors and shades the surrounding pixels to blend evenly toward that interim color.

Note: You can select dithering separately for display, printing, and exporting on the **Display**, **Printing**, and **Exporting** tabs.

Printing tab (Output Preferences dialog box)

Click the **Printing** tab to set the printing options for **Map** windows, **Layout** windows, and all other output file types. Select the appropriate printing settings based on your output requirements. Remember that resetting these printer options locally overrides these preferences.

Output Method

- **Print Directly to Device** - Select this option to print your image file directly from MapInfo Pro. This check box is checked by default.
- **Print Using Enhanced Metafile (EMF)** - Select this option to generate an enhanced metafile of your MapInfo Pro image before sending it to the printer. This setting takes advantage of current printer technology to shrink the spool size and print your file quicker without sacrificing quality. When printing to PDF, selecting this option generates a flat, non-layered, PDF file.

Note: You must use this setting if you are printing a map containing a translucent raster or grid layer. If you do not use this setting, the image will not print translucently.

- **Print Using Offscreen Bitmap (OSBM)** - Select this option to generate an Offscreen bitmap of your MapInfo Pro image before sending it to the printer. Offscreen bitmap is invoked depending upon the type of translucent content in the map and enhanced rendering state of the window. However, setting OSBM from this window means that while printing Offscreen bitmaps (OSBM) will be selected regardless of the translucency and anti-alias settings.

- **Print Border for Map Window** - Select this check box to print a black border around the image you are printing. Clear this check box to leave the image without a border. This check box is checked by default.
- **Internal Handling for Printing Transparent Vector Fills and Symbols** - Select this check box to have MapInfo Pro handle transparent fill patterns and bitmaps for vector images when printing or exporting. This check box is checked by default. Clear this check box to let the printer or Windows export functions handle this.
- **Scale Patterns** - Select this check box to match the non-transparent fill patterns in your print output to more closely match what you see on your screen. This check box is checked by default. Clear this check box to let the printer driver have exclusive control over rendering the pattern fills.

Note: The **Scale Patterns** check box does not affect transparent fill patterns because transparent fill patterns are always scaled.

- **Subdivide Printing** - Select this check box to break print jobs into multiple, smaller, print requests for better print quality. This is useful when printing large raster/translucent maps to large paper sizes. If unchecked, the print is done in a single request.
- **Polygon Mode** - Select this check box to display the rendering that draws the object as a single request with all nodes. **Polygon Mode** has three preferences based on three types of drawing: on-screen, printing, and exporting. You can select **Polygon Mode** separately for display, printing, and export on the **Display**, **Printing**, and **Exporting** tabs. When **Polygon Mode** is off, MapInfo Pro renders with special processing.

Note: Printing to PDF files may produce extra hairlines in the output when **Polygon Mode** is off.

- **Use ROP Method to Display Transparent Raster** - Select this check box to allow the internal ROP (Raster Overlay by Pixel) to manage the transparent pixel display and printing in raster images. Since the ROP Method is largely a display method, not all printers, plotters, and export programs can use it. We recommend that you either check with the printer manufacturer before using this setting or try a few test prints or exports to get the results you want. This check box is cleared by default.

Using the ROP method may not produce problems unless you print the metafile.

- **Print Raster in True Color When Possible** Select this check box to print and export your 24-bit raster or grid file images in true color (make sure your printer settings are set to greater than 256 colors). Clear this check box if you are not working with a color printer. This check box is checked by default.
- **Dither Method** See the description under [Display tab \(Output Preferences\)](#).

Exporting tab (Output Preferences dialog box)

Click the **Exporting** tab settings to set the export options for Map windows, Layout windows and all other output file types. Select the appropriate window export settings based on your output requirements. Remember that resetting these options locally overrides these preferences.

- **Export Border** - Select this check box to include a black border on images you are exporting. This check box is checked by default. Clear this check box to export the image without a border.

Note: The preference setting definitions for **Internal Handling for Transparent Vector Fills and Symbols**, **Use ROP Method to Display Transparent Raster**, **Print Raster in True Color When Possible**, and **Dithering Methods** are the same for export as for printing.

- **Internal Handling for Transparent Vector Fills and Symbols** - Select this check box to have MapInfo Pro handle transparent fill patterns and bitmaps for vector images when printing or exporting. This check box is checked by default. Clear this check box to let the printer or Windows export functions handle this.
- **Polygon Mode** - Select this check box to display the rendering that draws the object as a single request with all nodes. **Polygon Mode** has three preferences based on three types of drawing: on-screen, printing, and exporting. You can select **Polygon Mode** separately for display, printing, and export on the **Display**, **Printing**, and **Exporting** tabs. When **Polygon Mode** is off, MapInfo Pro renders with special processing.

Note: Printing to PDF files may produce extra hairlines in the output when **Polygon Mode** is off.

- **Use ROP Method to Display Transparent Raster** - When the ROP method is selected, the transparent image is rendered using a raster operation (ROP) to handle the transparent pixels. This method is used to draw transparent (non-translucent) images on-screen.
- **Export Raster In True Color When Possible** - Select this check box to display your 24-bit raster or grid file images in true color (make sure your display settings are set to greater than 256 colors). Clear this check box to display images using 256 colors. This box is checked by default.
- **Use Anti-Aliasing** - Select this check box to apply the anti-aliasing options available in MapInfo Pro. For a description of the anti-alias preferences, see [Understanding the Anti-Aliasing Export Preferences](#).

Note: We recommend using the enhanced rendering settings that are described under *Enabling Enhanced Rendering* in the *MapInfo Pro: Managing the Look of Your Map* Guide, because they superseded these anti-alias settings. For backwards compatibility, we continue to support the previous anti-alias settings that are described here.

Note: We recommend using the enhanced rendering settings that are described under [Enabling Enhanced Rendering](#), because they superseded these anti-alias settings. For backwards compatibility, we continue to support the previous anti-alias settings that are described here.

Recommendations for Effective Pattern Scaling

When you are printing, find out what type of printer driver you are using. Many PCL6 and some HPGL drivers handle fill pattern scaling and give you control over this feature. Turning off their scaling may be the difference between what you see in print and what you see on your monitor.

Before exploring your printer driver's scaling options, we recommend you try our scaling options, because we have enhanced our method to better meet your map and layout requirements. Then try turning off our scaling and turn your printer driver's back on and see what you like better. Our tests show that our scaling seems to produce output that more closely matches your screen's display.

To turn on MapInfo Pro's pattern scaling options:

- On the **PRO** tab, select **Options**, and then click **Output Settings**.
- In the **Output Preferences** dialog box, on the **Printing** tab, select the **Scale Patterns** check box.

For a description of how to set **Scale Patterns** for a single print job, see [Handling Scale Patterns](#).

Understanding the Anti-Aliasing Export Preferences

To apply anti-aliasing to your maps, we suggest that you use the enhanced rendering settings that are described under *Enabling Enhanced Rendering* and *Anti-Aliasing*, because they superseded the settings described in this section. For backwards compatibility, we continue to support previous anti-alias settings described here.

To give you more control over map images when exporting MapInfo Pro maps, you can use anti-aliasing methods. This is particularly important when you are saving maps created in MapInfo Pro for use in other Windows-based applications, in particular in slide presentations or for web pages.

The benefits of anti-aliasing can include:

- Make your fonts look smoother
- Make jagged edges in maps look rounder
- Can make text can be easier to read (for some) because it looks more like printed type
- Make maps look more visually attractive

Anti-aliasing allows you to smooth images in all types of windows, such as **Map** windows, layouts, and legends. However, you cannot anti-alias images you are saving to .EMF or .WMF format, because these are not true raster formats.

There are three smoothing options you can use to customize your raster image:

1. Smooth using a Filter value. You can set a flag that selects one of six filters that allow you to choose the direction the filter is applied to the image from.
 - Vertically and Horizontally (Smooths the image vertically and horizontally)

- All Directions (1) (Smooths the image in all directions)
 - All Directions (2) (Smooths the image in all directions using a different algorithm)
 - Diagonally (Smooths the image diagonally)
 - Horizontally (Smooths the image horizontally)
 - Vertically (Smooths the image vertically)
2. Smooth using a Mask value. You can select a value that indicates the size of the area you want to smooth. For example, to create a 3x3 pixel mask value, you would enter a three (3) in this field. This would limit the amount of change in the color of the pixels. Typically mask sizes would be 2-3 pixels when exporting at screen resolution. If you are exporting at a higher resolution, a larger mask might be appropriate.
 3. Smooth using a Threshold value. You can select a threshold value to indicate which pixels to smooth. Each pixel in an image has a value based on its color. The smaller the pixel value, the darker the color. Select this option to smooth all of the pixels above the threshold you enter in this field. When you set this value to zero (0), MapInfo Pro will smooth all of the pixels.

You must either set a global preference for these anti-aliasing options or set them during the export process (using the **Advanced** button).

Note: For advice about handling the fill patterns you see on the screen to more closely match what the printer will produce, see [Recommendations for Effective Pattern Scaling](#).

Setting Anti-Aliasing When Exporting a Map or Layout

By default, MapInfo Pro uses the anti-alias settings made as a preference when you save a **Map** or **Layout** window as an image. You can override these preferences when you save an image by selecting the **Use Anti-aliasing** check box in the **Save Window As** dialog box.

You cannot use anti-aliasing when saving an EMF or WMF image.

To override the anti-aliasing options when saving a map as an image (exporting):

1. After completing your work in a window, click **Save Image**, which is located in the **Output** group, on the **HOME** tab.
2. In the **Save Window to File** dialog box, select the folder location to save the file to and then type a file name into the **File name** field.
3. Click **Save** to continue.
4. In the **Save Window As** dialog box, select the **Use Anti-aliasing** check box and then click **Advanced**.

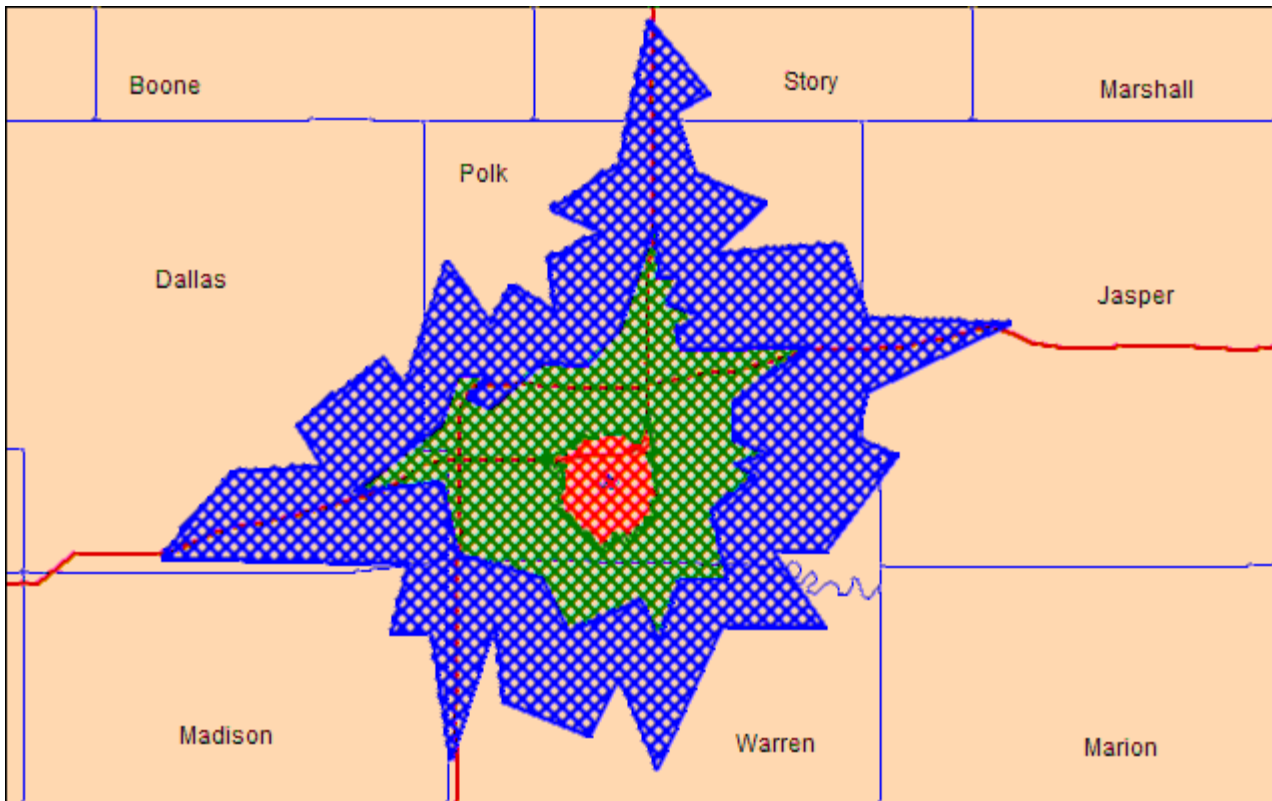
If you are exporting an EMF or WMF image, the **Use Anti-Aliasing** check box is disabled.

5. In the **Advanced Exporting Options** dialog box, change the settings in the **Anti-aliasing Options** panel: this includes **Filter**, **Mask Size**, and **Threshold**.

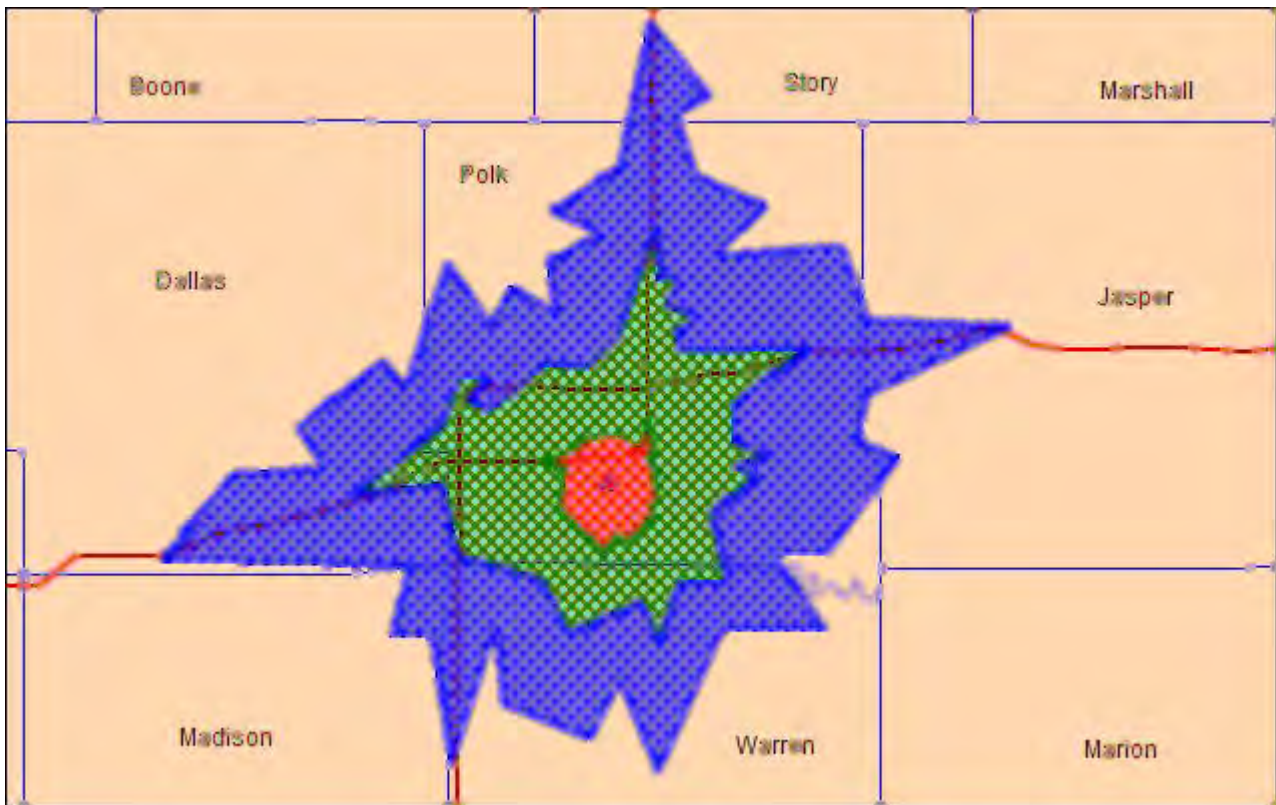
Note: You must select the **Use Anti-aliasing** check box on the **Save Window As** dialog box to enable the anti-aliasing options in the **Advanced Exporting Options** dialog box.

6. Click **OK** to close the dialog box.
7. Click **Save** to close the **Save Window As** dialog box and generate the image.

The next two figures show the results of setting an anti-alias mask. For both images, the **Filter** is set to **Vertical and Horizontal** and the **Threshold** is set to 100.



*Anti-Aliasing with **Mask** set to 2*



Anti-Aliasing with **Mask** set to 5

Enabling or Disabling Subdivided Printing

To allow print jobs to be broken into multiple, smaller print requests set the **Subdivide Printing** preference. This preference is initialized using a registry setting if it exists.

To use this option, you need to add a registry key to your local machine. We have created an online Knowledge Base document that contains the registration (.reg) files inside a ZIP file that you can use to enable or disable this option automatically. You will need to save the ZIP file locally, open the ZIP file and double-click the appropriate registry file to add this option to the registry. Adding registry keys to your computer requires Administrator rights, or at least write access to your computer's registry. If you do not have this type of access, we recommend you see your System Administrator for instructions.

1. On the **PRO** tab, click **Options**, and **Output Settings** to open the **Output Preferences** dialog box.
2. On the **Printing** tab, select the **Subdivide Printing** check box to break a print job into multiple, smaller print request. Clear the check box to print as a single request.
3. Click **OK** to close the dialogs and save your settings.

Note: Subdivide Printing is especially useful if printing large raster and/or translucent maps to large paper sizes.

Setting Your Language Preferences

You can work with characters from any language in your data files. MapInfo Pro can open tables, files, or workspaces with Unicode characters in the file name or path name regardless of the locale of MapInfo Pro or which localized version of MapInfo Pro you are running. A system setting called **Encode Workspaces and Tab Files** enables this feature, which is off by default. For more details, see [Using Data Files in Any Language or Character Set](#).

To support content from multiple languages, MapInfo Extended tables (*.tab) and Interchange files (*.mif, *.mid) can be written with UTF-8 and UTF-16 character sets, and Workspaces are created in the UTF-8 character set. You cannot use these tables with versions of MapInfo Pro that are older than version 15.2. MapInfo Pro also opens tables from other supported sources that are Unicode, such as, Shape (*.shp), Oracle, SQL Server, SQLite, PostGIS, Comma Separated Value (*.csv), and Text (*.txt) files.

Note: PostGIS requires using a Unicode driver.

A system setting called **Charset** lets you specify the character set, such as UTF-8 or UTF-16, you want to write files to. The default setting is UTF-8.

To enable the **Encode Workspaces and Tab Files** feature and set UTF support:

1. On the **PRO** tab, click **Options**, and **System Settings** to open the **System Settings Preferences** dialog box.
2. Select the **Encode Workspaces and Tab Files** check box to enable this feature or clear the check box to disable it.

This is enabled by default to work with multi-language tables.

3. On the **New Tables** panel, select a unicode (UTF) character set from the **Charset** list.
Change this when you want to work with a specific character set. The default setting is UTF-8.
4. Click **OK** to close the dialog and save your settings.

12 - Productivity Aids

This section lists tools and productivity aids available with MapInfo Pro.

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MapInfo Pro Tools

Working with MapInfo Pro Tools

MapInfo Pro installs with a library of tools designed for specific tasks or work flows. Some of these tools are pre-registered with MapInfo Pro, so that you can work with them. For a list of the tools that install with MapInfo Pro, see [Summary of MapInfo Pro Tools](#). At any time you can register more tools with MapInfo Pro as described under [Adding More Tools](#).

MapInfo Pro tools are written in MapBasic and provide additional features to make your work easier. MapBasic is MapInfo Pro's programming language that allows you to customize and automate MapInfo Pro functionality. You can also use MapBasic to create your own custom tools, or you can obtain tools from the MapInfo Pro community or from a vendor.

To get tools from the MapInfo Pro community, on the **HOME** tab, in the **Tools** group, click **Tool Extensions** to open the Tools Manager window. On the **Options** list, click **Get Tools** . This launches your Internet browser to a community download page, where you can share and obtain MapBasic tools.

Running a Tool

To run a tool:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**.
2. On the **Running** tab, double-click on the tool name that you want to run.

If you do not see the tool that you want to work with, go to [Loading a Tool](#).

The tool launches, or it integrates into the ribbon to the **LEGACY** tab or to another location.

- **Catalog Browser** is in the **Open** list, which is on the **HOME** tab in the **File** group, and on the **TABLE** and **MAP** tabs in the **Content** group.
- **Sync Window** is on the **MAP** tab.
- **Universal Translator** is on the **TABLE** tab, in the **Content** group.

Note: You can dock the **Tools Manager** window to the side of the MapInfo Pro screen by clicking on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Tool Extensions** from the list. This makes it easier to access a tool running in the **Tools Manager**.

Loading a Tool

If you do not see the tool that you want to work with on the **Running** tab in the Tools Manager, then you must load it.

To load a tool, so that you can run it:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**.
2. On the **Register** tab, locate in the list the tool that you want to work with. Select the **AutoLoad** check box beside it to load the tool every time you start MapInfo Pro.

If you do not see the tool that you want to work with, go to [Adding More Tools](#).


3. On the **Register** tab, click the **Load Tool (Run)** icon beside the tool name. This icon displays when you hover the mouse cursor over the tool name. The tool is now running and displays in the list on the **Running** tab.

Some tools require that you double-click on the tool name on the **Running** tab in the Tool Manager. Other tools add commands to the MapInfo Pro ribbon when they are running. See the tool description for notes about how to use it.


Unloading a Tool

You would unload a tool when you no longer need it. Unloading a tool does not delete the tool or any files associated with the tool, it just removes it from the **Running** tab in the Tools Manager and from the MapInfo Pro ribbon.

To unload a tool:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**.
2. On the **Running** tab, scroll to locate the tool you want to unload, and then click the **Unload Tool**  button beside its name.

The tool is no longer shown on the **Running** tab in the **Tools Manager** window.

To unload all tools, form the **Options** list on the **Tools Manager** tab, click **Unload All Tools** .

Adding More Tools

MapInfo Pro installs with more tools than are shown on the **Register** tab in the Tools Manager.

To register more of the tools that are supplied with your MapInfo Pro installation:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**.
2. Click **Options** on any of the tabs and then click **Run Program** to open the **Run MapBasic Program** dialog box.

By default, this dialog box opens to the **Tools** folder where MapInfo Pro is installed (for example, C:\Program Files\MapInfo\Professional\Tools).

3. Scroll through the list of tools to find the one you want to add, select it, and click **Open**.


Valid tools have a .MBX extension on their file names.

Note: There are tools that are not stored in the `Tools` directory but rather in their own directory. You can search for an .MBX file using this same procedure.




4. Follow the steps under [Running a Tool](#).


Loading/Autoloading External Tools

You can use MapBasic to create your own custom tools, or you can obtain tools from the MapInfo Pro community or from a vendor. You must register these external tools with MapInfo Pro before you can load and run them.

Note: To get tools from the MapInfo Pro community, on the **HOME** tab, in the **Tools** group, click **Tool Extensions** to open the Tools Manager window. On the **Options** list, click **Get Tools** . This launches your Internet browser to a community download page, where you can share and obtain MapBasic tools.

To register an external tool, which is a .MBX file, with MapInfo Pro:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**.
2. Click **Register Tool**  to open the **Register Tool** dialog box.
3. In the **Title** field, enter a name for this tool.
4. In the **Path** field, either enter the path and file name of the tool, or click the **Browse**  button beside the field to locate the file.
5. In the **Image** field, either enter the path and file name of an image to associate with this tool, or click the **Browse**  button beside the field to locate the image file. This field is optional.
6. In the **Description** box, enter information about what this tool does. Make the description as meaningful as possible for others that may also need to use this tool. This field is optional.
7. Click **OK** to register the tool with MapInfo Pro.

The tool displays in the Tools Manager on the **Register** tab, which you can view by clicking on the Tools  shortcut on the right-side of the MapInfo Pro screen. If you do not see the shortcut, then on the **HOME** tab, in the **Tools** group, click **Tool Extensions**.

You are now ready to load and run the tool, see [Running a Tool](#).

See Also:

[Running a MapBasic Program](#)

[Running a MapBasic Program Using a Startup Workspace](#)

Removing a Tool from the Tools Manager

You may not need all of the tools you have access to in the **Tools Manager**, so you can unregister a tool to remove it from the list. When you unregister a tool, you do not delete the tool or any files

associated with the tool, you just remove it from the list of registered tools in the **Tools Manager** window.

To unregister a tool from the Tools Manager:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**.

If present, you can also click on the Tools  shortcut on the right-side of the MapInfo Pro screen.

2. On the **Register** tab, scroll to locate the tool you want to unregister, and then click the **Unregister Tool** button beside its name.

The tool is no longer registered with your MapInfo Pro software, and is removed from the **Register** tab.

Autoscrolling While Using Tools

When you use a tool in the **Map** or **Layout** window, the window scrolls if you drag the tool outside of the window boundaries. The window will continue to scroll until you release the mouse or move the cursor back into the window.

Press **Esc** to stop scrolling; the tool remains active.

To cancel the tool, press **Esc** after the scrolling has stopped. Autoscrolling works with any tool that can be dragged; it does not work with single-click tools, such as the **Pan** or **Info** tools.

Configure MapInfo Pro on Initial Startup

System Administrators managing MapInfo Pro installations can create a workspace file, named `AddUser.wor`, that contains initial setup commands for MapInfo Pro. This is useful when you create or obtain custom tools that you want to load and register with MapInfo Pro. MapInfo Pro runs the `AddUser.wor` the first time a user launches MapInfo Pro. If multiple users are working with MapInfo Pro, then this file is run for each user.

You can use any valid WOR command within the `AddUser.wor` file. Save the file to the MapInfo Pro application directory (for example, to `C:\Program Files\MapInfo\Professional`).

Summary of MapInfo Pro Tools

The following is a list of the MapInfo Pro tools.

Tool	Description
Catalog Browser Tool	Use this tool to locate descriptive information about spatial and non-spatial datasets. This information is referred to as metadata. Metadata describes information about the data, such as its title, creation/modified date, coordinate reference system and location.
Command Editor Tool	The Command Editor customizes keyboard short-cuts and command resources.
Coordinate Extractor Tool	Allows you to add two columns to an open table and updates each column with x and y coordinates in the table's native projection. For objects other than points, the x and y coordinates will represent CentroidX and CentroidY locations.
CoordSys Bounds Manager Tool	This tool checks and sets the coordinate system bounds for mappable MapInfo Pro base tables.
Degree ConverterTool	Converts a column of data containing DMS coordinates to Decimals, and Decimal Degrees to degrees/minutes/seconds.
Delete Duplicates Tool	Use this tool to delete duplicate records from a table while retaining map objects. This tool does not change the original table in any way.
Disperse Points Tool	Use this tool to disperse points located at the same position. Points can be dispersed systematically or randomly. You can disperse points in the same position either systematically or randomly using the Disperse Points tool.
Distance Calculator Tool	The Distance Calculator tool (<code>DISTANCECALC.MBX</code>) is used to calculate the distance from a selected object (or group of objects) to the closest or farthest object(s). You can also specify criteria to limit the results.
Drivetime tool	Use this tool to access a Driving Regions server to create time-based and distance-based buffers for the selected table entries..
Geocode Tool	Use this tool to assign geographic coordinates to your data.
GELink: Link Utility for Google Earth	Use this tool to display your map data on Google Earth Maps.
Grid Maker Tool	Draws a Graticule: a grid of latitude/longitude lines.
Layout Scale Bar AddIn	Use this tool to create a custom distance scale bar to annotate a Map window. This tool can also be used in Layout windows. (For improved map annotation, see <i>Adding an Adornment to Your Map</i> in the <i>MapInfo Pro: Managing the Look of Your Map</i> Guide to add a scale bar to your map using the Scale Bar menu option.)

Tool	Description
MapCAD Tool	This product provides tools that work with MapInfo Pro to create maps that are appropriate for land development and surveying tasks.
MapInfo EasyLoader Tool	MapInfo EasyLoader is a Windows-only utility that is loaded using the Tools Manager. MapInfo EasyLoader let you upload MapInfo Pro tab files to a remote database. For details, see the MapInfo EasyLoader <i>Help System</i> .
Named Views Tool	Use this tool to save a Map window's current zoom and center as a named view. Return to that view by selecting the view name from a dialog box.
North Arrow Tool	Add North Arrows of various styles and optionally add a Magnetic Declination arrow. A North Arrow can be added to a Map or Layout. You can either specify from the dialog box which corner to position the North Arrow, or use the toolbar button to drag a rectangle and place the North Arrow at the specified location.
Pack Tool	Use this tool to compress multiple tables together in a single operation. Pack tool replaces the table manipulation command Pack Table under the TABLES tab. For details about packing and compressing tables, see Packing a Table .
Proportional Overlap Tool	This tool calculates proportional aggregates for objects in a target table that overlap with objects in a base table. Calculation results are added to a new or to an existing column in the target table.
Quick Search Tool	Use this tool to quickly search and execute commands on the MapInfo Pro ribbon.
RDBMS Set MBR Tool	Use this tool to change the bounds of a table in the MapInfo Map Catalog, in a remote database.
Register Vector Tool	Use this tool to put control points into a vector image and reference points into a Map window and then performs an affine transformation to line them up.
Rotate Labels Tool	This tool is used to rotate labels in a Map window.
Rotate Map Window Tool	Rotate Map Window enables you to rotate the contents of the current map window a specific number of degrees.
Rotate Symbols Tool	Use this tool to rotate all the symbols in a map layer at once.
Seamless Table Manager Tool	Use this tool to create and manage seamless map sheets.
Search and Replace Tool	Search a character column for a specific string and replace it with another string or to search and replace multiple column entries.

Tool	Description
Spider Graph Tool	This tool draws lines between objects in a single table, or the objects from two tables based on a join. It then creates a new table of lines that connect the objects from the original table(s) based on matching column names.
Synchronize Windows Tool	This tool provides toolbar icons that allow you to automatically share changes made in one mapper window to all other mapper windows in a given MapInfo Pro session.
Symbol Maker Tool	This tool allows you to create, edit, or delete symbols from the MapInfo 3.0 Compatible symbol font.
Table Manager Tool	This tool allows you to get info about all currently open tables.
Transfer Labels Tool	This tool allows you to transfer your layer's labels into permanent text objects.
Universal Translator Utility (FME Quick Translator)	Import and export MapInfo Pro data to and from other popular mapping file formats. Provides a log file viewer to confirm log file changes.
Window Manager Tool	This tool assigns the title of Map , Browser , Layout , Layout , and Redistrict window and the default table view..
Workspace Packager Tool	Use this tool to create a copy of a workspace in a new location or folder, and copies all the data referenced by the workspace to the same location. MapInfo Pro updates the internal references in the workspace and .TAB files to point only to the "packaged" copies of the data, so you can open the new workspace no matter where the folder is moved or copied, even if the folder is moved or copied to a different computer.

Catalog Browser Tool

The Catalog Browser is a tool in MapInfo Pro that allows you to locate descriptive information about spatial and non-spatial datasets. This information is often referred to as metadata. Metadata describes information about the data, such as its title, creation/modified date, coordinate reference system and location.

Metadata is stored in a catalog as individual records for each dataset. Organizations, particularly those in the public sector, make their catalogs known to others to describe and advertise the availability of their spatial datasets. The Catalog Browser enables you to see what data is available and how to get it.

The Catalog Browser can search any available CSW-compliant catalog. Note that some catalog capabilities are limited by the organization who owns the catalog, such as the ability to edit metadata

and access datasets for free. Information from the owner organization is provided in the metadata for each record.

You can search and view metadata records with the Catalog Browser. In the future, a CSW-compliant Catalog service and catalog from Precisely will be available as a separate purchase that support enhanced operations, such as records management and harvesting.

You can launch the Catalog Browser from the **Open** list, which is on the **HOME** tab in the **File** group, and on the **TABLE** and **MAP** tabs in the **Content** group.

If you do not see the Catalog Browser in the **Open** list, then you must add it to MapInfo Pro, as described under [Working with MapInfo Pro Tools](#).

For how to work with the Catalog Browser, see the Catalog Browser *Help System*.

Supported Standards

The Catalog Browser supports CSW and ISO/GMD standards for metadata records. We provide URLs to several catalog servers that you can search, each returning results as csw:Record and/or gmd:MD_metadata record types. The Catalog Browser also supports the U.S. FGDC standard, as well as the INSPIRE, GEMINI(UK) and ANZLIC (Australia/New Zealand) profiles that extend the ISO standard.

Acquiring Data

If a metadata record provides access to the dataset it describes, Catalog Browser provides a number of ways of bringing the data directly into a MapInfo Pro map Window. Catalog Browser supports opening .TAB, .WOR, self-registered raster images, Tile Servers, WFS and WMS, and .ZIP files. Data in web archive files can be copied locally for further investigation. Finally, Catalog Browser will launch browsers, email clients, Windows Explorer and other system programs as required by links that cannot be readily opened in MapInfo Pro.

Concentric Ring Buffer Tool

This tool creates concentric ring buffers around one or more map objects. The tool also computes aggregated values for underlying data that occur within each ring. Therefore, it can be used to count how many customers occur within each ring and their total sales.

For information about how to add a tool to the Tool Manager, see [Adding a Tool Using the Tools Manager](#).

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

To create a concentric ring buffer:

1. Select the object(s) you want to place buffers around in the Map window.
2. On the **Tools** menu, choose **Concentric Ring Buffers** and click **Create Ring Buffers**. The **Concentric Ring Buffers** dialog box displays.

3. To add a ring, specify the radius in the **Radius** field and click **Add Ring**. Continue this until you have added all of the rings you want from the smallest to largest.
4. Select the units of each radius in the Units drop-down list.
5. To set the smoothness of the ring buffer, type a number between 3 and 100 in the **Smoothness** field. The larger the number, the smoother and less jagged the curves of the ring.
6. Type the table name and select the path in which you want to store this buffer information. MapInfo Pro stores the concentric ring buffer information into this table including the columns containing the ring number, radius value, radius units, area, and area units for each ring.
7. When you have finished the buffer settings, click **OK**.

Use the **Modify Ring** and **Delete Ring** buttons to change the ring settings, or click **Clear All** to start all over and create new concentric rings. To change the style of a buffer ring, select it in the Buffer Radii list, and use the style buttons to change the fill pattern and line style for the buffer. You can also collect data within each buffer ring using the **Calculate Ring Statistics** button.

Coordinate Extractor Tool

This tool extracts x, y coordinates for each record in your table using a projection in the MAPINFOW.PRJ file and places them in designated columns.

The COORDINATEEXTRACTOR.MBX tool allows you to add two columns to an open table and updates each column with x and y coordinates in the table's native projection. For objects other than points, the x and y coordinates will represent CentroidX and CentroidY locations. You can extract coordinates in any projection listed in the .prj file. The Coordinate Extractor also displays current table projections and gives the option to change to a different projection.

The Coordinate Extractor tool can be used on mappable tables that contain at least one geographic object. This tool cannot be used on the following types of tables:

- Query
- Read-Only
- Seamless
- Remote
- Raster

It is recommended that you use float type columns for the coordinates. Other column types may not be able to fit all the coordinate information in the column. If you select character columns, the coordinate values will include six digits after the decimal place.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids* Guide.

Displaying your Coordinate Data in a Browser

To use the Coordinate Extractor:

1. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and double-click **Coordinate Extractor** on the **Running** tab.

The **Coordinate Extractor** dialog box opens.

2. Select the table that you want to extract the points from.
3. Indicate the columns you want to use for the X and Y coordinates, or click the **Create new columns to hold coordinates** button to have the tool add the columns. When you click this button, a dialog box displays asking you to name the columns.
4. Select the **Browse Results** check box to have the results displayed in a Browser window after the operation is completed.
5. Click **OK**.

To take out the coordinate information after you have used Coordinate Extractor, revert the table.

CoordSys Bounds Manager Dialog Box

The CoordSys Bounds Manager checks and sets the coordinate system bounds for mappable MapInfo Pro base tables. This is useful for controlling the resolution of object coordinates. The CoordSys Bounds Manager works only with open, mappable, base tables.

This tool is available on the Tools Manager, on the **HOME** tab, in the **Tools** group, click **Tool Extensions**.

For instructions on how to load and run tools, see [Working with MapInfo Pro Tools](#).

For instructions on how to load and run tools, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids* Guide.

Note: The coordinate system bounds are usually much larger than the actual data bounds, which may make finding your displayed data difficult. You are usually zoomed out too far to be able to locate your data easily.

Tables

Lists all currently open native TAB files. Select the table to check or set the coordinate system bounds for.

Table CoordSys Bounds

Displays the X and Y coordinates that match the bounds of the table. Provide X and Y coordinate values in the same number of decimal digits (unless ending in zeros). The number of decimals varies within a certain range with the level of internal precision.

Min X

Minimum X value.

Min Y

Minimum Y value.

Max X

Maximum X value.

Max Y

Maximum Y value.

Actual Data Bounds

Displays the X and Y coordinates that match the actual data bounds.

Min X

Minimum X value.

Min Y

Minimum Y value.

Max X

Maximum X value.

Max Y

Maximum Y value.

Table CoordSys**Name**

Displays the coordinate system projection name that the table is in.

Clause

Displays the MapBasic CoordSys clause for the table, which shows the CoordSys Earth Projection *type* value and *datum* value.

Buffer % for Bounds Optimization

This controls how close the new bounds rectangle is to the actual limits of the data in the table. Enter a positive value. A value of zero (0) sets the bounds to the limits of the data in the table.

ReRead CoordSys Bounds

Click to refresh the dialog with the coordinate system bounds information set for the table.

Optimize CoordSys Bounds

Click to match the table coordinate system bounds to the actual data bounds. The match applies the **Buffer % for Bounds Optimization** value to calculate the table coordinate system bounds.

Save Table As with CoordSys Bounds

Click to save a copy of the table with your settings.

Save Table As without CoordSys Bounds

Click to save a copy of the table without coordinate system bounds information.

Draw outline of bounds

Click to show the coordinate system bounds on the map.

Copy

Click to select and copy the text in the **Clause** field to paste it into your MapBasic application or MapBasic window. (If you can edit the text in the Clause field while in copy mode, the CoordSys Bounds Manager ignores the edits.)

Cancel

Click to close the dialog box.

Degree Converter Tool

This tool converts a column of data containing DMS coordinates to Decimal Decimals and Decimal Degrees to degrees/minutes/seconds. The Degree Converter tool is part of the toolset that ships with MapInfo Pro. It converts coordinate information to decimal degrees from a degrees, minutes, seconds (d/m/s) format. It can also convert the columns back to degrees, minutes, seconds from decimal degrees.

Note: You can also use the Degree Converter to convert decimal degrees back to degrees, minutes, seconds format. Use this feature if you must return the data to its original format.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids* Guide.

Converting Degree/Minute/Second Coordinates into Decimal Degrees

The Degree Converter tool is part of the toolset that ships with MapInfo Pro. It converts coordinate information to decimal degrees from a degrees, minutes, seconds (d/m/s) format. It can also convert the columns back to degrees, minutes, seconds from decimal degrees.

Before using this program, make sure that there are two new columns available to hold the converted data. You can also use the Degree Converter to convert a single Latitude/Longitude coordinate to either decimal degrees or D/M/S. You can also run this program with the **Run Program** command, as well as any of the other tools in the Tools Manager.

If you are entering map coordinates in degrees, you must enter decimal degrees as opposed to degrees/minutes/seconds. For example, to specify the coordinates 40 degrees, 30 minutes, enter 40.5 degrees.

MapInfo Pro includes a MapBasic application, `DMSCNVRT.MBX`, which converts d/m/s coordinates into decimal degrees.

To convert degrees, minutes, seconds coordinates to decimal degree coordinates:

1. Run the **Degree Converter** tool to display the **Decimal / Degree Converter (Version 1.3)** window. See [Running a Tool](#) for details.
2. Select the table containing the columns for conversion.
3. Choose one of the columns containing the coordinate information. You have to run the program once for the longitude (X) column and once for the latitude (Y) column.

4. Enter the **DMS Separator**. You should be able to look at your table and identify the character separating the degrees, minutes, and seconds entries.
5. Choose the column for the converted results and click **OK**.
6. Browse your table to see the new column of coordinate information in decimal degrees. Repeat this procedure for your other coordinate column. You are ready to use the **SPATIAL** menu to click the **Create Points** command.

Note: You can also use the Degree Converter to convert decimal degrees back to degrees, minutes, seconds format. Use this feature if you must return the data to its original format.

Delete Duplicates Tool

The **Delete Duplicates** tool deletes duplicate records from a table while retaining map objects. This tool does not change the original table in any way. Keep in mind that MapInfo Pro has a 255 byte/5-column limit for a Group by clause, so you may have to change the size of your columns if they are unusually wide.

When we say duplicate rows, we mean rows that have duplicate occurrences of the same column value for the column you select.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Removing Duplicate Records from a Table

Before you open the **Delete Duplicates** tool in MapInfo Pro, make sure the tables you want to work with are open.

To remove duplicate records from a table and save the cleaned table to a new file:

1. Open the table or tables you want to delete duplicates from.
2. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and double-click **Delete Duplicates** on the **Running** tab.

The **Delete Duplicate Records** dialog box opens. The list of tables on the left contains all of the currently open tables.

3. Select the table you want to delete duplicates from in the first column. A list of the columns in that table displays on the right.
4. Select the column that contains information that should be unique to each row from the **Select Columns** list.

CAUTION: To avoid deleting data incorrectly, give this step a lot of thought. For example, we do not recommend you select customer names or addresses for this step.

5. Select the **Count** check box to add a column to your new table that shows the number of instances of the column value found in the original table. This is an optional feature.
6. Click **OK**. The **Please Choose a Path** dialog box displays.

7. Select a path and a file name for the new table in this dialog box. Then select **Save**. The tool removes rows containing duplicate column values according to the column you selected. A Browser window displays with the results of the new table.

The last column contains the count of instances of the row containing duplicate column values in the original table.

Disperse Points Tool

This tool disperses points located at the same position. Points can be dispersed systematically or randomly. You can disperse points in the same position either systematically or randomly using the Disperse Points tool. This tool is a MapBasic program that ships with MapInfo Pro.

To disperse points:

1. On the **HOME** tab, click **Tool Extensions**. On the **Running** tab, click **Disperse Points**.
2. Choose the table containing the points to be dispersed. Click **OK**.
3. A warning displays suggesting that you save a copy of the table if you have not already done so. If you are working with a copy of the original table, click **Continue**.
4. Choose the appropriate method for dispersing points. Click **OK**. Methods include:
 - **Systematically N, S, E, W, NE, SW, NW, SE**: Points are dispersed roughly one symbol width away from the original point in eight possible directions.
 - **Systematically "Around The Clock"**: Points are dispersed roughly one symbol width away from each other in a clockwise fashion.
 - **Randomly**: Points are clustered around the original location in a random pattern. In this case, the points can end up overlapping each other.
 - **Randomly with Call Out Lines**: Random dispersion with a callout line to indicate the original location of the point.

The **Zoom Level** dialog box displays.

5. Enter the zoom level at which you will typically view the table. This is so the dispersal distance can be customized to that particular zoom level.
6. Click **OK**.

Note: The program works slightly faster if you do not display the table you are dispersing.

CAUTION: This program permanently changes the table. Save a copy of the table before running this program to be safe.

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Distance Calculator Tool

The Distance Calculator tool (`DISTANCECALC.MBX`) can be used to calculate the distance from a selected object (or group of objects) to the closest or farthest object(s). You can also specify criteria to limit the results.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Using the Distance Calculator Tool

To use the Distance Calculator tool:

1. Open the table you want to calculate the distance in.
2. Run the **Distance Calculator** tool to open the **Distance Analysis** window. See [Running a Tool](#) for details.

On the **MAP** tab, in the **Options** group, click **Map Tools**, and then click **Distance Calculator**.

3. From the drop-down lists at the upper right part of the **Distance Analysis** dialog box, you specify the origin and destination tables and their unique identifying columns.

For example, you can calculate the distance between each customer site listed in the `US_CUSTG` table and the nearest big city listed in the `CITY_125` table. The accompanying **Layer Control**, **Select**, **Zoom**, **Pan**, and **Snap** buttons function just as they do throughout the MapInfo Pro interface.

4. When you click **Calculate Distance**, the results of the distance query are displayed in the **Browser** window. The results may then be cleared (**Clear Results**) saved to a table (**Save Results**), or appended to. To discard the current results and generate new results, select **Clear Results** before recalculating distances.

To append more results, change table, column, and other criteria as desired, then click **Calculate Distance**. The new results will be added to the bottom of the results table.

5. Optionally, you can also set destination criteria to limit the results. For example, after checking the **Use the following criteria** check box you could restrict your results according to selected criteria (for example, to cities with populations greater than a specified number).
6. Optionally, you can restrict the number of destination distances to find for each origin point. The default is 1.
7. You can also select the display distance units that are used for calculating distances. The default is miles.

When you click **Calculate Distance**, the possible destination points are limited to the subset defined by your criteria.

Example of Find Nearest Use

The following example shows the closest distances between California customer sites in the `US_CUSTG` table and cities with over 2 million population.

1. Select **Layer Control** and make sure that the `US_CUSTG` table is the topmost selectable layer. This may mean that you need to clear the **Selectable** indicator for other layers.
2. Use the **Boundary Selection** command to select California (on the **MAP** tab, in the **Selection** group, click **Boundary Selection** from the selection list). This restricts results to origins (in this example, Customers) within the state of California.
3. Select **Selection from US_CUSTG** from the origin table drop-down list.
4. Select **Company** for the origin table identifying column.
5. Select **CITY-125** for the destination table.
6. Select **City** for the destination table identifying column.
7. After checking **Use the following criteria**, specify `Tot_pop > 2000000` to target destination cities with a population greater than 2 million.
8. In **Enter the number of distances to find** enter the number 2 to limit the results to two destinations for each origin.
9. Make sure you **Clear Results** to clear previous results from the Results Browser window; otherwise the new results would be appended to the previously displayed results.
10. Click **Calculate Distance**.

Notes on Using the Distance Calc Tool to Find Nearest/Farthest

The Distance Calculator tool calculates the distance between all the objects in a table or all the objects between two tables and displays the results in a Browser window. When you are processing distances for Region or Polyline tables, the processing time may be slower, due to the complex nature of the calculation.

Drivetime Regions Tool

Drivetime Regions is a MapInfo Pro tool that is loaded by default when you install MapInfo Pro. This tool replaces the older **Drivetime Regions (Table)** Utility that used an Envinsa 4.0 server. Using this tool, you can access a Driving Regions server to create time-based and distance-based buffers for the selected table entries. MapInfo Pro accomplishes this by connecting to:

- Spectrum Spatial Server.
- Precisely LI APIs.

You can load or unload the **Drivetime Regions** tool from the **Tool Extensions** drop-down list under the **Tools** group on the **HOME** tab.

Note: The older **Drivetime Regions (Table)** utility is visible only when the **Drivetime Regions** Tool is not loaded. When loaded, the **Drivetime Regions** tool takes precedence and replaces the older version.

How do I access the Drive Regions command?

1. There must be an open table for this command to work.
2. On the **SPATIAL** tab, in the **Create** group, on the **Regions** list, click **Drive Regions** from the list.

Geocode Tool

Geocode is a MapInfo Pro tool that is loaded by default when you install MapInfo Pro. This tool replaces the older **Geocode using Server** Utility. Using this tool, you can assign geographic coordinates to your data, which can be street addresses. Point values assigned to each address turn each record into a geographic object that MapInfo Pro can display on a map. Visualizing your records on a map can make the relationships among your data clearer. You can display your geocoded records against a street map, a postal code centroid map, a county map, or whatever is most appropriate to your needs. You can then use the wide variety of functions available in MapInfo Pro mapping software to perform querying, create thematic maps, create territories, and perform many other types of geographic analysis.

MapInfo Pro accomplishes this by connecting to:

- Spectrum Spatial Server.
- Precisely LI APIs.

You can load or unload the **Geocode** tool from the **Tool Extensions** drop-down list under the **Tools** group on the **HOME** tab.

Note: The older **Geocode using Server** utility is visible only when the **Geocode** Tool is not loaded. When loaded, the **Geocode** tool takes precedence and replaces the older version.

How do I access the Geocode Tool?

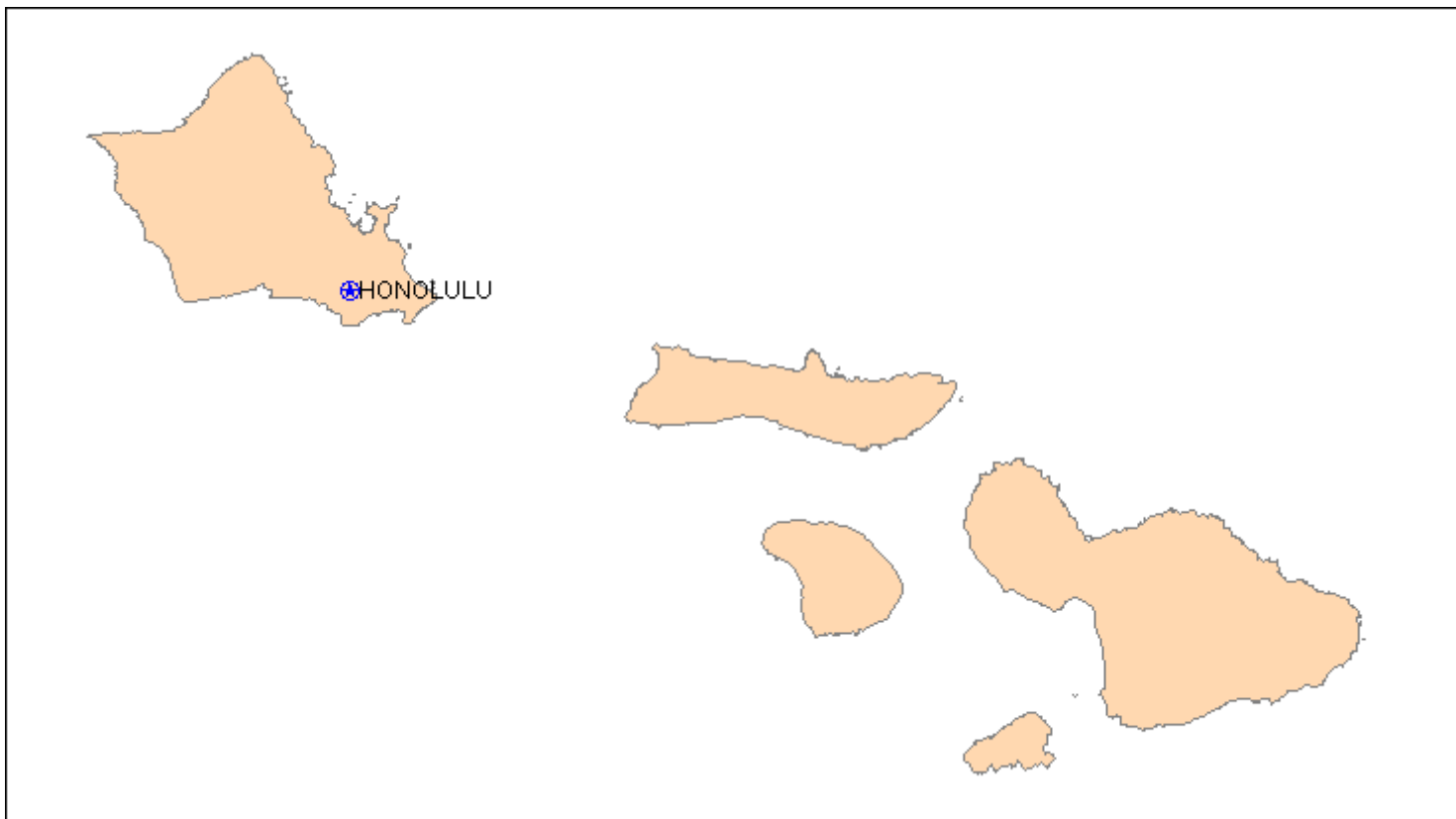
1. There must be an open table for this command to work.
2. On the **SPATIAL** tab, in the **Create** group, on the **Geocode** list, click **Geocode using Server** from the list.

For details, see [Geocoding a Table using a Geocode Tool](#)

GELink Utility for Google Earth

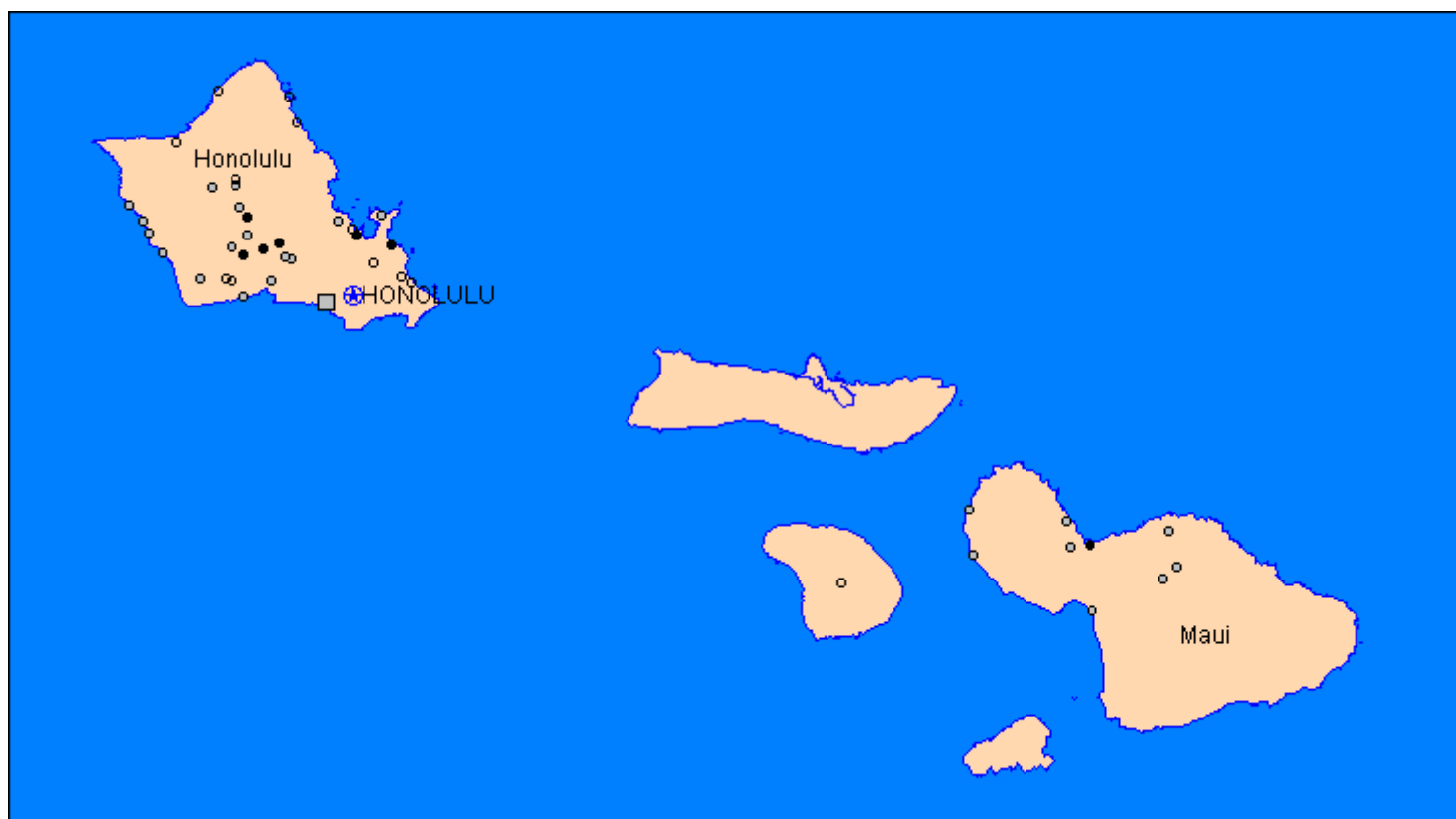
GELink gives you a way to export and display MapInfo Pro raster and vector map data on top of detailed Google Earth™-hosted aerial photos from all over the world. You can export these maps as raster images (in .jpg format) or in Google data format (known as .kml).

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro Productivity Guide*.



Simple Vector Map

When we add the ocean, cities, and labels, the same map starts to provide perspective.



More Complex Vector Map

You can export both types of maps from MapInfo Pro using the Link Utility to the Google Earth application.

Accessing the Link Utility for Google Earth

To access the Link Utility for Google Earth, add the **GELink** tool to the Tools Manager.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro Productivity Guide*.

Exporting a Map to Google Earth

Thematic maps and style overrides must be sent to the Google Earth application as a raster image.

To display a view of your point, line, or region thematic map on a Google Earth map:


1. Create the thematic map you want to display using the Link Utility. Refer to the *MapInfo Pro User Guide* for assistance.
2. Display the view you want to export in the Map window. The limits of your map view will represent the limits of your exported map.




Thematic Map before Export

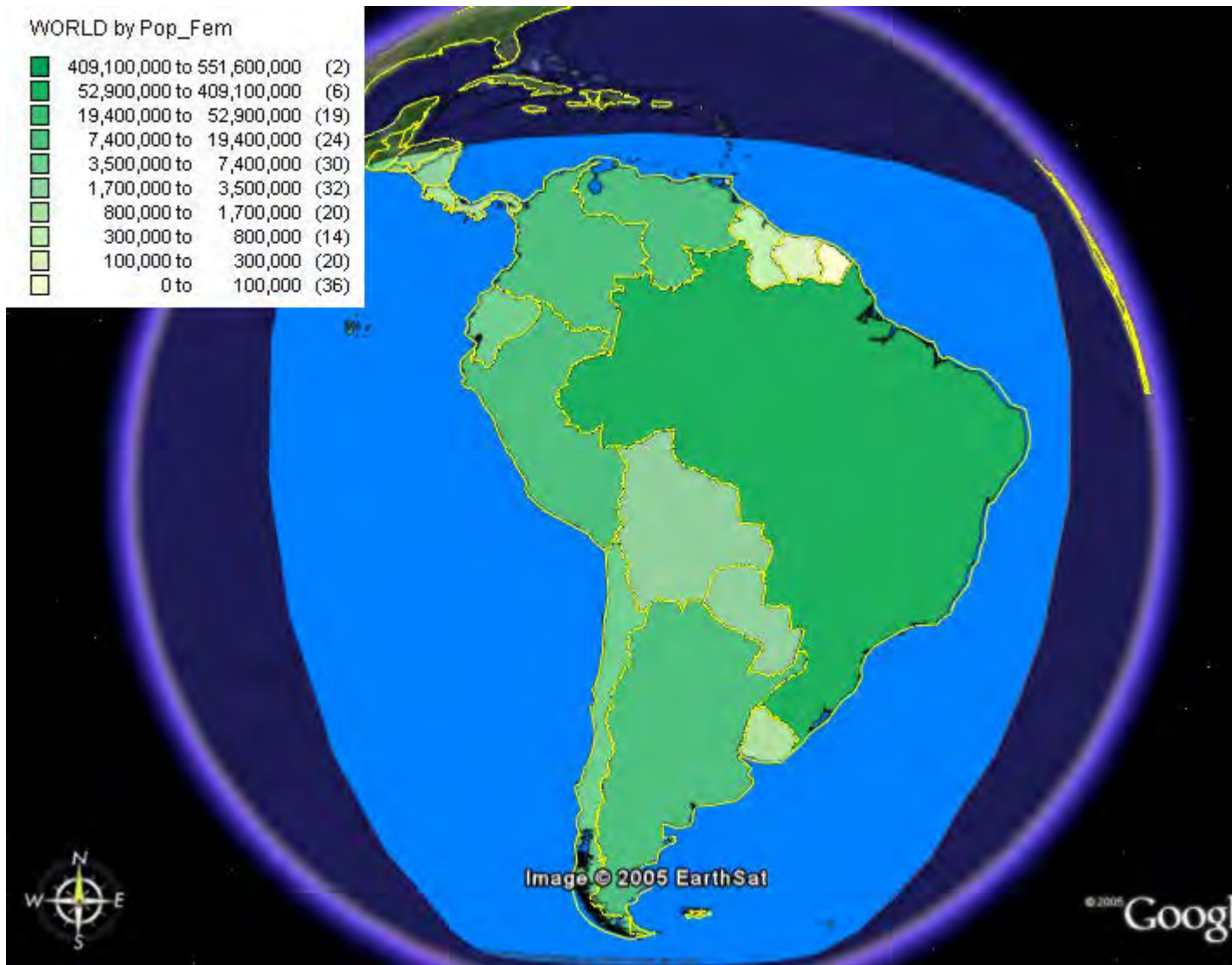
- 3. On the **HOME** tab, in the **Tools** list, right-click on **GELink** and click **Export Map Image or Current Selection to Google Earth**. The **Export to Google Earth** dialog box displays.

Note: Since you did not select a particular object in this image to export, the utility assumes you want to export the whole image as a raster map.

Output Path	Use the  button to select a folder or leave the current entry as is to accept the default location.
File Name	Type a new name for the file you are creating or accept the default entry.

Place Name	Indicates the name that displays in the Places list representing the map you are exporting. You can type over this entry or you can accept the default.
Specify a file containing the copyright text	Select the check box beside this option and use the  button to find the file that contains the copyright text.
Send to Google Earth Now	Select this option to save the raster file locally rather than displaying it in Google Earth.

4. Complete the entries in this dialog box. Click **OK**. If you did not select the Send to Google Earth Now option, the Google Earth map displays with the thematic map view you exported on it.



Thematic Map Exported to Google Earth with Legend

You can also export WMS and WFS images using this utility.

Enhancing the Display of your Exported Map

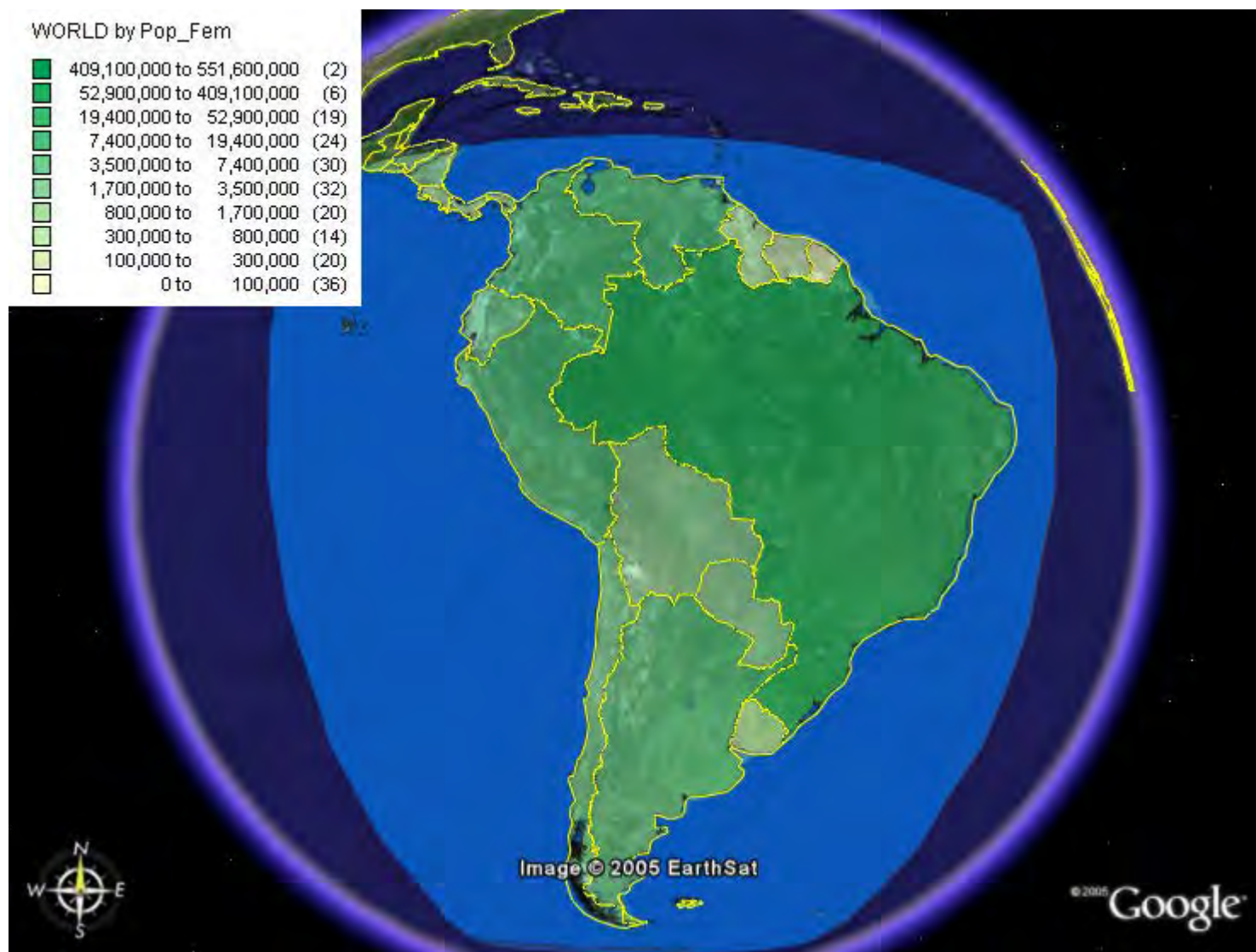
In the **Places** list, the **MapInfo Saved View** entry represents the exported thematic map.



When you export a MapInfo Pro map to the Google Earth environment, it displays under the Temporary Places section of the Places list. As you add new views, Google Earth stacks them in this list, placing the most recent map at the top of the list.

You can use the check box beside the **MapInfo Saved View** and **Thematic Legend** entries to display or hide the exported map or legend beside it. For example, if you add a new map, you may want to hide the previous map to see if it displays better.

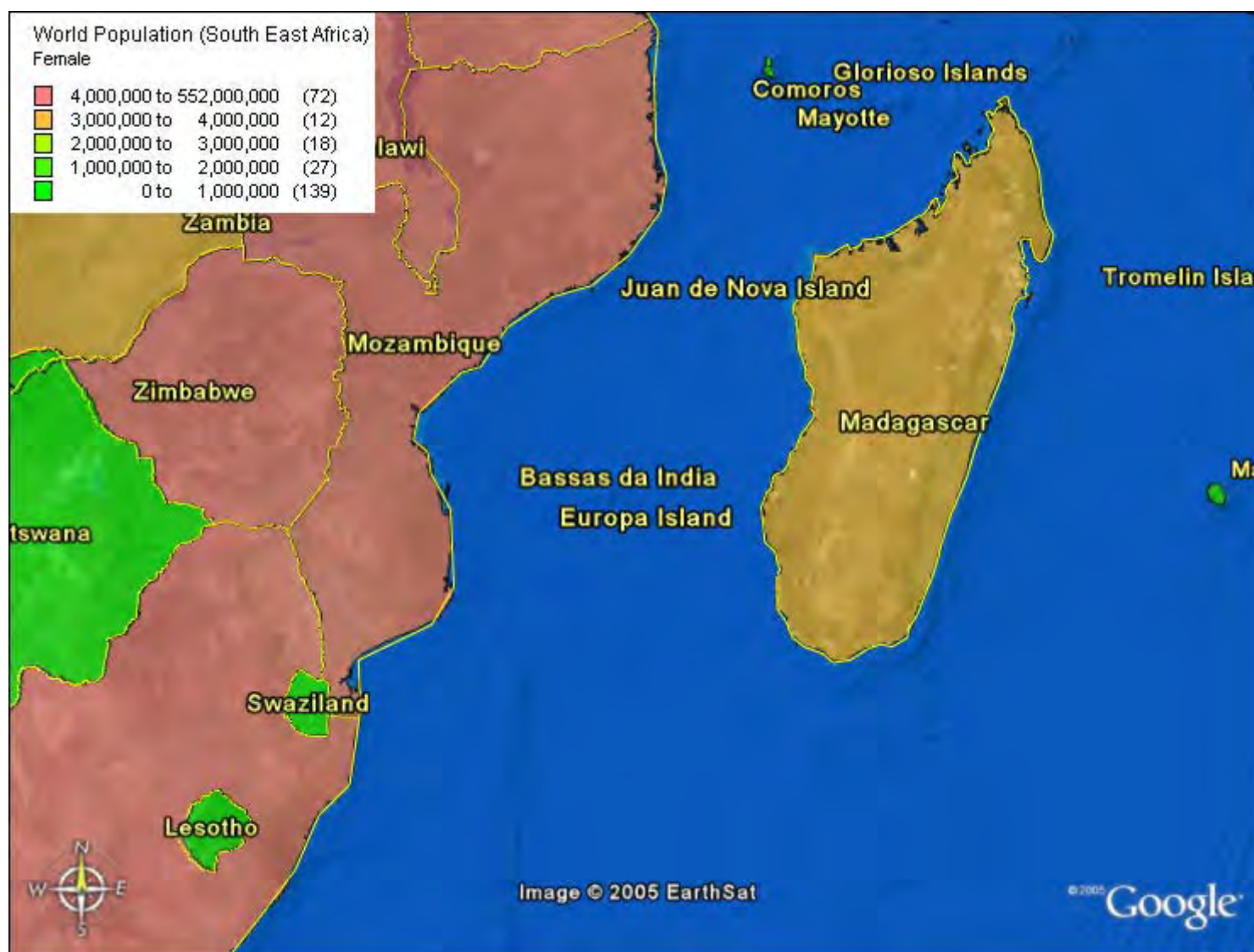
The horizontal scroll bar at the bottom of the list allows you to set the transparency of the thematic image. To change the transparency of the map and not the legend, highlight the **MapInfo Saved View** entry and use the scroll bar to get the desired effect.



Thematic Map Exported to Google Earth with Transparency Change

Exporting your Map Selection to Google Earth

When you want to export a map selection, you can export it as a vector map into .KML format. If you try to export a selected map object as a raster, the utility ignores the selection and exports the whole view instead.



Population Map: The labels and borders in this map are supplied by Google Earth. The legend was created in MapInfo Pro.


You can export your map selection as a vector map using the Google Maps .kml format. When you use this format, you preserve all of the data associated with those objects and can access that metadata in Google Maps. KML is an object description language similar to GML or XML.

To export the currently selected objects as .KML to Google Earth:

1. Display the map in MapInfo Pro.
2. Select the map object you want to export and on the **HOME** tab, in the **Tools** list, right-click on **GELink** and click **Export Map Image or Current Selection to Google Earth** to display the **Export to Google Earth** dialog box.

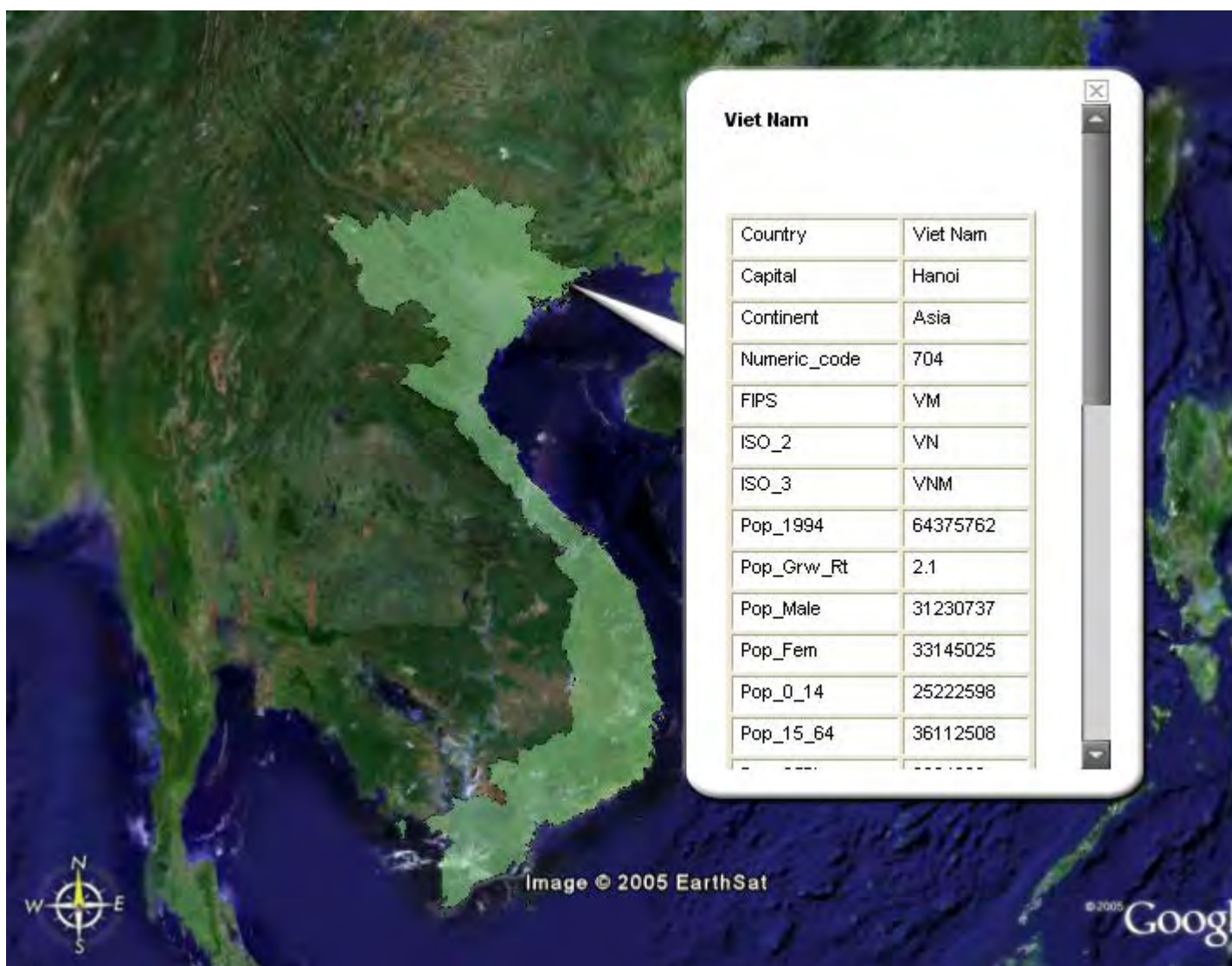
Note: This dialog displays when a Map window is the active window and you have selected an object in it. If you do not select any objects in the Map window, MapInfo Pro assumes that you want to send the map as registered raster image.

- To export the selected objects, click **Export selected objects (.KML)**. Click **OK**. The **Export Map Objects to Google Earth** dialog box displays.

Output Path	Use the  button to select a folder or leave the current entry as is to accept the default location.
File Name	Type a new name for the file you are creating or accept the default entry.
Description	Description of the layer.
Select the Source for the Place Name	Select the first button and type a place name in the first field or accept the MapInfo Saved Objects text as the place name for each object you are exporting. Select the second button and select the column name to provide the place name for each object you are exporting.
Follow Terrain	Select this button to position the selected objects in relation to the map terrain.
Height Value	Select this button and type the altitude (in meters) at which you would like to display the data field from the MapInfo Pro table. The utility uses the number in this table to create the altitude for each record. This field can only be populated by numeric fields.
Height Field	Select this button and choose the column that contains the height for each object you are exporting.
Extend Objects to Ground	Select this check box to display the map as specified in the settings above. Once you set an altitude value for a object, you can select the Extend Objects to Ground check box. When single-point objects display, a single line appears from the earth's surface to the object. When you display a line or a region, a geometric shape is drawn from the earth's surface to the line or region.

Choose Columns	Click this button and use the Choose Columns list to select a subset of the attribute columns for display. When you click OK , the utility uses the columns you selected. If you select Cancel , the utility uses the previously selected columns. See Choosing Columns to Display in Google Earth for complete instructions.
Send to Google Earth now	Click this button to save the raster file locally rather than displaying it in Google Earth.

4. Click the **OK** button to export the map with all of your selections in the Google Earth application.
5. In the Google Earth application, you can display the data associated with a particular area of the superimposed map. Click the **Place Name** and then double-click the region on the map. A data box displays.



Map with Data Box

Choosing Columns to Display in Google Earth

When you export map objects as a KML object to Google Earth, you can choose the data columns to be exported using the Choose Columns button. This might shorten the amount of time it takes to display the map when not all of the data in a map needs to be exported.

To select objects you want to export:

1. Open the data and select an object you want to export using MapInfo Pro.
2. Click **Google Earth** to display the **Export to Google Earth** dialog box.

Note: This feature only applies to the KML option because it is a vector image that can retain the data associated with it when you export it. This feature is not available if you select the raster image option.

3. Click **Export** selected objects (KML) and click **OK** to display the **Export Map Objects to Google Earth** dialog box. The **Choose Columns** button displays at the bottom.
4. To choose columns to send to Google Earth from the selected vector data, click **Choose Columns**. The **Choose Columns** dialog box displays.

The tool "remembers" the selections you make for this table in this dialog box from export to export as long as the Link Utility is loaded or MapInfo Pro is open. If you unload the tool, change tables, or close MapInfo Pro, the column selection reverts to All Columns.

Note: If you make no selections in this dialog box, no data is sent to Google Earth.

5. Highlight the columns you want to send to Google Earth and use the **Right Arrow** button to move them to the **Selected Columns** list. Click **OK** when you have selected all of the columns you want to export.

To remove a column from the **Selected Columns** list, highlight it and use the **Left Arrow** button.

Note: Use the **Shift** key to select multiple contiguous columns and the **Ctrl** key to select multiple non-contiguous columns.

6. Click **OK** in the **Export Map Objects to Google Earth** dialog box to begin the export process. MapInfo Pro only exports the columns you selected

Adding a Custom Copyright Message to Exported Raster Maps

When you export data from MapInfo Pro to Google Earth, you should credit the data company that provided the information. We have added functionality that allows you to do this from within the Link Utility for raster maps.

Note: You must download the Google Earth application and load the Link Utility for Google Earth tool in the Tools Manager before you can export your maps to the Google Earth process.

Adding a Custom Copyright Message

To add a custom copyright message to a raster map in the Google Earth window:

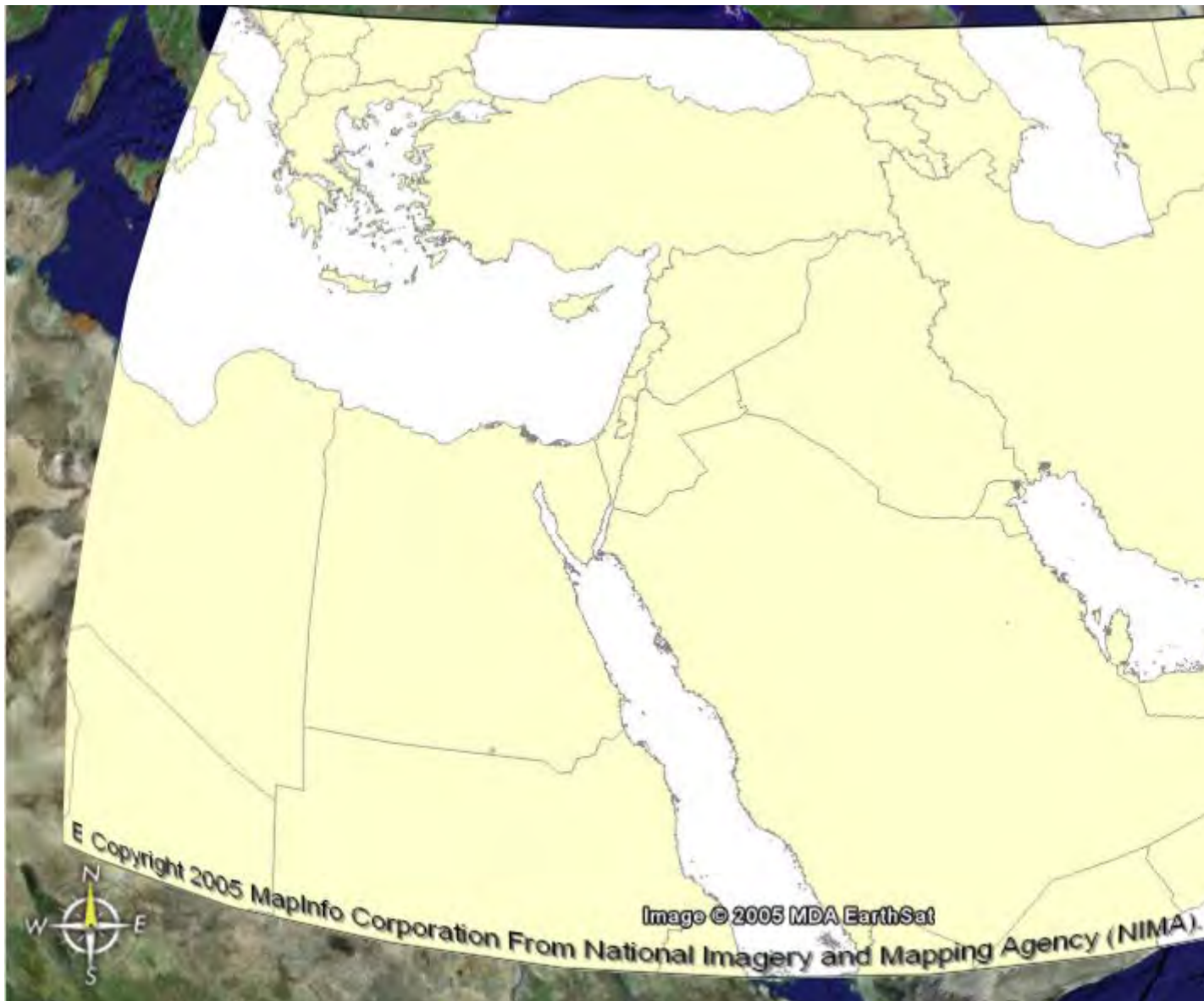
1. Open the data you want to export using MapInfo Pro.
2. Click **Google Earth** to display the **Export to Google Earth** dialog box.
3. Click **Export Map window as raster image (.JPG)** and click **OK** to display the **Export Map Image to Google Earth** dialog box. The **Specify a file containing the copyright text field** displays at the bottom.

The **Send to Google Earth Now** check box allows you to save the raster file locally rather than displaying it in Google Earth.

4. Select the check box beside the **Specify a file containing the copyright text** field and use the button to find the file that contains the copyright text.

Note: You may need to create this text file yourself.

5. Select the **Send to Google Earth now** check box and click **OK** to display the copyright data you selected on the Google Earth map you prepared.



Google Earth Map Containing Your Copyright Information

Important Google Earth™ Licensing Information

Google, Inc. provides three product levels to Google Earth, which you should investigate before using the Link Utility. For the most timely and complete Google Earth licensing options, please consult Google's web site and license agreement.

Please choose the Google Earth product that meets your organization's needs. Precisely does not authorize or license any of these products for your use.

Third-Party Data Licensing

When you use licensed data within MapInfo Pro to create files for export to Google Earth, make sure you have the appropriate rights from Precisely or the data provider to share those exported files with third parties.

Note: Depending on the data you use, you may be responsible for displaying a copyright on any maps that result from exporting maps from Precisely software. Additionally, you may be required to purchase additional data licenses.

Grid Maker Tool

What is the purpose of Grid Maker?

To draw a Graticule: a grid of latitude/longitude lines, over a selected region in the map.

When is Grid Maker active?

When the Grid Maker .MBX is loaded.

How do I access Grid Maker?

On the **HOME** tab, in the **Tools** group, click **Tool Extensions**. From the **Running** tool list, click **Grid Maker**.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Keyboard Shortcuts Tool

The Keyboard Shortcuts tool customizes keyboard short-cuts and command resources. Use this tool to edit the following command resources in MapInfo Pro.

- Key gesture (command keyboard short-cuts)
- Menu item text
- Menu item toggle text
- ToolTip description
- ToolTip text
- ToolTip disabled text

The Keyboard Shortcuts tool creates a copy of the `MAPINFOPRO.MNU` file, located in the MapInfo Pro installation directory, and edits the copy. This file contains command short-cuts and context menu definitions for MapInfo Pro. Changing a short-cut in the `MAPINFOPRO.MNU` file can break the default setting for the short-cut, which is why edits are made to a copy. The copy of the file is user specific and is created at following location:

`C:\Users\username\AppData\Roaming\MapInfo\MapInfo\Professional\1520` (where username is the Windows user)

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

For a list of keyboard short-cuts, see [Shortcuts by Keystroke](#).

Using the Keyboard Shortcuts tool

Launch the Keyboard Shortcuts tool on the **HOME** tab, in the **Tools** group, by clicking **Tool Extensions**. On the **Running** tab, click **Keyboard Shortcuts**. If you do not see the Keyboard Shortcuts tool, then locate it on the **Registered** tab and double click on it.

The Keyboard Shortcuts window lists the key gestures for each command. Click on a key gesture to edit it. You can also add a key gesture to a command that does not already have one. Clicking **Update** saves your changes, which are user-specific, and a pop-up window appears informing that the changes will take affect when MapInfo Pro is started next time. Clicking **Cancel** closes the window without saving changes.

To revert all key strokes back to their original settings, click **Restore to Defaults**.

In the **Basic** view of the Command Editor tool, only key gesture column is available for editing. Click on **Advanced** to see more options.

Use the scroll bars to see all of the columns of information for a command. For any command, you can update its:

- Key gesture: The sequence of key strokes that enable the command
- Menu item text: The name of the context menu items
- Menu item toggle text: Not used
- Tool tip description: A summary or title, which is the first line of text that displays when hovering the mouse over the command name in the Pro ribbon
- Tool tip text: A description, which is the second line of text after the tool tip description
- Tool tip disabled text: Displays when the command is unavailable

The Tool is now auto-loaded. The Tool adds a new Keyboard Shortcuts item to the Backstage Options Tab under the System group. A new Tab allows you to customize single key mapper shortcuts. You can press F2 on a selected item to edit the shortcut. Search now also searches the menu item text. You can now sort the list by clicking on the column headers. Missing Layout commands are now able to be customized. Help button added to dialog and tools.

You can also customize single key shortcuts for mapper window by making/modifying entries in the `MapInfoPro.MNU` file under `ArrayOfMapInfoProKeyShortcut` tag. Refer to the following example to create your custom entries:

```
<!-- ArrayOfMapInfoProMapCommand section of the file contains the single
key shortcut for map window function.-->
<ArrayOfMapInfoProKeyShortcut
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <!-- MapInfoProCommand tag represents the overridden command
properties. Name attribute corresponds to a internal name of a MapInfo
Pro command and its value should never be modified by the user.-->
    <MapInfoProKeyShortcut Key="M" Control="false" Shift="true"
CommandId="840" WindowType="ViewWindow" Description="View entire map"/>

    <!-- Make your new entry here.-->
</ArrayOfMapInfoProKeyShortcut>
```

Note: This currently works only for the Mapper window. You can use the **Keyboard Shortcuts** tool to customize mapper shortcuts.

Layout Scalebar AddIn

The Scale Bar tool lets you add a map scale to your layout in a **Layout** window. A map scale is used to reference distances on the map.




Note: To add a scale bar to your map in a **Map** window, see [Adding an Adornment to Your Map](#), which describes how to use the **Scalebar** command located on the **MAP** tab in the **Options** group.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids Guide*.

Before You Begin


Before you can work with this tool, you must ensure that it is running. For instructions, see *Working with MapInfo Pro Tools* in the *MapInfo Pro: Productivity Aids Guide*.

When it is running, this tool adds a **Scalebar** command  to the **LAYOUT** tab (in the **Edit** group). Click this command to open the **Create Scalebar** dialog box, where you can select properties and display styles for the new scale bar. You can preview your selections in the dialog before adding the scale bar to your layout.

You will need to have a **Layout** window open in MapInfo Pro and have a map on the layout. For instructions on how to do this, see *Adding a Map to a Layout* in the *MapInfo Pro: Preparing Maps for Publishing* Guide.

Creating a Simple Scale Bar

To add a simple map scale to your layout in a **Layout** window:

1. On the **LAYOUT** tab, in the **Edit** group, click **Scalebar**  to open the **Create Scalebar** dialog box.
2. From the **Link to Map** list, select the map to create a scale bar for.


You can have multiple maps on a layout and you can create a scale bar for each map.

3. Click **OK** to add a scale bar to the layout using all of the default settings.

Double-clicking on the scale bar in the layout opens the **Create Scalebar** dialog box where you can then edit the scale bar properties or display style.

Creating a Scale Bar with Specific Properties

To add a map scale with specific properties to your layout:

1. On the **LAYOUT** tab, in the **Edit** group, click **Scalebar**  to open the **Create Scalebar** dialog box.
2. From the **Link to Map** list, select the map to create a scale bar for.

You can have multiple maps on a layout and you can create a scale bar for each map.

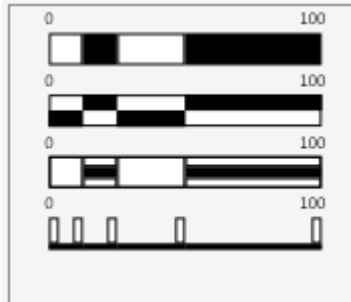
3. Set the scale bar length. The two values are proportional: the first value is the distance on the paper map, the second value is what the first value represents as a distance on the Earth's surface. Specify the length of the scale bar to a maximum of 34 inches or 86.3 cm on the printed map.
4. Set the scale bar height. This is the distance on the paper map to use for the height of the scale bar.
5. Select the **Use Automatic Scaling** check box to include a "nicer" scale value on a map. There is a description just below this check box that explains how the current scale bar will be drawn into the map.
6. Select the **Add Cartographic Scale** check box to include a representative fraction (RF) with the scale bar. In MapInfo Pro, a map scale that does not include distance units, such as 1:63,360 or 1:1,000,000, is called a **cartographic scale**.
7. Click **OK** to add the scale bar to the layout.

Changing the Display Style for a Scale Bar

You can set the display style for a scale bar when you are creating it in the **Create Scalebar** dialog box or after it is already on the map.

To change the display style of an existing scale bar:

1. Double-click on the scale bar in the layout to open the **Create Scalebar** dialog box.
2. Select a preset scale bar: Check Bar, Solid Bar, Line Bar, or Tick Bar.



3. Click on the **Select Scalebar Font and Font Style** button to set the font type, style, and color. Use the slider under the preview panel to adjust the font size.
4. Click on the **Select Scalebar Color One** to open the **Select Color** dialog and set the fill color. Click on the color wheel to select a color and use the slider to adjust the transparency of the fill color. For more precision choosing a color, enter RGB (Red, Green, Blue) values or a hexadecimal value in the fields provided. You can also enter a transparency value in the field labeled A (Alpha component); use zero (0) for fully transparent and 255 for fully opaque.
5. Click on the **Select Scalebar Color Two** to open the **Select Color** dialog and set the fill color.
6. Click on the **Select Scalebar Boarder Color** to open the **Select Color** dialog and set the boarder color.
7. Click **OK** to apply your style changes.

Layout Templates

A **Layout Template** is as a user defined format that contains a Layout window with required placeholders for maps/browsers/etc. in a specific arrangement for presentation. You can choose from a list of pre-built templates provided as part of MapInfo Pro or create and define your own and automate the filling on contents within it. **Layout Templates** are made up of empty frames that get filled in with contents of other windows such as maps or browsers, static content (text, shapes, images, etc) and dynamic text such as date, path, etc. They are portable and can be used in any environment in which MapInfo Pro operates and with any MapInfo products.

For details, see [Layout Templates](#)

Sharing Maps for Land Development and Survey using MapCAD

MapCAD® has powerful CAD drawing tools that make working with graphical objects in MapInfo Pro even easier. MapCAD is an add-on to MapInfo Pro for creating maps that are appropriate for land development and surveying tasks.

Use MapCAD for building development for:

- Drawing property or unit boundaries.

- Drawing buildings of a fixed size.
- Changing the angle of a building to match roads and parcels.
- Moving or positioning buildings at specific distances from other buildings, roads or objects.
- Aligning, pairing, matching or mirroring buildings by aligning, copying, rotating objects and flipping them.
- Creating units according to descriptive definitions ("metres and bounds") and/or with boundaries relative to other objects and at specific angles.

Use MapCAD for building infrastructure, such as for:

- Drawing ducts, pipes, and cables.
- Drawing ducts or pipelines at fixed intervals from road or parcel boundaries.
- Drawing ducts, pipelines, cables or wires at fixed angles from a road.
- Attaching text objects from a separate DXF/DWG imported layer into the associated sewer or pipeline layer.
- Changing line direction for the purposes of representing the direction of water flow.

MapCAD offers customization and drawing features, so that you can:

- Customize the MapCAD tool bars, so that only those features you need display.
- Automatically create lines or polylines from a table that contains coordinate information.
- Create circles from coordinates in a table to highlight points of interest, show assets, or define affected areas.
- Copy and paste styles from one object to another.

For assistance using this product, see the help that comes with MapCAD. For support, contact Anwender-Geo-Informationen-Systeme GmbH directly. Their web site is: <http://www.geoas.de>.

Enabling the **Metes and Bounds** option enables the functions Create Line / Polyline, Polar Append, and Calculate Direction, which are executed by using compass-like settings: N/ S xxx'yy'zz" E / W.

The term *metes* refers to a boundary defined by the measurement of each straight stretch, specified by a distance between the terminal points, and an orientation or direction. A direction may be a simple compass bearing or a precise orientation determined by accurate survey methods.

The term *bounds* refers to a more general boundary description, such as along a certain watercourse, a stone wall, an adjoining road way, or an existing building. The system is often used to define larger pieces of land where precise definition is not required or would be far too expensive, or previously designated boundaries can be incorporated into the description.

For information about how to add a tool to the Tool Manager, see *Working with MapInfo Pro Tools* in the *MapInfo Pro Productivity Guide*.

MapInfo EasyLoader Tool





MapInfo EasyLoader is a utility to upload MapInfo TAB files to a remote database. The spatial information in the TAB files is maintained in the remote database and is available for viewing and analyzing in MapInfo Pro.


For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).






Using the MapInfo EasyLoader Tool

To start MapInfo EasyLoader, run the **MapInfo EasyLoader** tool to display the **MapInfo EasyLoader** window, see [Running a Tool](#).

MapInfo EasyLoader is a single window within which you can set everything necessary to upload data tables to a database.

Name	Icon	Description
Database Connection		Select the connection to the database you want to upload tables to. You can use existing database connections created from the Microsoft Start menu or from in MapInfo Pro.
Manage Connection List and Choose a Connection		Create a new connection by selecting New Connection from the Database Connection list and then clicking this button.
Output Directory		Select a path location to save live access files to. Unless you select not to create them, MapInfo EasyLoader saves .tab files to your machine that contain database access information. MapInfo Pro uses these files when accessing the tables that MapInfo EasyLoader uploads. If you select not to create these files, you can create them later from within MapInfo Pro. A live access file has the same name as the upload file with a _srv extension, such as YourServerTableName_srv.tab.
Browse for an Output Directory (Folder)		Select a different directory from what is in the Output Directory list by clicking this button.
Source Table		Lists the data tables to upload to the database. To add tables, click the Browse for one or more tables to upload  button and then select Add Tables or Add Tables from Folder .
Server Table		Shows the table name as it will appear on the database server. You can click on the name to change it.

Name	Icon	Description
Operation		<p>Select for each table what you would like to do in the database:</p> <p>Create a New Table creates a new table in the database using the source table name.</p> <p>Replace Existing Table replaces an existing table in the database that has the same name as the source table.</p> <p>Append to Existing Table appends the contents of the source table to an existing table in the database that has the same name as the source table.</p> <p>For more details, see <i>Table Processing Options</i> in the <i>MapInfo EasyLoader Help</i>.</p>
Catalog		<p>By default, upload tables are added to the map catalog on the database unless you clear the check box in the Catalog column.</p> <p>MapInfo Pro uses the Map Catalog on the database for spatial indexing. Select this check box to add a new Map Catalog or clear it to unregister a table from the Map Catalog. For information about the Map Catalog and what options you can set, see <i>Using the Map Catalog</i> in the <i>MapInfo EasyLoader Help</i>. If you do not add the upload table data to the Map Catalog now, then you can do so later in MapInfo Pro.</p>
Upload States		<p>Gives information about the upload. If there was an error with the upload, then hovering the mouse pointer over the image in this column shows more information.</p>
Map Catalog		<p>This command is available when you are connected to a database connection. Selecting this command displays the Map Catalog window where you can edit data on the database. For more information about the Map Catalog, see <i>Using the Map Catalog</i> in the <i>MapInfo EasyLoader Help</i>.</p> <p>Owner Name - You can filter the list of tables by selecting the Owner Name.</p> <p>Unregister - Unregisters a table from the database.</p> <p>Copy - Copies the selected row as comma separated values (csv).</p> <p>Close - Closes the Map Catalog window.</p>

Name	Icon	Description
Options		<p>The drop-down list has following command options:</p> <p>Options opens the Options dialog box where you can access the Server Table Processing options. For details, see <i>Server Table Processing Options</i> in the <i>MapInfo EasyLoader Help</i>.</p> <p>View Log opens the <code>EasyLoader.log</code> file in a text editor. This file contains the database connection information currently in use to upload data tables with. For details, see <i>Locating the MapInfo EasyLoader Log File</i> in the <i>MapInfo EasyLoader Help</i>.</p> <p>Close When Complete is off by default. When set, MapInfo EasyLoader closes after finishing the upload.</p>
Help		<p>Online Help opens the product help. You need access to the internet to view this.</p> <p>PDF Help opens the product help as a PDF file for printing and for viewing when you do not have access to the internet.</p> <p>About MapInfo EasyLoader opens a message dialog box displaying the version of MapInfo EasyLoader.</p>
Start or Resume Uploading Tables		Starts the upload process or continues the process if you put it on pause.
Pause the Upload		Pauses the upload process, which you can resume later.
Cancel the Rest of the Upload		Stops and cancels the upload process.

For more about the MapInfo EasyLoader tool, refer to the *MapInfo EasyLoader Help*.

MapInfo Marketplace

The MapInfo Marketplace is an online repository embedded into MapInfo Pro. This repository offers you a wide variety of downloads including sample data sets, custom symbols, and Layout Templates to help you increase your productivity and complete your work faster using the tools and data shared by the MapInfo Pro community.

The main purpose of this Marketplace is to improve the customer experience by making it easier to discover and maintain MapInfo Pro add-ins and tools. Note that all existing add-ins and tools would continue to be free. Going forward, we also plan to introduce new MapInfo Pro apps that would extend the core functionality of MapInfo Pro. These apps would be available to MapInfo Pro customers on a try-before-you-buy, evaluation version basis before making a purchase.

The Marketplace is a tool that allows us to be more agile and responsive to our customer's needs. Our intention with MapInfo Marketplace is to roll-out features and fixes to you quickly and effectively thereby reducing the time-frame between requirement, development and delivery.

We would also continue to deliver MapInfo Pro add-ins and tools that we develop through the usual MapInfo Pro releases.

Accessing the MapInfo Marketplace

The MapInfo Marketplace is auto-loaded when you start MapInfo Pro. Click on **MapInfo Marketplace** from the **Tools** button group under the **HOME** tab to launch the MapInfo Marketplace. But if for some reason you do not see this control, you may need to load the add-in manually using the followings steps:

1. Click the **HOME** Tab, then click **Tool Extensions** to launch the **Tool Manager** window.
2. Under the **Registered** tab in the **Tools Manager** window, double-click on **MapInfo Marketplace** to load the add-in. The **MapInfo Marketplace** button should now appear on the **HOME** tab under the **Tools** button group. It may take a while the first time it runs as it checks for MapInfo Marketplace updates and performs any necessary upgrades.

Note: The MapInfo Marketplace requires that you have an online Precisely account. If you are not already logged in, you will be required to enter your credentials. This is to ensure that we deliver an improved customer experience by helping you keep track of your downloads and recommend add-ins that are tailored to your usage and requirements.

Using the MapInfo Marketplace

To use the MapInfo Marketplace:

1. Click on **MapInfo Marketplace** from the **Tools** button group under the **HOME** tab to launch the MapInfo Marketplace and display a list of products available for download.
2. Click on the product you wish to download and install. This displays the product's details, screen shots, publisher information, etc. along with an **Install Product** button.
3. Click on the **Install Product** button to download and install the selected product.

Once installed, the product appears under the **Running** tab in the **Tool Manager** window.

Note: Downloaded Products are only registered but not auto-loaded in MapInfo Pro. Therefore, when you restart MapInfo Pro, these products will not auto-load but would have to be manually loaded from the **Registered** tab.

If you want a downloaded product to run every time MapInfo Pro starts, you may choose to auto-load the product.

1. On the **HOME** Tab, click the "Tool Extensions" button to launch the Tool Manager window.
2. Click the "Registered" tab in the Tools window.
3. Check the **AutoLoad** check-box for the tool you wish to auto-load.

Named Views Tool

The Named Views tool saves a map's view, position and zoom settings, so you can return to them as needed. This is useful if there is a neighborhood or other area you need to refer to frequently. The Named Views window is dockable.

You can use other user's list of views by copying the NViews.XML file to the following location:

```
%APPDATA%\MapInfo\MapInfo\nviews.xml
```

Note: If you overwrite your Nviews.XML file with that of another user, you will lose your existing views information. To retain your existing views, keep a copy of your Nviews.xml file and restore it at the same location, when required.

Note: If you want to use views created in MapInfo Pro 12.5, copy the Nviews.XML file from %APPDATA%\MapInfo\MapInfo\Professional\1250\nviews.xml to the new location %APPDATA%\MapInfo\MapInfo\nviews.xml

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Creating a Named View

To create a named view:

1. Display the map at the exact position and zoom level you want to return to.
2. Run the **Named Views** tool to display the **Named Views** dialog box. See [Running a Tool](#) for details.
3. Click **Add** and type a description of the current map view. Click **Add** to save your description.

Note: Views you create with the Named Views tool are global and are saved independently of the workspaces and tables they are associated with. If you delete the list of views, you delete these views.

To return to a named view:

1. Display the map at the exact position and zoom level you want to return to.
2. Run the **Named Views** tool to display the **Named Views** dialog box.
3. Click the named view you want to return to in the list and click **GoTo** to display your requested view.

Description of Named View Options

Add button

Displays the **Add Named View** dialog box. When the user clicks **OK**, the application adds a new node to the Treeview control. The position of the new node is based on the currently selected treeview node.

Goto button

Changes the view of the front most window. If the front most window is not a Map window, then the application displays an error message.

You cannot return to the view information and issue the code from MapBasic.

New Folder button

Inserts a new Folder node into the Treeview control and immediately puts the node into label edit mode so you can rename it. The default name of the folder is "New Folder", unless there is already a folder with that name. The position of the new node is based on the currently selected Treeview node.

To expand or collapse a node, double-click its Folder node.

Move button

Displays a dialog box that contains the tree structure without the View nodes. When you click **OK**, you move the selected node (Folder or View) under the target node. If a node with the same name already exists under the Target node, then an error message displays and the move does not occur.

Rename button

Puts the currently selected node into label edit mode.

Press **F2** while the Treeview has focus to perform the same operation as selecting the node and clicking **Rename**.

Delete button

Displays a confirmation dialog box before deleting the selected node. If the selected node is a Folder node, a confirmation dialog box displays warning that all contents of the folder will be deleted.

If you click **Delete** while the Treeview has focus, the application behaves the same way as selecting the node and clicking **Delete**.

Note: Double clicking a View node should be the same as selecting that node and clicking the **Goto** button.

You can drag and drop Folder and View nodes using the mouse.

North Arrow Tool

Use this tool to add a North Arrow to a **Map** in various styles, and, optionally, add a Magnetic Declination Arrow. Use the North Arrow tool to designate in which corner to position the North Arrow, or use the North Arrow button on the Tools Toolbar to draw a rectangle and place the North Arrow at the specified location.

Use the North Arrow tool to add North Arrows of various styles and optionally add a Magnetic Declination arrow. A North Arrow can be added to a **Map** window.

To use the North Arrow tool in a **Map**:

1. You must first load the North Arrow tool from the Tools Manager.

Follow the directions in [Working with MapInfo Pro Tools](#).

2. Click on a **Map** window to make it the active window and run the **North Arrow** tool to display the **North Arrow (version 1.03)** window. See [Running a Tool](#) for details.
3. You can select various North Arrow styles. The foreground and background pens and brushes can also be specified. The insertion corner can be specified by picking NorthWest, NorthEast, SouthEast or SouthWest. The size is specified as a percentage of the window size.

If the active window is a Map, You can also specify whether the arrow should point to the north. The **Magnetic Declination** button allow the user to set the Magnetic Declination parameters.

4. Click the **Magnetic Declination** button. The **Magnetic Declination** dialog box displays.

If the **Display Magnetic Declination** check box is selected, the magnetic declination arrow is drawn in addition to the north arrow. The angle can be specified in the Magnetic Declination field. The arrow style can be specified.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Overview Tool

What is the purpose of the Overview Tool?

The Overview Tool opens a new Map window to provide an overview of another Map window.

When is Symbol Styles active?

When any Map window is active.

How do I access Symbol Styles?

On the **MAP** tab, in the **Options** group, click **Map Tools** and the click **Overview**.

Pack Tool

Use this tool to compress tables to take up less disk space.

To pack tables:

1. On the **TABLE** tab, in the **Maintenance** group, click **Table**, and **Pack** to open the **Pack** dialog box.
2. Choose table(s) from the Pack Table multi-select list.
3. Click the appropriate radio button to specify the type(s) of data.

Option	Description
Pack Tabular Data	This option removes deleted records, making the table smaller, and increasing processing speed.

Option	Description
Pack Graphic Data	This option packs only graphic information.
Pack Both Types Of Data	Both graphic and textual information are packed.

4. Click **OK**.

MapInfo Pro closes all related tables or workspaces, compresses the tables and reopens them again for your use.

Note: Packing a table can corrupt customized labels saved to a workspace. If you are going to be working with customized labels, pack the table before you create the labels.

You can choose to pack only tabular data or graphic objects or both. Packing tabular data removes deleted records. When you pack a table or tables, MapInfo Pro requires that you have twice as much free space as the tables take up to handle a copy of the database as a scratch file.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Proportional Overlap Tool

This tool calculates proportional aggregates for objects in a target table that overlap with objects in a base table. Calculation results are added to a new or to an existing column in the target table.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Table to update

Select the target table to which to add values resulting from the proportional aggregate calculation.

Column to update

Select an existing column in the target table to which to add values, or select **New Column** to create a new column in the table.

Adding a new column to a table will force the table to close and reopen. This removes the table from any maps and causes the table to lose all style override settings for that layer.

Note: For live access tables, the option to add a column is active, but the Proportion Overlap tool is unable to add a column to a non-native table. Selecting to add a column to a live access table generates an error.

Note: For linked tables, the Proportional Overlap tool cannot add a field to a linked table even though it saves as a TAB file. This is because a linked table has a reference back to the database table.

Get values from table

Select the base table to overlap. This is the table that supplies the data for the calculation.

Calculate

Select the type of calculation to perform for the proportional overlap.

Proportion Sum - A sum calculation that is adjusted based on how much of one object is within another object.

Proportion Avg - An average calculation that is adjusted based on how much of one object is within another object.

Proportion WtAvg - A weighted average calculation that is adjusted based on how much of one object is within another object.

Of

Select the column in the base table to use values from for the calculation.

Weighting expression

Select the column in the base table to use values from for the Proportion Weighted Average calculation.

Using the Proportional Overlap Tool

To use the Proportional Overlap tool:

1. Open a base table and a target table.
2. Run the **Proportional Overlap** tool to display the **Professional Overlap** window. See **Running a Tool** for details.
3. From the **Table to update** list, select the target table to which to add values resulting from the proportional aggregate calculation.
4. From the **Column to update** list, select an existing column in the target table to which to add values, or select **New Column** to create a new column in the table.

Note: You cannot add a column to a linked or live access table. Adding a new column forces the table to close and reopen, removing it from any maps and causing the table to lose all style override settings.

5. From the **Get values from table** list, select the base table to overlap. This is the table that supplies the data for the calculation.
6. From the **Calculate** list, select the type of calculation to perform for the proportional overlap.
7. From the **Of** list, select the column in the base table to use values from for the calculation.
8. If you selected to calculate a Proportion Weighted Average in a previous step, then in the **Weighting expression** list, select the column in the base table to use values from for the Proportion Weighted Average calculation.
9. Click **OK** to update the target table with the proportion aggregate data.

Notes

There are some known issues using the Proportional Overlap tool:

- Adding a column to the table forces the table to close and reopen. This removes the table from all maps (it does not affect browsers in **Layout** windows), and removes style override settings for the layer.
- The Table to update list includes Raster, WMS, and WFS tables, which are not editable.
- The Column to update list contains an option to add new column for a live access DBMS table. You cannot add a column in a live access table, so an error message results if you select to add a new column to a live access DBMS table and then run the Proportional Overlap tool.

Quick Search Tool

You can use **Quick Search** to quickly search and execute commands on the MapInfo Pro ribbon. These commands might be grouped or nested under different tabs, sub-menus or backstage items but the **Quick Search** tool displays a list of all relevant commands as you type your query in the search box. Once you see the desired command in the drop-down list, select or click on the command to launch. The selected command location on the ribbon interface is also highlighted on launch from **Quick Search** to aid you in locating the command.

Quick Search is a MapInfo Pro tool that is loaded by default when you install MapInfo Pro. Once loaded, it is located at the top-right corner of the MapInfo Pro ribbon and is accessible by choosing the **Ctrl+Q** keys. You can show or hide the **Quick Search** box by loading or unloading the **Quick Search** tool from the **Tool Extensions** drop-down list under the **Tools** group on the **HOME** tab.

If you are connected to the internet, Software Data and Marketplace content is also searchable from the Quick Search tool.

Note: Toggle this option by right-clicking on the **Quick Search** tool in the **Tools** window and selecting **Search MapInfo Marketplace**.

Custom Keywords

You can define custom keywords to launch specific commands using the **Quick Search** tool. The keyword list is in a comma separated value (CSV) file stored in the Application Data directory of the **Quick Search** tool at

%appdata%\MapInfo\MapInfo\Professional\2021\Tools\QuickSearch\keyword_en.csv

The keyword list works on the Key-Value pair concept. A typical keyword list looks like

```
info,point query
add theme,thematic,Create Thematic Map, Bivariate, Chloropleth
hybrid,bing hybrid,base map
aerial,bing aerial,base map
roads,bing roads,base map
```

Here the first entry in every CSV line is the key (command searched) and all subsequent entries are values (search query). For example, from the first line of the keyword list; if you type point query in the Quick Search box, a list of all `info` commands would be displayed.

Highlighting Command on Launch

An important feature of the Quick Search tool is that along with searching a command for you it aids you in locating that command in the ribbon interface. As soon as you launch a command from Quick Search, it is highlighted on the ribbon interface. You can enable/disable this highlighting feature or set the duration and color of the highlight when a particular command is launched by updating the following three entries in the

`%appdata%\MapInfo\MapInfo\Professional\2021\Tools\QuickSearch\QuickSearch.dll.config` file.

```
<add key="Enable_Command_Highlight" value="True" /> // Default value is
True, set to False to disable highlighting
<add key="Command_Highlight_TimeSpan_Seconds" value="4" /> //Sets the
duration of the highlight
<add key="Command_Highlight_Brush" value="Blue" /> //Sets the color of
the highlight
```

Note: For command highlighting to work correctly, it is recommended that you disable **Ribbon Tab Switching**. Under the **PRO** tab, click **Options** and then click **Application** in the **System** section to open **Application Preferences**. Set **Ribbon Tab Switching** to **None**.

RDBMS Set MBR Tool

This tool allows a DBA to change the bounds of a table in the MapInfo Map Catalog, in a remote database.

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Register Vector Utility Tool

What is the purpose of Register Vector Utility?

To put control points into a vector image and reference points into a Map window and then performs an affine transformation to line them up.

When is Register Vector Utility active?

When the Register Vector Utility .MBX is loaded.

How do I access Register Vector Utility?

On the **HOME** tab, in the **Tools** group, click **Tool Extensions**. From the **Running** tool list, click **Register Vector Utility**.

See Also:

- [Working with MapInfo Pro Tools](#)

Rotate Labels Tool

This tool is used to rotate labels in a Map window. Labels are first converted into custom labels.

Note: Rotation is in degrees and Zero is horizontal.

after you rotate labels, it may make room for new ones to appear. To rotate them, just run this tool again.

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Rotate Map Window Tool

Rotate Map Window enables you to rotate the contents of the current map window a specific number of degrees. Rotate Map Window calculates and sets an Affine transformation for the map window. It does not change any of the tables displayed there.

Use the **Save As** button on the Rotate Map Window dialog to make a permanently rotated copy of a table in the rotated map window.

Affine transformations do not rotate raster images nor grid files. Affine transformations do correctly rotate the positions of symbols and text, but do not rotate the individual symbols, letters, and digits.

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Rotate Symbols Tool

What is the purpose of Rotate Symbols?

To rotate all the symbols in a map layer at once.

When is Rotate Symbols active?

When the Rotate Symbols .MBX is loaded.

How do I access Rotate Symbols?

On the **HOME** tab, in the **Tools** group, click **Tool Extensions**. From the **Running** tool list, click **Rotate Symbols**.

See Also:

- [Working with MapInfo Pro Tools](#)
- *Working with Seamless Layers* in the *MapInfo Pro: Getting Started Guide*

Seamless Manager Tool

What is the purpose of Seamless Manager?

To create and manage seamless map sheets.

When is Seamless Manager active?

When the Seamless Manager .MBX is loaded.

How do I access Seamless Manager?

On the **HOME** tab, in the **Tools** group, click **Tool Extensions**. From the **Running** tool list, click **Seamless Manager**.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Search and Replace Tool

This tool searches a character column for a specific string and replaces it with another string.

The Search and Replace tool facilitates the replacement of multiple column entries in a selected table. This tool is particularly useful when names change or specific character data changes. To search a table, the file must be open.

To use the search and replace tool:

1. Open the table for which you want to search and replace data. MapInfo Pro must be able to read the tables you want to search.
2. On the **Tools** Menu, select **Search and Replace** and click the **Search and Replace** option. The **Search & Replace** dialog box opens.
3. Select the table and columns you want to search from the **Table to Search** and **Column to Search** drop-down lists.
4. Type the text you want to find in the **Search String** field.
5. Type the new text you want to insert into the **Replacement String** field.
6. If the string you entered should be case sensitive, select the **Case Sensitive** check box.
7. Click **OK** to begin the search and replace process.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Spider Graph Tool

The **Spider Graph** tool draws lines between objects in a single table, or the objects from two tables based on a join. It then creates a new table of lines that connect the objects from the original table(s) based on matching column names. By default, the lines are color-coded based on their table of origin. Also by default, the new table includes a distance column that stores the length of each line.

As an example, if you have Stores and Customers as two tables, and both tables have a store identifier column then the SpiderGraph tool can create a new table with lines connecting customers to their store. The resulting table contains the lines as well as chosen attributes from the input table(s),

along with a column that stores the length of each line. The lines can be color-coded based on their attribute of origin.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Using the Spider Graph Tool

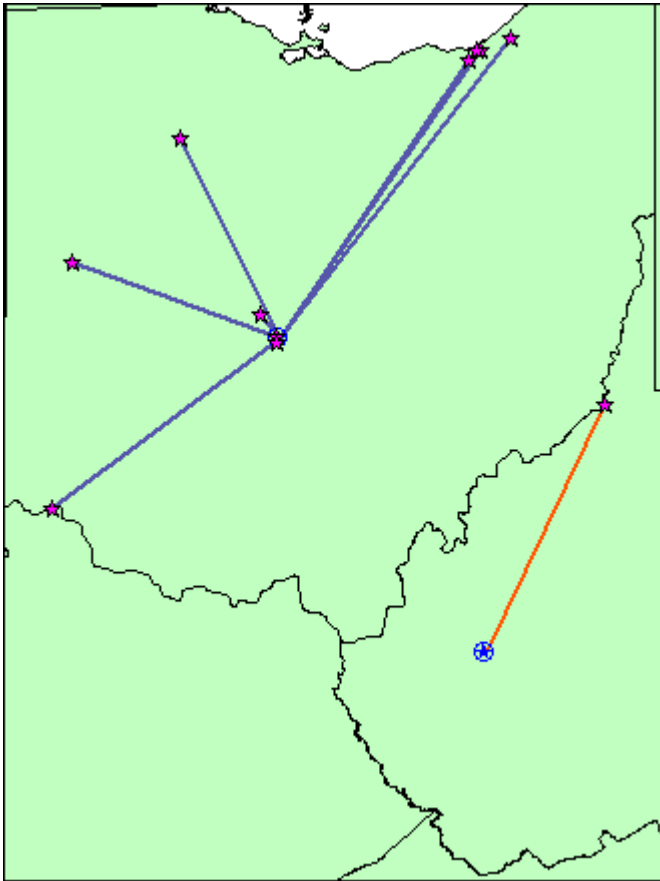
To use the **Spider Graph** tool:

1. Open the MapInfo tables you want to work with.
2. In the **Tools Manager**, ensure that the **Spider Graph** tool is loaded.
3. Click **Spider graph** to activate the tool.

Note: The **Spider Graph** tool works with mappable vector tables only. It cannot be used with raster images.

1. In the **Spider Graph** dialog box, select the origin table from the left drop-down list. Then select the column name that will be used to join the origin table to the destination table.
2. Select the destination table from the right drop-down list. Then select the column name that will be used to join the destination table to the origin table.
3. Select the columns that you want to include in the resulting table. To select multiple columns, press the **Ctrl** key while you click. If you do not choose any columns, **Spider Graph** will automatically include the join column specified for the origin table.
4. By default, the **Spider Graph** tool will color-code the resulting lines and add a distance column to the new table to record the length of each line. If you do not want these features, clear the appropriate check box. The distance lines will use units of miles by default. To change this, select another distance unit from the **Units** drop-down list.
5. Click **Create Lines** and enter a new name for the resulting table in the **Save Copy As** dialog box.
6. In the **Save Copy As** window, use the **Save in** drop-down list to select the target folder for the resulting .TAB file. In the **File name** area, type a file name for the resulting table.
7. Click **Save**.

As an example, the following portion of a resulting map window shows the Warehouse to Customer relationships in the Ohio, West Virginia region of the USA.










Synchronize (Sync) Windows Tool

The Synchronize (Sync) Windows tool gives you access to tool bar buttons that allow you to control what displays on selected, open **Map** windows. This tool lets you automate common MapInfo Pro tasks and creates a way to control the addition and removal of embedded legends in a **Layout** window. The Sync Windows tool lets you automatically share changes made in one **Map** window to all other open **Map** windows in a given MapInfo Pro session.

For example, you might use this tool to look simultaneously at several sets of complex feature data covering the same location. In cases where a single map containing all the data would be more confusing than helpful, several synchronized maps can often display the information more clearly. The ability to embed thematic legends is useful to provide greater understanding of the data being presented.

Once added to MapInfo Pro using the Tools Manager, the **Sync Windows** group is visible on the **MAP** tab. The **Sync Windows** icons are shortcuts to commonly used functionality.

Sync Windows Toolbar

Icon	Command	Description
	Sync	Synchronizes all Map windows and embeds thematic legends.
	Instant Sync	Enables, or disables, the synchronization of all Map windows.
	Rectangle	Draws a rectangle in the same location on all cosmetic layers across all Map windows.
	Ellipse	Draws an ellipse in the same location on all cosmetic layers across all Map windows.
	Polyline	Draws a polyline in the same location on all cosmetic layers across all Map windows.
	Symbol	Draws a symbol in the same location on all cosmetic layers across all Map windows.
	Clear Cosmetic Layers	Removes all features added to the cosmetic layers on all synchronized Map windows. This removes all features not just the synchronized features added by this tool during the session

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Symbol Maker Tool

Symbol Maker tool allows you to create, edit, or delete symbols from the MapInfo 3.0 Compatible symbol font. You can load or unload the **Symbol Maker Tool** from the tools list in the **Tools** window. Click **Tool Extensions** on the **HOME** tab to display the **Tools** window.

The symbols you create or edit become part of the standard MapInfo symbol set.

To create a new symbol:

- Right-click **Symbol Maker** in the Tools window and Choose **Create New** and then draw the symbol using the standard MapInfo drawing tools.

To edit a symbol:

- Right-click **Symbol Maker** in the Tools window and Choose the **Edit and Delete** and select the symbol to change using the **Symbol Picker** dialog. Then choose the **Edit** button. The selected symbol will appear in a mapper where it can be edited.

Note: Arcs and text objects cannot be a part of the symbol and, therefore, are ignored.

To remove a symbol:

- Select a symbol from the **Symbol Picker** dialog and click **Delete**.

By default, symbols you create or edit are assigned colors that cannot be overridden by color selections made when the symbol is displayed.

- Use the **Colors** menu item to specify that the line and fill colors assigned to all or part of the symbol can be changed.
- Select **Line** or **Fill** from the **Colors** dialog before saving the symbol, and the selected items will use the symbol color you choose at runtime.
- View the Symbol browser to see which items can have user selectable colors.

After editing or creating symbols MapInfo Pro will automatically update the symbol list. You can start using the new or modified symbols as soon as you save them."

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Table Manager Tool

Table Manager tools allows you to get info about all currently open tables. In addition, you can view and edit Metadata. Metadata is information about a table that is stored in the table. You can also save Metadata in a separate file as a template and load it into a different table. Lastly, you can export Metadata in a format compliant with Federal Government Data Center (FGDC) standards.

You can load or unload the **Table Manager Tool** from the tools list in the **Tools** window. Click **Tool Extensions** on the **HOME** tab to display the **Tools** window.

Double-click **Table Manager** to display the **Table Manager** dialog.

- To view the details and metadata of a particular open table, select it in the list box at the top of the dialog.
- To view the value of a particular metadata key of the currently selected table, select that key in the list box in the Metadata section. The corresponding value is displayed in the text box below it.
- To modify the metadata of a table, first make sure the **Modify Metadata** check-box is checked. This is disabled if the table is read only.
- To add a new key, click on the **Add** button, enter the key name and value, and then click on the **OK** button.
- To delete a key, select the key in the list box, and click on the **Delete** button.
- To modify a key, select the key in the list box, and enter a new value in the text box below it.

- To use an automatic value (date, time, etc.) in a key value, select it from the pull-down list below the text box.
- To add all the keys and values from an existing metadata template to the currently selected table, click on the **Load** button and specify the file name of the existing template.
- To save all the keys and values of the currently selected table as a metadata template, click on the **Save As** button and specify the file name for the template.
- To write all the keys and values of the currently selected table into an ASCII text file in an FGDC compatible format, select the **Export** button and specify the file name.
- To use an automatic value (date, time, etc.) in a key value, select it from the pull-down list below the text box.
- To add all the keys and values from an existing metadata template to the current template, click on the **Load** button and specify the file name of the existing template.
- To save all the keys and values as a metadata template, click on the **Save As** button and specify the file name for the template.

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Transfer Labels Tool

This tool would:

1. Transfer your layer's labels into permanent text objects
2. Allow you to label the current selection
3. Allow you to use a label tool and individually label objects as permanent text objects.

Opening the Transfer Labels Tool brings up the Transfer Labels dialog box with a choice of which layer to get the labels from and which layer to save the labels to. There is also a check-box that allows you to include hidden labels (labels that have been deleted).

This will transfer labels for the current selection into the cosmetic layer and will place a text object in the cosmetic layer for the object you click on with the cross-hairs.

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Universal Translator

What is the purpose of Universal Translator?

To move your data quickly between common data formats, which include:

- AutoCAD DWG/DXF
- ESRI® Shapefiles
- MicroStation Design
- MapInfo Pro MID/MIF
- MapInfo Pro TAB

When is Universal Translator active?

When the `UNIVERSAL_TRANSLATOR.MBX` is loaded.

How do I access Universal Translator?

- On the **TABLE** tab, in the **Content** group, click **Universal Translator** to open the **FME Quick Translator** dialog box.
- On the **HOME** tab, in the **Tools** group, click **Tool Extensions**. On the **Running** tab, double-click on **Universal Translator** to open the **FME Quick Translator** dialog box.

You can also launch the Universal Translator from the Tools Manager, or run it manually in a MapBasic window using another language program, in batch-file mode, or from the commandline.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Tool Description

You can import and export (translate) MapInfo data from and to popular mapping file formats using the Universal Translator. The Universal Translator, is run in MapInfo Pro from the Tools menu, but can also be run manually in a MapBasic window using another language program, in batch-file mode, or via the commandline.

The Universal Translator uses the Feature Manipulation Engine (FME) for spatial data translation, which gives you access to native and non-native GIS, database, spatial, and non-spatial data formats. It lets you translate data for use in MapInfo Pro and export your MapInfo data for use in other applications.

When you run the Universal Translator, it opens the FME Quick Translator window. This window gives you control over the translation process and makes it easy for you to:

- Begin and end translation processes, and manipulate and save log files.
- Reuse workflows through automation that require minimal steps to setup.
- Select input formats that include all the formats that are available on the **HOME** tab, in the **File** group, from the **Open** list, by clicking **Universal Data**.
- Select a URL where the input format data resides.
- Select compressed folders for input.
- Select entire directories of data for input and merge the translation results into single or multiple directories, or single files if applicable. You can set how the multiple input sources are to be processed for output.
- Fine-tune how the input data will be handled by setting parameters that are unique to the input data format.
- Save the output result to native TAB or MIFMID file(s) that can be edited and updated immediately for projects.
- Fine-tune how the output data will be handled by setting parameters that are unique to the output data format.

For descriptions and information about how to work with the Universal Translator features, click the **Help** menu in the **FME Quick Translator** window or the **Help** button in the dialog boxes.

The Universal Translator is located on the **TABLE** tab, in the **Content** group. By default, the Universal Translator is running when you launch MapInfo Pro. If you do not see the Universal Translator, then you must add it to MapInfo Pro, as described under [Working with MapInfo Pro Tools](#).

Supported Formats

You can translate these file formats into MapInfo .TAB and .MIF\ .MID files using the Universal Translator:

- Autodesk AutoCAD (*.DWG, *.DXF)
- Bentley MicroStation Design (V7) (*.FC1, *.DGN, *.POS)
- Bentley MicroStation Design (V8) (*.FC1, *.DGN, *.POS)
- ESRI ArcInfo Export (*.E00)
- ESRI Geodatabase (File Geodb API) (*.GDB)
- ESRI Geodatabase (Personal Geodb) (*.MDB)
- ESRI Legacy ArcSDE
- ESRI Shapefile (*.SHZ, *.SHP)
- GML (Geography Markup Language) (*.GML, *.GZ, *.XML)
- Google KML (*.KML, *.KMZ)
- OS MasterMap Database – Supports Cadcorp OS MasterMap Database data.
- OS VectorMap District – Reader supports GML data in OS VectorMap District format.
- OS VectorMap Local – Reader supports GML data in OS VectorMap Local format.
- Spatial Data Transfer Standard (SDTS) (*.CATD, *.DDF)
- Vector Product Format (VPF) Coverage (*.FT)

You can translate MapInfo .TAB and .MIF\ .MID files into these Vector Product Format Coverage (VPF) formats using the Universal Translator:

- Autodesk AutoCAD DWG/DXF (.dxf, .dwg)
- Bentley MicroStation Design 7 (.dgn)
- Bentley MicroStation Design 8 (.pos, .fc1, .dgn)
- ESRI ArcInfo Export (.e00)
- ESRI Shapefile (.shp)

The Universal Translator supports bounded, affined, and affine and bounded projections.



Using the Universal Translator Tool

By default, the Universal Translator is running when you launch MapInfo Pro. If you do not see the Universal Translator, then you must add it to MapInfo Pro.


For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

To use Universal Translator:

1. On the **TABLE** tab, in the **Content** group, click **Universal Translator**.

2. On the **FME Quick Translator** dialog box, on the **File** menu, click **Translate** to open the **Set Translation Parameters** dialog box.
3. Beside the **Format** list box in the Reader panel, click **Browse the gallery** . The **Reader Gallery** dialog box opens.
4. Select the format of the dataset that you want to translate and then click **OK**.
5. In the **Dataset** field, enter the path to the dataset file that you want to translate or click **Open file browser**  and search for the file.

Note: When you select **AutoCAD** as the format type, the translator defaults to **DWG** format.



6. Click **Parameters** to open a dialog box of parameters that may be set for the dataset that you want to translate.
7. In the **Coord. System** field, enter a coordinate projection to apply to this dataset or click **Open file browser**  and search for the projection.

The projection files that display in the **Choose Projection** dialog box are from the MapInfo Projection `MAPINFOW.PRJ` file. If the projection entry that you need does not display in this list, then you can make a custom matching projection entry beforehand in this file.

See *Building Blocks of a Coordinate System* and *Adding Projections to the MAPINFOW.PRJ File* in the *MapInfo Pro Coordinate Systems Guide*.

If you select the wrong projection, you may get erroneous results. Contact the vendor or creator of this data to obtain descriptive information and/or metadata about the projection\coordinate system used in the input files to translate them correctly into MapInfo format.

If you do not select a projection and the input format does not have associated projection information (such as with DGN and DWG\DXF formats), then the FME Translator assigns a non-earth coordinate system. It uses the extents of the data in the drawing for the values that define the non-earth bounds.


8. Beside the **Format** list box in the Writer panel, click **Browse the gallery** . The **Writer Gallery** dialog box opens.
9. Select the format to translate to and then click **OK**.
10. In the **Dataset** field, enter the path to where you want to save the dataset file or click **Open file browser**  and search for a location.
11. Click **Parameters** to open a dialog box of parameters that may be set for the dataset that you want to create.
12. Click **OK** to begin the translate.



A message log displays with details of the translation process. If the translation fails, look at the log to determine the cause of failure.

Translating Multiple Files

The Universal Translator gives you the option to select multiple files, or a directory of files, to translate. The data is merged during the translate process to produce a single output file.

To translate multiple files:

1. Run the **Universal Translator** tool to display the **FME Quick Translator** window. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and on the **Running** tab, double-click **Universal Translator** (see [Running a Tool](#) for details.)
2. On the **FME Quick Translator** dialog box, on the **File** menu, click **Translate** to open the **Set Translation Parameters** dialog box.
3. Beside the **Format** list box in the Reader panel, click **Browse the gallery** . The **Reader Gallery** dialog box opens.
4. Select the format of the dataset that you want to translate and then click **OK**.
5. Beside the **Dataset** field, click the **Open advanced browser** button. The **Select File** dialog box opens.
6. Click either:
 - **Add Files** to select individual files to translate. To select more than one file in the **Select One or More Files** dialog box, press **Ctrl** while selecting files. Make your selections and then click **Open**.
 - **Add Directories** to select a directory of files to translate. Make your selection in the **Select a Folder** dialog box and then click **Choose**.






You can select to open both individual files and a directory. Your selections display in the **Select File** dialog box. When you are finished making selections, click **OK**.
7. From the **Multiple Source Dataset Options** list, select how you want to save the output of the translation. When you add an directory as input, these options enable:
 - **Merge source datasets to one destination** - Select to merge all of the input files into a single output file.
 - **Separate destinations for each source file** - Select to generate an output file for each input file.
 - **Separate destination for each source directory** - Select to generate output directories for each input directory.
8. In the **FME Quick Translator** window, beside the **Format** list box in the Writer panel, click **Browse the gallery** . The **Writer Gallery** dialog box opens.
9. Select the format to translate to and then click **OK**.
10. In the **Dataset** field, enter the path to where you want to save the dataset file or click **Open file browser**  and search for a location.

The translation will generate a single dataset file from your data file selections.

11. Click **Parameters** to open a dialog box of parameters that may be set for the dataset that you want to create.
12. Click **OK** to begin the translate.

Translating MapInfo .TAB Files to DGN 8.0 Format


To translate a MapInfo .TAB file into a Microstation Design 8.0 file:





1. Run the **Universal Translator** tool to display the **FME Quick Translator** window. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and on the **Running** tab, double-click **Universal Translator** (see [Running a Tool](#) for details.)
2. On the **FME Quick Translator** dialog box, on the **File** menu, click **Translate** to open the **Set Translation Parameters** dialog box.
3. Beside the **Format** list box in the Reader panel, click **Browse the gallery** . The **Reader Gallery** dialog box opens.
4. Select **MapInfo TAB (MFAL)** and then click **OK**.
5. In the **Dataset** field, enter the path to the TAB file that you want to translate or click **Open file browser**  and search for the file.
6. In the **Coord. System** field, enter a coordinate projection to apply to this dataset or click **Open file browser**  and search for the projection.
7. Beside the **Format** list box in the Writer panel, click **Browse the gallery** . The **Writer Gallery** dialog box opens.
8. Select **Bentley Microstation Design (v8)** and then click **OK**.
9. In the **Dataset** field, enter the path to where you want to save the dataset file or click **Open file browser**  and search for a location.
10. Click **Parameters** to open a dialog box of parameters that may be set for the dataset that you want to create.
11. Click **OK** to begin the translate.

A message log displays with details of the translation process.

Translating MapInfo .TAB Files AutoCAD DWG/DXF Formats

To translate a MapInfo .TAB file into AutoCAD DWG/DXF format:

1. Run the **Universal Translator** tool to display the **FME Quick Translator** window. On the **HOME** tab, in the **Tools** group, click **Tool Extensions**, and on the **Running** tab, double-click **Universal Translator** (see [Running a Tool](#) for details.)
2. On the **FME Quick Translator** dialog box, on the **File** menu, click **Translate** to open the **Set Translation Parameters** dialog box.
3. Beside the **Format** list box in the Reader panel, click **Browse the gallery** . The **Reader Gallery** dialog box opens.

4. Select **MapInfo TAB (MFAL)** and then click **OK**.
5. In the **Dataset** field, enter the path to the TAB file that you want to translate or click **Open file browser**  and search for the file.
6. In the **Coord. System** field, enter a coordinate projection to apply to this dataset or click **Open file browser**  and search for the projection.
7. Beside the **Format** list box in the Writer panel, click **Browse the gallery** . The **Writer Gallery** dialog box opens.
8. Select **Autodesk AutoCAD DWG/DXF** and then click **OK**.
9. In the **Dataset** field, enter the path to where you want to save the dataset file or click **Open file browser**  and search for a location. You can save to one of the following formats:
 - **DXF** (Drawing eXchange Format) if you require an ASCII output format.
 - **DWG** (DraWinG) if the file you are translating is very large and you want a binary output format.
10. Click **Parameters** to open a dialog box of parameters that may be set for the dataset that you want to create. This is where you specify the AutoCAD version to translate to.

AutoCAD release 2000 to 2002 formats are identical. AutoCAD release 2004 and 2005 are identical.
11. Click **OK** to begin the translate.

A message log displays with details of the translation process.

Exiting the Universal Translator

To remove the Universal Translator from MapInfo Pro:

- On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Tool Extensions** from the list.
- On the **Running** tab, right-click on the Universal Translator and click **Unload**. This removes the Universal Translator from the MapInfo Pro ribbon and from the **Running** tab in the Tools Manager.
- To also unregister this tool from the Tools Manager, on the **Register** tab, highlight the Universal Translator and click **Unregister Tool** button beside it.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Window Manager Tool

This tool assigns the title of **Map**, **Browser**, **Layout**, **Layout**, and **Redistrictor** window and the default table view. The Set Default View option allows you to select a layer from an open map window and make the default zoom and center settings for the layer's base table match those of the map window. The default center and zoom settings are written to the table's .MAP file.

You can resize the open **Browser**, **Map**, **Layout**, and **Layout** windows in MapInfo Pro using the Window Manager tool. Remember you need to add the Window Manager tool to the Tools Manager list before using it.

Before you can work with this tool, you must register it with MapInfo Pro and then run it. For instructions, see [Adding a Tool Using the Tools Manager](#).

To resize a Map window:

1. Open the Map window you want to resize.
2. On the **HOME** tab, in the **Tool Windows** group, click **Tools**.
3. On the **Running** tab, double-click **Window Manager** and click **Set Window Size** to display the **Set Window Size** dialog box.

This dialog box does not accept negative, zero, or blank values as entries. You can enter decimal amounts, but in the format **##** not **.#**. If you enter one of these values, an error results.

4. Type the width and height values in the fields provided and then select the units that are appropriate for those values.

Note: Inches are the initial default setting as they are based on paper units, but once you have changed the selection in the Units drop-down list, MapInfo Pro "remembers" it for the session.

5. Click **OK** to resize the window.

Keep in mind that the display of the window you resize can be affected by your computer's display settings and that the Title bar and scroll bars are included in the calculation of the window's size.

For information about how to add a tool to the Tool Manager, see *Adding a Tool Using the Tools Manager* in the *MapInfo Pro Productivity Guide*.

Workspace Packager Tool

This is a useful tool for sharing maps with others who are not on your system, for backing up a workspace that may have many distributed table locations into one directory, or for sharing a partial map with others who may have more current information.

The Workspace Packager tool can:

- Collect the files of a list of workspaces into a single location and create new workspace files to reference the copied tables
- Collect a workspace's table information (references) into one new file for easy access by others who share your network access and permissions
- Copy all of the tables in a workspace to a specified folder or network location and create a new workspace file to share these tables. Users who do not share your network access or permissions can access this workspace easily
- Create a new workspace file from selected table references of an existing workspace for easy access by others who share your network access and permissions

- Create a new workspace file from copies of selected tables from an existing workspace and save it to a location from which others who do not share your network access or permissions can access it

These options ensure that the map you are trying to share with others will open properly under different access and permission circumstances. Further, using this tool, your workspace users will be able to open your packaged workspace no matter where the files are moved to or copied to, even if the files are moved or copied to a different computer.

For each of the Workspace Packager options, you can select one of these entries:

- Select **Make native copy (Save Copy As)** to make a copy of the tables in the workspace and save them to a particular folder or network location. We recommend this option when you want to send your map to someone who does not have access to the folders or network locations where these .TAB files are kept. You might also want to use this option if you are not sure whether the person to whom you are sending this map has access to the data. Workspace files created this way are larger than the Keep Original version would be.
- Select **Keep Original (do not copy)** to maintain the original table location references in a new workspace. We recommend this option when you want to send your map to someone who has access to the same folders and network locations. Using this options saves space.

Keep these definitions in mind as you use the Workspace Packager tool.

For information about how to add a tool to the Tool Manager, see [Working with MapInfo Pro Tools](#).

Using the Workspace Packager to Save Tables to One Location

Use these instructions to save the tables associated with a workspace to one location and create a new workspace that accesses these copied files. This process allows you to share a workspace with others who may not have your network access or permissions.

To use the Workspace Packager to copy all .wor tables into one location:

1. Run the **Workspace Packager** tool to display the **Workspace Packager** window. See [Running a Tool](#) for details.
2. Use the **Browse** button to identify the folder to which you want to save the packaged workspace files. We recommend that you change the file name of the workspace file at the end of the field to something meaningful to you.

The options in the next step allow you to specify the handling of tables based on their location

3. To copy all of the tables of a .wor file to one directory, choose **Make native copy (Save Copy As)** for each of these enabled options.
 - Tables stored locally
 - Tables with UNC paths
 - Remote and linked tables
4. Once you have completed these selections, click **OK** to run the Workspace Packager tool.

Using the Workspace Packager to Specify Table References

Sometimes you want to share a workspace with other users who

From time to time, the users you want to share your workspace with have access to some files locally and not to others. Use these instructions to specify whether tables associated with the workspace should be copied

Use these instructions to save the table references associated with a workspace to a new workspace. and create a new workspace that accesses these copied files. This process allows you to share a workspace with others who may not have your network access or permissions.

Keyboard Shortcuts

Shortcuts by Keystroke

Command Shortcuts

This topic contains a comprehensive list of the short-cuts available in the MapInfo Pro application. For information on how to customize them, see [Customizing Command Shortcuts](#).

Command	Shortcut	Tab
Add Legend	Shift+F3	MAP
Add New Row	Ctrl+E	TABLE
Add Node	Ctrl+Shift+N	SPATIAL
Add Theme	F9	MAP
Add Workspace	Ctrl+Shift+A	HOME
Clear	Ctrl+W	MAP/TABLE/SPATIAL
Clear Target	Ctrl+Delete	SPATIAL

Command	Shortcut	Tab
Clone Window	Ctrl+Shift+C	HOME
Copy	Ctrl+C	HOME/SPATIAL
Cut	Ctrl+X	HOME/SPATIAL
Exit	Alt+F4	PRO
Find and Mark	Ctrl+F	TABLE/SPATIAL
Find Selection	Ctrl+Shift+F	TABLE/MAP/SPATIAL
Info Tool	Ctrl+Shift+I	MAP under Map Tools
Layers Window	Ctrl+Shift+L	HOME
Legend Window	Ctrl+Shift+G	HOME
Line Style	Shift+F8	SPATIAL
MapBasic Window	Ctrl+Shift+B	HOME
Map Redraw On/Off	Ctrl+Shift+D	MAP
Browser Window	F4	HOME
Layout Window	F5	HOME/LAYOUT
Map Window	F3	HOME/MAP
New Table	Ctrl+N	TABLE
Open Table	Ctrl+O	HOME/TABLE/MAP/LAYOUT
Open Workspace	Ctrl+Shift+O	HOME/TABLE/MAP
Paste	Ctrl+V	HOME/SPATIAL

Command	Shortcut	Tab
Previous View	Alt+Left Arrow	MAP
Print	Ctrl+P	LAYOUT
Prism Window	F10	HOME
Redistrict Window	Shift+F4	HOME/MAP
Redraw Window	Ctrl+D	HOME/MAP
Region Style	Ctrl+F8	SPATIAL
Remove	Delete	LAYOUT
Reshape	Ctrl+R	SPATIAL
Run MapBasic Program	Ctrl+U	HOME
Save Table	Ctrl+S	HOME/TABLE
Save Workspace	Ctrl+Shift+S	HOME
Set Target	Ctrl+T	SPATIAL
Snap to Nodes	S Key	SPATIAL
Statistics Window	Ctrl+Shift+Z	HOME/MAP
Symbol Style	Alt+F8	SPATIAL
Table Window	Ctrl+Shift+T	HOME
Tasks	Ctrl+Shift+K	HOME
Text Style	F8	SPATIAL
Tool Manager	Ctrl+Shift+U	HOME

Command	Shortcut	Tab
Undo	Ctrl+Z	HOME/SPATIAL
WFS Table Refresh	Alt+F5	TABLE
Workspace Explorer Window	Ctrl+Shift+E	HOME/MAP
3D Map Window	F11	HOME

Window Shortcuts

The following keyboard shortcuts for windows are supported.

Explorer window

Explorer Window	Shortcut
Jump to Maps section	Alt-M
Jump to Tables section	Alt-T
Jump to Windows section	Alt-W
Jump to Connections section	Alt-C
Jump to Search box	ALT+F
Jump to next item	Tab

Window List window

Window List	Shortcut
Context menu	Shift+F10
Rename a window	F2
Select all windows of the same type	Ctrl+A

Window List	Shortcut
Close a window	Del
Toggle visibility check box	Space
Activate window	Enter or Double-Click
Activate the window but keep keyboard focus on the Windows list.	Ctrl+Enter
Clone a window	Ctrl-Shift+C

Connections window

Connections Window	Shortcut
Context Menu	Shift+F10
Close	Delete
Add new connection	Ins
Open tables from a connection	Enter or Double-click

Layers window

Layers Window	Shortcut
Context Menu	Shift+F10
Rename a map	F2
Select all (if not in a group) or all in a group layer	Ctrl+A
Toggle visibility check box on/off	Spacebar
Opens Layer Properties dialog box	Shift+P or double-click

Layers Window	Shortcut
Toggle Editable on/off	Shift+E
Toggle Selectable on/off	Shift+S
Toggle Autolabels on/off	Shift+L
Toggle View Entire Layer on/off	Shift+V
Style Override Swatch	Click or Enter
Multi-Select	Shift+arrow keys
On a map node: activate the map and keep focus on the Layers list	Click or Enter
On a map node: activate that map and set keyboard focus on Map window	Ctrl+Enter (Alt+Click)
On a map node: view entire layer	Shift+V
On a map node: Collapse/Expand Node	Shift+/-
On a map node: Collapse/Expand Node all nodes	Ctrl+Shift+/-

Tables window

Tables Window	Shortcut
Context Menu	Shift+F10
Select all or, if tables are in a treeview, select all in group	Ctrl+A
Open one or more layers in a new map	Shift+M
Open one or more layers in current Map window	Shift+C

Tables Window	Shortcut
Open one or more layers in new Browser map	Shift+B
Close one or more layers	Del
Modify Table Structure	Double-click

Layout window

Layout Window	Shortcut
Context menu	Shift+F10
Context menu on selected frames	Shift+F10
Select All frames	Ctrl+A
Select tool	Shift+S
Pan tool	Shift+P
Zoom In/Zoom Out tools	+ / -
Move selected frames	Arrow keys
Move selected frames by X	Shift+Arrow keys
Override snap behavior	Ctrl+Arrow keys
Disable snap for mouse	Alt+mouse drag
Cut selected frames	Ctrl+X
Copy selected frames to clipboard	Ctrl+C
Paste from clipboard	Ctrl+V
Delete selected frames	Del

Layout Window	Shortcut
Fit layout in window	Shift+F
Print layout	Ctrl+P

Rolling the mouse wheel in a **Layout** window zooms in or out. Pressing the **CTRL** key while using the mouse wheel scrolls the layout up or down.

Map window

Map Window	Shortcut
Context Menu	Shift+F10
Shift center of map	Arrow keys (left, right, up, down)
Snap	s key
Cross-hair C key	c key
Auto node N key	n key
Trace T key	t key
Zoom	+/-
Select All from selection Layer	Ctrl+A
View Entire Map	M
Change View Dialog	V
Zoom In Tool	z
Zoom Out Tool	Z
Info Tool	I
Map Options Dialog	O

Map Window	Shortcut
Pan Tool	P
Select Tool	S
Label Tool	L
Create Legend Dialog	I
Create Theme Dialog	T
Unselect All	U
Change to next customized mini toolbar	Space
Insert Point Tool	1
Insert Text Tool	2
Insert Line Tool	3
Insert Polyline Tool	4
Insert Arc Tool	5
Insert Polygon Tool	6
Insert Ellipse Tool	7
Insert Rectangle Tool	8
Insert Rounded Rectangle Tool	9
Select By Location	B
Toggle Snap mode	s
Change cross-hair cursor	c

Map Window	Shortcut
Toggle Auto-Node	n
Toggle Trace	t

Rolling the mouse wheel in a **Map** window zooms in or out. Pressing the **CTRL** key while using the mouse wheel scrolls the map up or down.

Browser window

Browser Window	Shortcut
Context Menu	Shift+F10
Select All	Ctrl+A
New Row	Ctrl+E
Edit a cell	F2

Rolling the mouse wheel in a **Browser** window scrolls the table up or down.

MapBasic window

MapBasic Window	Shortcut
Context Menu on selected frames	Shift+F10

Move to window

Move To Window	Shortcut
Jump to Map window	Ctrl+Enter
Zoom to best view	Alt+double-click

Tasks window

Tasks Window	Shortcut
Context Menu	Shift+F10
Remove finished job from Task Manager	Del
Pause	
Cancel	
View log	Shift+L

Info window

Info Window	Shortcut
Next layer	Ctrl+Right Arrow
Previous layer	Ctrl+Left Arrow
Scroll	Page up/down

Tools window

Tools Window	Shortcut
Run default command	Enter

Using Key Tips

Key tips are an efficient way to navigate the MapInfo Pro ribbon commands. Key tips give you access to most commands on the ribbon by using only two to four key strokes from anywhere in the application. Key tips are also easy to discover visually, because they display the keystroke over the command on the ribbon.

You can still apply commands using the keystrokes described under [Shortcuts by Keystroke](#). However, you have access to more commands using key tips.

To see and use key tips:

1. Press the **Alt** key to display letters over the ribbon tabs.
2. Press the letter key for the tab you wish to view, such as M for the **MAP** tab.
3. Letters display over the commands on the ribbon you selected. Press the letter or letters for the command you want to use.
4. If the command is a list, then the list expands and letters display over the commands in the list. Press the letter or letters for the command you wish to use in the list.

Customizing Command Shortcuts

You can customize command short-cuts by editing the `MAPINFOPRO.MNU` file located in the MapInfo Pro installation directory. This file contains the command short-cuts and context menu definitions for MapInfo Pro.

Note: Changing a short-cut in the `MAPINFOPRO.MNU` file can break the default setting for the short-cut. We recommend using the **Command Editor tool** instead, because it makes a user-specific copy of the `MAPINFOPRO.MNU` file for edits.

The following information is for advanced users who understand this issue, but want more control over how to customize short-cut keys.

To change an existing short-cut override the current `<KeyGesture>` value with a new value.

To remove a short-cut, put in an empty value `<KeyGesture/>`.

To add a short-cut for a command not listed, see the list of commands in `MAPINFOPRO.MNU.SAMPLE`. Copy the `<MapInfoProCommand>` section for the command you want to add and include it in the `ArrayOfMapInfoProCommand` section of `MAPINFOPRO.MNU`. Add a value for the `KeyGesture` if necessary.

```
<MapInfoProCommand Name="UpdateColumn">
<DisplayText>Update Column</DisplayText>
<MenuItemText>Update Column</MenuItemText>
<MenuItemToggleText>Update Column</MenuItemToggleText>
<KeyGesture>Ctrl+Shift+U</KeyGesture>
<ToolTipDescription>Create / Modify Columns</ToolTipDescription>
<ToolTipText>Create temporary columns or modify existing
columns.</ToolTipText>
<ToolTipDisabledText>This command is disabled. Open one or more editable
tables to enable it.</ToolTipDisabledText>
</MapInfoProCommand>
```

The MapInfo Pro installation directory also contains a `MAPINFOPRO.MNU.KEYSAMPLE` file, which shows the default keyboard short-cuts for MapInfo Pro.

Window Navigation

Activating a window (tabbed, floating, or docked) via mouse, shortcut key, or calling `setfrontwindow`, puts the focus and keyboard focus into that window's content. Exceptions to this include the standalone **Layers** or within the **Explorer** window. For keyboard navigation of the Layers window see [Layers Window Shortcuts](#).


Tab and arrows are not used to navigate between windows or on the ribbon. See [Window Shortcuts](#).

Working with the MapBasic Window

This section allows advanced MapInfo Pro users to go behind the scenes and take advantage of functions that enhance the use of MapInfo Pro through the MapBasic window. MapBasic is MapInfo Pro's programming language that allows you to customize and automate MapInfo Pro functionality. When MapBasic was created, the MapBasic Window feature was added to MapInfo Pro as a means of testing and debugging code for an application. It became apparent that the MapBasic window is also a useful tool to MapInfo Pro users for doing certain tasks such as complex selections and queries based on object information.

The MapBasic window is limited to selected commands from the MapBasic programming language. The MapBasic window can take commands line by line. It does not include the capability for looping, inter-application communication, and other more complex commands. If you find yourself using the MapBasic window often, you may want to consider transferring your code to a MapBasic application that will automate the process.

Accessing the MapBasic Window

To open the **MapBasic** window, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list. As with any other window, you may resize it or move it to a new location. The window lets you enter MapBasic code or view MapBasic code as MapInfo Pro generates it.

To see how MapInfo Pro carries out a select statement:

1. Open the **MapBasic** window and then open the WORLD table.
2. On the **TABLE** tab, in the **Selection** group, click **SQL Select** to open the **SQL Select** dialog box.
3. Type in the expression `Pop_1994 > 1000000`. Make sure that the Browse Results box is checked.
4. Click **OK**.

The syntax for these commands appears in the MapBasic window as follows:

```
Open Table "C:\MAPINFO\DATA\WORLD\WORLD.tab" Interactive
Map From World
select * from World where Pop_1994 > 1000000 into Selection
browse * from Selection
```

The first line is a result of opening the WORLD table. The second line of code is written automatically because the WORLD table displays in a Map window by default. The third line is the syntax for the select statement. The fourth line is the result of selecting the **Browse Results** check box.

You can also enter MapBasic commands into the **MapBasic** window. Position your cursor under the `browse * from Selection` line and type the following:

```
Map from Selection
```


Press **Enter** after the line, and the command executes. You should see your selection displayed in a **Map** window.

As stated before, the **MapBasic** window was primarily designed to assist MapBasic programmers. You can statements and functions in the **MapBasic** window such as `Buffer()` function or `Insert` statement.

To find the appropriate usage and syntax for these statements and functions, refer to the *MapBasic Reference*, which is located in the `Documentation` folder of your installation directory. The *MapBasic Reference* provides a comprehensive guide to MapBasic programming statements and functions along with examples.


Displaying or Hiding the MapBasic Window

To display the **MapBasic** window, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list.

To hide the **MapBasic** window, click the context menu button  located on the upper-right corner of the **MapBasic** window. On the menu, click **Auto Hide**. The **MapBasic** window minimizes to the bottom of the MapInfo Pro screen. Clicking on the minimized **MapBasic** window reopens it.

You can perform tasks by typing statements into the **MapBasic** window or by choosing them from the MapInfo Pro ribbon.

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You can perform tasks by typing statements into the **MapBasic** window or by choosing them from the MapInfo Pro ribbon.

Options on the MapBasic Context Menu

Right-clicking on the **MapBasic** window opens a context menu where you can select from the following options.

Run Command	Run the commands that are in the MapBasic window.
Clear Contents	Removes the contents of the MapBasic window.
Save Contents	Opens the Save As dialog box, so that you can save the contents of the the MapBasic window to a MapBasic (*.mb) document or text (*.txt) file.
Undo	Reverse the results of the last action.
Redo	Perform the last action.
Cut	Remove highlight text.
Copy	Copy highlighted text to the clipboard.
Paste	Insert text from to the clipboard at the cursor position.
Select All	Select all text in the MapBasic window.

Running a MapBasic Program

MapBasic is a programming language that you can use to customize or automate MapInfo Pro. To create MapBasic applications, you need the MapBasic compiler, which is a separate product. However, you do not need the MapBasic compiler to run a MapBasic application.

MapInfo Pro comes with MapBasic applications, which are tools designed to make your work easier, such as:

- **Symbol** (`SYMBOL.MBX`). Creates custom symbol shapes.
- **Scale Bar** (`SCALEBAR.MBX`). Annotates a map with a distance scale.
- **Named Views** (`NVIEWS.MBX`). Assigns a name to the current map view and use that name to return to that view later.
- **Overview** (`OVERVIEW.MBX`). Opens a second **Map** window that displays an overview of the current map (also referred to as an *area detail map*).

For a list of the tools that install with MapInfo Pro, see [Summary of MapInfo Pro Tools](#). To run one of these MapBasic tools, see [Running a Tool](#).

To run your own MapBasic application, see [Loading/Autoloading External Tools](#).

Running a MapBasic Program Using a Startup Workspace

You can use a startup workspace to run a MapBasic application. When you want to run a MapBasic application in your startup workspace, you need to create the workspace with a text editor. To do this:

1. Place the following into an ASCII file:

```
!workspace
!version 700
run application "someprog.mbx"
```


2. Replace "*Someprog.app*" with the name of the MapBasic application you want to launch from the startup workspace.
3. Name this file `STARTUP.WOR`.
4. Place this file in your MapInfo Pro program directory or in your home directory.

Note: For a comprehensive list of MapBasic functions and statements, click the **Help** button in the **MapBasic** window.

Copying the Contents of the MapBasic Window

The **MapBasic** window displays custom messages from a MapBasic program. You can use this window to display status messages ("Record deleted") or to prompt the user ("Select the territory to analyze.").


To display the message window and copy its contents:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Perform some action in MapInfo Pro that you want to display the details of in the **MapBasic** window. This can be as simple as selecting an object on the map or opening a new .TAB file.
3. Highlight the information you want to copy and do one of the following:
 - Right-click to display the shortcut menu, click **Copy**
 - Hold down the **Ctrl** key and press **C**.
4. Go to the application you want to paste the message contents to and do one of the following:
 - Right-click to display the shortcut men, click **Paste**.
 - Hold down the **Ctrl** key and press **Insert**.

Issuing Commands through the MapBasic Window

When you issue a command through the **MapBasic** window, you must use the correct syntax. When you choose many of MapInfo Pro's commands, MapInfo Pro displays the commands in the **MapBasic** window. You can learn something about the syntax of MapInfo Pro commands simply by observing them in the window.

To issue a command through the **MapBasic** window:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Type a command.
3. Press **Enter** and MapInfo Pro executes the command.

When the command does not have the result you want, you can edit the command statement by deleting items, adding new items, or rearranging items.

To reissue a command that you have previously issued:

1. Position the cursor anywhere within the command statement.
2. Press **Enter**.

This is particularly useful when you want to issue a command several times with small changes each time.

To reissue a series of commands:


1. Choose the series by dragging the cursor over them to highlight them.
2. Press **Enter**.

Examples of MapBasic Programs

This section shows examples of MapBasic programs you can use to enhance your maps.

Converting a Table of Coordinates to a Table of Lines

The following steps can be used to create lines for each record in a table. You must have a column for each of the necessary coordinates. It is suggested that you make any changes on a copy of your table. If there are already objects in a **Map** window for this table, they will be lost.

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Type the following command in the window:

```
update point_table set obj=createline(Start_X, Start_Y,End_X,End_Y)
```

Where `point_table` is the copy of your original table, `Start_X` is the column containing the first X coordinate, `Start_Y` is the column containing the first Y coordinate, `End_X` is the column containing the second X coordinate, and `End_Y` is the column containing the second Y coordinate. These columns will be the names that you have already specified in your table.

MapInfo Pro will go row by row through your table and create a line object based on the information in that row. You will not see a change in the table until you redraw the window or open a new **Map** window for it.


Troubleshooting (Converting a Table of Coordinates to a Table of Lines)

Before you proceed with the update make sure that the table in which the lines will be stored is mappable. To make the table mappable, on the **TABLE** tab, in the **Edit** group, click **Maintenance**, and **Modify Structure**.

If your map is projected, the line objects may not be created properly. To work around this situation, see the `Set Coordsys` statement in the *MapBasic Reference* to change the MapBasic coordinate system.

Creating Circles Around Points Using the MapBasic Window

The following `createcircle` command can be used to convert a table of points to a table of circular regions. This command is similar to creating buffers on a point layer. It differs, however, from buffering in that it actually converts the point objects into circles. It is suggested that you make any changes on a copy of your table. If there are already objects in a **Map** window for this table, they will be lost.

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Type the following line in the window (all on one line):

```
update tablename set  
obj=createcircle(centroidx(obj),centroidy(obj),radius)
```

Where `tablename` is the name of the copy of the table, and `radius` is the radius of the circle in current system units.

The table will then be automatically updated.

Troubleshooting (Creating Circles Around Points Using the MapBasic Window)

This command modifies the object column of your table. The command replaces the point object with circular objects. If you wish to undo this operation, make sure the **Map** window is active and on the **TABLE** tab, in the **Contents** group, click **Revert** to revert the table to the last time it was saved.

The final parameter in the MapBasic command, 10 in this example, is the radius of the newly created buffers, in miles. This figure is adjustable. If you perform the command and find that the radius is too small or too large, perform the command again, with a different radius.

If your map is projected, the circular objects may not be created properly.


If you wish to convert a table of circular objects back to a table of points, run the MapBasic command:

```
Update tablename set obj=Buffer(obj,smoothness,distance,units)
```

Using the ObjectInfo Function to Describe Graphical Object Types

The `ObjectInfo` command is used to return the type of graphic object associated with each row. Each object type is represented by a small integer. MapInfo Pro has 12 types of objects. They are listed in the `ObjectInfo` function section in the *MapBasic Reference*.


To determine the different types of objects in a single layer, do the following:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Enter the following SQL Select command. Where `obj` refers to the object associated with the row of the table, 1 is the code to return the object type, and `tablename` is your table.

```
Select ObjectInfo (obj,1) from tablename
```

3. On the **HOME** tab, in the **Windows** group, click **New Document**, and click **Browser** from the list, to open a **Browser** window.
4. Choose to browse selection. A list of the number codes for each object type appear.

Selecting All Records of a Specific Object Type


1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Type the following SQL Select statement. Where `tablename` is your table and `objecttype` is the type of object you wish to select. To determine the type of an object, double-click the object. A dialog box displays with the region type listed.

```
Select * from tablename where str$(obj)="objecttype"
```

3. Choose to browse or map the selection of these objects. You can also search for other types of objects including regions, arcs, lines, ellipses, rectangles, points, and polylines.

Selecting Streets by Color Using SQL Select

To select all streets from a StreetPro file by the width, pattern, and color of the line segment, do the following:

1. With your street file open, on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. To select thin red lines, type the following:

```
Str$(ObjectInfo(obj,2))="Pen (2, 2, 16711680) "
```


Finding the Angle from a Horizontal

The following procedure finds the angle (angle A in the next example) between a line that connects two given points and a horizontal line. This is done by creating a right triangle where the hypotenuse is the line between the two points and the adjacent is the line between the origin point and a point on the horizontal directly below or above the destination point. After you find the hypotenuse and adjacent distances, you can find the angle by taking the arc cosine of the adjacent divided by the hypotenuse.

Note: The angle will be calculated using a Cartesian coordinate system. For some projections, a calculated 90 degree angle may be obviously different from a "right angle" on the projected map.

The two points will be referred to as the origin and the destination. The origin is the point that is on the horizontal line. The destination is the other point. In the next example, Hartford is the origin. It lies on the imaginary horizontal line. Boston is the destination. The hypotenuse is the distance from Hartford to Boston; the adjacent is the distance from Hartford to the point where the horizontal intersects the vertical dotted line that passes through Boston.



1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Double-click the origin point (Hartford). MapInfo Pro opens a Point Object window that shows the coordinate information. Write down the X and Y coordinates. These coordinates will be referred to as **OriginX** and **OriginY**.
3. Double-click the destination point (Boston). MapInfo Pro opens a Point Object window that shows the coordinate information. Write down the X and Y coordinates. These coordinates will be referred to as **DestX** and **DestY**.
4. In the **MapBasic** Window, type and run the following command. Substitute the values you find in step 2 and 3 for **OriginX**, **OriginY**, **DestX** and **DestY**. MapInfo Pro returns the distance between the origin and destination points in a **Message** window. The value is the hypotenuse of the triangle.

```
Print Distance(OriginX, OriginY, DestX, DestY, "mi")
```

5. In the **MapBasic** window, type and run the following command. Substitute the values you find in step 2 and 3 for **OriginX**, **OriginY**, **DestX** and **DestY**. MapInfo Pro returns the distance between the origin and a point on the horizontal directly below the destination point. MapInfo Pro returns the distance in a **Message** window. The value is the adjacent of the triangle.

```
Print Distance(OriginX, OriginY, DestX, OriginY, "mi")
```

6. In the **MapBasic** window, find the angle with the following MapBasic command. Substitute the values that you found in step 4 and 5 for adjacent and hypotenuse. MapInfo Pro returns the angle in degrees in a **Message** window.

```
Print (ACOS (Adjacent/Hypotenuse) *57.2958)
```

If you would like to find the angle in radians, omit the multiplication at the end of the statement, leaving:

```
Print (ACOS (Adjacent/Hypotenuse))
```

If, instead of two points, you have one line that has the destination and origin as endpoints, do the following instead of steps 2 and 3:

1. Double-click the line object. MapInfo Pro opens a window that shows the coordinate information. Write down the Start Point and End Point X and Y coordinates.
2. Determine whether the Start Point or the End Point is higher, that is, which point has a more northerly Y coordinate.


If the destination is above the origin (like the example above), then the destination will have the coordinates of the most northerly point (determined in the previous step). The origin would then take the coordinates of the other endpoint of the line.

If the origin is above the destination, then it takes the coordinates of the more northerly point.

3. Continue with step 4.

Finding Floating Windows

All windows in MapInfo Pro may be docked or may be floating windows. These include the **Map**, **Browser**, and **Layout** windows, as well as special windows like the **Info** window, **Statistics** window, button pads, ruler, and **Message** window. You can move windows around and place them off to the side of the screen. Occasionally, one of these windows may be shifted out of view. Using MapBasic, you can bring these windows back to the center of your screen. This example uses the **Info** window. Other special windows are listed in the `Set Window` statement in the *MapBasic Reference*.

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Type the following code into the window:


```
Set Window Info Position (1.5,2.0) Units "in"
```

The **Info** window displays in the center of your screen.

Setting the Default Zoom for a Map

When you open a map in MapInfo Pro, it displays in the default view every time, even though you probably changed the zoom when you last opened the map. You can change the default zoom for a map with the `Set Map` statement.

For example, if you open the standard world map that ships with MapInfo Pro, it displays with the whole world in view, by default. You frequently use the world map to view just the European countries and would like the map to display in that view every time you open it. To change the map's default zoom, do the following:

1. On the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **MapBasic**  from the list, to open the **MapBasic** window.
2. Open the **WORLD** map.
3. Set the zoom level and position of your map to view Europe only.
4. In the **MapBasic** window, enter the following command:

```
Set Map Layer 1 Default Zoom
```

5. Close the **WORLD** table.
6. Re-open the **WORLD** table. It opens in the zoom level that you set.

Street Characteristics of MapInfo Data

Description of Object	Graphic Object Details	Pen (width, pattern, color)
Primary highways	Thin red line	Pen (2,2,16711680)
All other roads	Thin black line	Pen (1,2,0)
Railroads	Thin Black railroad	Pen (1,26,0)

Pen Width is a number from 1-7: one (1) is the narrowest and seven (7) is the widest. These numbers correspond to the line widths set in the **Line Style** dialog box, which shows seven (7) line styles in the **Pixels** drop-down list. To access this dialog box, on the **SPATIAL** tab, in the **Create** group, on the **Style** list, click **Line Style**.

The pattern is a number from 1 to 77. These numbers correspond to the patterns you see in the **Line Style** dialog box in the **Style** drop-down list: the numbers match the styles going from left to right.

Get MapBasic Applications Online

You can obtain MapBasic applications written by people in the MapInfo Pro community, on the **HOME** tab, in the **Tools** group, by clicking **Tool Extensions** and then clicking **Get Tools** from the **Options** list. This launches your Internet browser to a community download page, where you can share and obtain MapBasic tips and applications. Stay up-to-date with the latest developments in this community by regularly checking for new updates.

Python Language Support

MapInfo Pro now supports writing add-ins in the Python language. This allows developers to take advantage of the Python language and its existing libraries/modules when writing MapInfo Pro add-ins. Python, with its feature rich set of libraries, is a very popular platform for Data Analysis and Visualization. We have provided Python developers and data analysts an easier way to work with MapInfo data by providing access to MapInfo Pro table data. While you can make use of any of the

libraries and functionality available to Python, the ability to perform data analysis on MapInfo Pro table attribute data using the rich set of available data analysis tools (for example, Pandas, SciPy, Matplotlib, etc.) adds more capabilities and functionalities to existing ones.

For details, see **Using Python Language** under **Creating an Add-in** in the MapInfo Pro Extensibility Reference Guide.

Installation

Python 3.7.6 x64 is installed with MapInfo Pro in the installation directory in the Python37 folder. MapInfo Pro uses the PythonNet implementation to interact with the Python environment and allow interop between .NET and Python.

Python installation bundled with MapInfo Pro has the following modules pre-loaded:

EFAL is installed with MapInfo Pro in the installation directory in the EFAL folder. Install Additional Python modules:

1. numpy
2. scipy
3. seaborn
4. pandas
5. matplotlib
6. osgeo (Access to GDAL library with MapInfo EFAL driver for NativeX format)
7. ptvsd (Python Tools for Visual Studio debug server)
8. mi_py_debugger (Custom module enable debugging of python script in MapInfo Pro)

To install additional python modules, open the script prompt.bat in %INSTALLDIR%\Python37 folder and execute the following command:

```
python -m pip install module_name
```

Running Python Scripts and Add-ins

The "run application" MapBasic statement now supports running *.py files. Any valid python will work as long as the required modules are installed. The Run Program dialog (Ctrl+U) now lists both .mbx and .py files. You can also drag a .py file onto MapInfo Pro to run it.

There are two ways in which MapInfo Pro runs Python files:

1. Add-in Scope - If the .py file is recognized as a MapInfo Pro add-in, then it is run in its own scope and app domain. Note that when the add-in is run, a .mbx file will still be created next to it, which means that the location must be write-able.
2. Global Scope - If the .py file is not recognized as a MapInfo Pro add-in then it is run in the Global scope. This is a special python environment that is initialized the first time any python code is run. The following setup is done:
 - sys, clr, subprocess, shlex, matplotlib python modules are already imported in this special python environment.
 - matplotlib module uses a Non-GUI backend called agg which will not allow call to plt.show() from within MapInfo Pro in global scope.
 - Reference to WindowsBase .Net framework assembly is added using clr module.
 - PythonProUtil c# utility class is imported as proUtil from MapInfo.Types assembly.
 - MessageOutput class is imported from MapInfo.Types assembly.
 - MessageOutput class overrides the default python stdout, stdin, stderr and prints to MapInfo Pro message window.

```
import clr
import subprocess
import shlex
import matplotlib
# Non-GUI backend for matplotlib. use plt.savefig(fname) instead of
  plt.show()
matplotlib.use('agg')
clr.AddReference('WindowsBase')
from MapInfo.Types import PythonProUtil as proUtil
from MapInfo.Types import MessageOutput
sys.stdout = sys.stderr = sys.stdin = MessageOutput()
```

- RASTER folder is added to path.
- A python variable named pro is initialized to point to the IMapInfoPro interface. It can be used to access MapInfo Pro's object model and to execute MapBasic commands.
- The following help methods are imported in global scope, which can be used directly in Python scripts:

```
end_mapinfo(interactive) -> Halts MapInfo Pro.
  Parameters:
    interactive (bool): prompt to save changes or not when exiting.

do(command) -> Execute an interpreted MapBasic command.
  Parameters:
    command (str): the command to run.

eval(command) -> Evaluate an interpreted MapBasic function.
  Parameters:
    command (str): the command to evaluate.

get_current_module_path() -> Gets the current executing module path
```



```
for standalone python script. (In global scope __file__ is not
available,
therefore use this method.)
```

- If a startup.py file is found in one of the following locations it is executed in the global scope setup. Similar to the way startup.wor is found.
 - FOLDER_MI_APPDATA (-1)
 - FOLDER_MI_LOCAL_APPDATA (-2)
 - FOLDER_MI_PREFERENCE (-3)
 - FOLDER_MI_COMMON_APPDATA (-4)
 - Folder where MapInfoPro.exe is located

See GetFolderPath\$() MapBasic function for more help on these locations.

Once the global scope has been initialized as above, every time the Python code is run, a copy of the global scope is made and used to execute the code.

Creating a Python Add-in

To create a MapInfo Pro add-in in python:

1. Use one of the existing python add-in templates to start with your add-in. The MapBasic version 2019 installation contains two python add-in templates for creating a simple MapInfo Pro add-in or a layout custom frame add-in in python.
 - SAMPLES\RIBBONINTERFACE\Python\py_addin_templates\Simple
 - SAMPLES\RIBBONINTERFACE\Python\py_addin_templates\CustomFrame
2. Copy one of the add-in templates listed above and start modifying it.
 - Start with renaming the files (PY and MB) to your add-in name.
 - Rename module reference as per your new file names.
 - Check for all TODO in python code and modify the code as per your requirement.
3. Once the code is completed, you can run the main python file directly in MapInfo Pro. If your add-in does not have a corresponding .mbx file, a new one with the same base filename as the .py file will be created next to it. This means that the location must be write-able. You can also create, customize and compile the template .mb file.

Note: The name of the MapBasic MB file should be the same as the main python module file. Also, the class below should be present in the main Python module file to load the add-in.

```
# this class is needed with same name in order to load the python add-in
and can be copied
# as it is when creating another add-in.
```

```

class main():
    def __init__(self, imapinfo):
        self._pro = imapinfo

    def load(self):
        try:
            # uncomment these lines to debug the python script using
VSCODE
            # Debug in VSCODE with Python: Attach configuration

            #ptvsd.enable_attach()
            #ptvsd.wait_for_attach()
            #ptvsd.break_into_debugger()

            if self._pro:
                # obtain the handle to current application if needed
                self.thisApplication =
self._pro.GetMapBasicApplication(os.path.splitext(__file__)[0] + ".mbx")

        except Exception as e:
            print("Failed to load: {}".format(e))

    def unload(self):
        try:
            print("Unloading")

self._pro.Ribbon.Tabs['TabMap'].Groups[0].Controls.Remove(self._button)

        except Exception as e:
            print("Failed to unload: {}".format(e))

    def __del__(self):
        self._pro = None
        pass

    def addin_name(self) -> str:
        return "Hello Python Add-in"

    def addin_description(self) -> str:
        return "Hello Python Add-in Description"

    def addin_defaultcommandtext(self) -> str:
        return "Hello Python Add-in Default Command"

    def addin_defaultcommand(self):
        self.on_hello_button_clicked(self)

    def addin_imageuri(self) -> str:
        return join(dirname(__file__), "images/copyright16.png")

```

Loading a MapInfo Pro Python Add-in

To Load a python addin in MapInfo Pro, you need to create a startup MapBasic script which will load the Python module and start executing it. The following sample mapbasic script templates can be used as is or can be modified for loading a Python add-in in MapInfo Pro.

```
'MBX Template for Simple Python Addin
'*****
'      Copyright 2020 Precisely
'      All rights reserved.
'*****/
Include "mapbasic.def"
Include "IMapInfoPro.def"
Include "ResStrng.def"

Declare Method PyAddinAbout Class "MapInfo.Types.PythonAddinLoader" Lib
  "MapInfo.Types.dll" Alias AddIn_About(ByVal p1 as This)
Declare Method PyAddinHelp Class "MapInfo.Types.PythonAddinLoader" Lib
  "MapInfo.Types.dll" Alias AddIn_Help(ByVal p1 as This)
Declare Method PyAddinDefaultCommand Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_DefaultCommand(ByVal p1 as This)
Declare Method PyAddinVersion Class "MapInfo.Types.PythonAddinLoader"
  Lib "MapInfo.Types.dll" Alias AddIn_Version(ByVal p1 as This) As String
Declare Method PyAddinName Class "MapInfo.Types.PythonAddinLoader" Lib
  "MapInfo.Types.dll" Alias AddIn_Name(ByVal p1 as This) As String
Declare Method PyAddinDescription Class "MapInfo.Types.PythonAddinLoader"
  Lib "MapInfo.Types.dll" Alias AddIn_Description(ByVal p1 as This) As
  String
Declare Method PyAddinImageUri Class "MapInfo.Types.PythonAddinLoader"
  Lib "MapInfo.Types.dll" Alias AddIn_ImageUri(ByVal p1 as This) As String
Declare Method PyAddinHideRunningProgram Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_HideRunningProgram(ByVal p1 as This) As Logical
Declare Method PyAddinProcessCommandUri Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_ProcessCommandUri(ByVal p1 as This, ByVal commandUri as String)
  As Logical
Declare Method PyAddinDefaultCommandText Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_DefaultCommandText(ByVal p1 as This) As String

Declare Sub EndHandler
Declare Sub Main

Declare Sub AddIn_About
Declare Sub AddIn_Help
Declare Sub AddIn_DefaultCommand
Declare Function AddIn_Name() As String
Declare Function AddIn_Description() As String
Declare Function AddIn_ImageUri() As String
Declare Function AddIn_Version() As String
```

```

Declare Function AddIn_AssemblyName() As String
Declare Function AddIn_ClassName() As String
Declare Function AddIn_HideRunningProgram() As Logical
Declare Function AddIn_ProcessCommandUri (ByVal commandUri as String) As
    Logical
Declare Function AddIn_DefaultCommandText() As String

Global mapinfoApplication as This
Global mbAddIn as This

Sub Main
    onerror goto ErrorTrap

        if (SystemInfo(SYS_INFO_MIPLATFORM) = MIPLATFORM_WIN64) then
            if (SystemInfo(SYS_INFO_MAPINFO_INTERFACE) =
MIINTERFACE_RIBBON) then
                goto ContinueSample
            end if
        end if

        InvalidScenario:
            Note "This sample can only work with 64-bit Ribbon Interface
UX."
            goto Done
        ContinueSample:

        dim app_name as string
        app_name = ApplicationName$()
        app_name = Left$(app_name, len(app_name) - 4)

        dim str_file as string
        str_file = ApplicationDirectory$() + app_name + ".str"
        If FileExists(str_file) Then
            If LoadStrings(str_file) = FALSE Then
                Note GetResString(IDS_Res_Load_Error) +
ApplicationDirectory$() + app_name + ".str"
            Exit Sub
        End If
    End If

    mapinfoApplication = SYSTEMINFO(SYS_INFO_IMAPINFOAPPLICATION)
    mbAddIn = New_PythonAddin()

    if mbAddIn <> 0 Then
        call InitializePyAddin(mbAddIn, mapinfoApplication,
ApplicationDirectory$() + ApplicationName$())
    End if

    Done:
    Exit Sub

    ErrorTrap:
        Note "Main: " + Str$(err()) + ": " + Error$()

```

```

        Resume done

End Sub

Sub EndHandler
    If mapinfoApplication <> 0 and mbAddIn <> 0 Then
        call UnloadPyAddin(mbAddIn)
    End If
    mbAddIn = NULL_PTR
    mapinfoApplication = NULL_PTR
End Sub

Sub AddIn_About
    call PyAddinAbout(mbAddIn)
End Sub

Sub AddIn_Help
    call PyAddinHelp(mbAddIn)
End Sub

Sub AddIn_DefaultCommand
    call PyAddinDefaultCommand(mbAddIn)
End Sub

Function AddIn_Version() As String
    AddIn_Version = PyAddinVersion(mbAddIn)
End Function

Function AddIn_Name() As String
    AddIn_Name = PyAddinName(mbAddIn)
End Function

Function AddIn_Description() As String
    AddIn_Description = PyAddinDescription(mbAddIn)
End Function

Function AddIn_ImageUri() As String
    AddIn_ImageUri = PyAddinImageUri(mbAddIn)
End Function

Function AddIn_HideRunningProgram() As Logical
    AddIn_HideRunningProgram = PyAddinHideRunningProgram(mbAddIn)
End Function

Function AddIn_DefaultCommandText() As String
    Addin_DefaultCommandText= PyAddinDefaultCommandText(mbAddIn)
End Function

Function AddIn_ProcessCommandUri(ByVal commandUri as String) As Logical
    AddIn_ProcessCommandUri = PyAddinProcessCommandUri(mbAddIn,

```

```
commandUri)
End Function
```

```
'MBX Template for Layout Custom Frame Python Addin
'*****
'      Copyright 2020 Precisely.
'      All rights reserved.
'*****/
Include "mapbasic.def"
Include "IMapInfoPro.def"
Include "ResStrng.def"

Declare Method PyAddinAbout Class "MapInfo.Types.PythonAddinLoader" Lib
  "MapInfo.Types.dll" Alias AddIn_About(ByVal p1 as This)
Declare Method PyAddinHelp Class "MapInfo.Types.PythonAddinLoader" Lib
  "MapInfo.Types.dll" Alias AddIn_Help(ByVal p1 as This)
Declare Method PyAddinDefaultCommand Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_DefaultCommand(ByVal p1 as This)
Declare Method PyAddinVersion Class "MapInfo.Types.PythonAddinLoader"
  Lib "MapInfo.Types.dll" Alias AddIn_Version(ByVal p1 as This) As String
Declare Method PyAddinName Class "MapInfo.Types.PythonAddinLoader" Lib
  "MapInfo.Types.dll" Alias AddIn_Name(ByVal p1 as This) As String
Declare Method PyAddinDescription Class "MapInfo.Types.PythonAddinLoader"
  Lib "MapInfo.Types.dll" Alias AddIn_Description(ByVal p1 as This) As
  String
Declare Method PyAddinImageUri Class "MapInfo.Types.PythonAddinLoader"
  Lib "MapInfo.Types.dll" Alias AddIn_ImageUri(ByVal p1 as This) As String
Declare Method PyAddinHideRunningProgram Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_HideRunningProgram(ByVal p1 as This) As Logical
Declare Method PyAddinProcessCommandUri Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_ProcessCommandUri(ByVal p1 as This, ByVal commandUri as String)
  As Logical
Declare Method PyAddinDefaultCommandText Class
  "MapInfo.Types.PythonAddinLoader" Lib "MapInfo.Types.dll" Alias
  AddIn_DefaultCommandText(ByVal p1 as This) As String

Declare Sub EndHandler
Declare Sub Main

Declare Sub AddIn_About
Declare Sub AddIn_Help
Declare Sub AddIn_DefaultCommand
Declare Function AddIn_Name() As String
Declare Function AddIn_Description() As String
Declare Function AddIn_ImageUri() As String
Declare Function AddIn_Version() As String
Declare Function AddIn_AssemblyName() As String
Declare Function AddIn_ClassName() As String
Declare Function AddIn_HideRunningProgram() As Logical
```

```

Declare Function AddIn_ProcessCommandUri (ByVal commandUri as String) As
    Logical
Declare Function AddIn_DefaultCommandText() As String

Global mapinfoApplication as This
Global mbAddIn as This

Sub Main
    onerror goto ErrorTrap

        if (SystemInfo(SYS_INFO_MIPLATFORM) = MIPLATFORM_WIN64) then
            if (SystemInfo(SYS_INFO_MAPINFO_INTERFACE) =
                MIINTERFACE_RIBBON) then
                goto ContinueSample
            end if
        end if

        InvalidScenario:
            Note "This sample can only work with 64-bit Ribbon Interface
UX."
            goto Done
        ContinueSample:

        dim app_name as string
        app_name = ApplicationName$()
        app_name = Left$(app_name, len(app_name) - 4)

        dim str_file as string
        str_file = ApplicationDirectory$() + app_name + ".str"
        If FileExists(str_file) Then
            If LoadStrings(str_file) = FALSE Then
                Note GetResString(IDS_Res_Load_Error) +
ApplicationDirectory$() + app_name + ".str"
                Exit Sub
            End If
        End If

        mapinfoApplication = SYSTEMINFO(SYS_INFO_IMAPINFOAPPLICATION)
        mbAddIn = New_PythonCustomFrameAddin()

        if mbAddIn <> 0 Then
            call InitializePyAddin(mbAddIn, mapinfoApplication,
ApplicationDirectory$() + ApplicationName$())
        End if

        Done:
        Exit Sub

        ErrorTrap:
            Note "Main: " + Str$(err()) + ": " + Error$()
            Resume done

End Sub

```

```

Sub EndHandler
    If mapinfoApplication <> 0 and mbAddIn <> 0 Then
        call UnloadPyAddin(mbAddIn)
    End If
    mbAddIn = NULL_PTR
    mapinfoApplication = NULL_PTR
End Sub

Sub AddIn_About
    call PyAddinAbout(mbAddIn)
End Sub

Sub AddIn_Help
    call PyAddinHelp(mbAddIn)
End Sub

Sub AddIn_DefaultCommand
    call PyAddinDefaultCommand(mbAddIn)
End Sub

Function AddIn_Version() As String
    AddIn_Version = PyAddinVersion(mbAddIn)
End Function

Function AddIn_Name() As String
    AddIn_Name = PyAddinName(mbAddIn)
End Function

Function AddIn_Description() As String
    AddIn_Description = PyAddinDescription(mbAddIn)
End Function

Function AddIn_ImageUri() As String
    AddIn_ImageUri = PyAddinImageUri(mbAddIn)
End Function

Function AddIn_AssemblyName() As String
    Addin_AssemblyName = "MapInfo.Types"
End Function

Function AddIn_ClassName() As String
    Addin_ClassName = "MapInfo.Types.PythonCustomFrameAddinLoader"
End Function

Function AddIn_HideRunningProgram() As Logical
    AddIn_HideRunningProgram = PyAddinHideRunningProgram(mbAddIn)
End Function

Function AddIn_DefaultCommandText() As String
    Addin_DefaultCommandText= PyAddinDefaultCommandText(mbAddIn)
End Function

```



```
Function AddIn_ProcessCommandUri(ByVal commandUri as String) As Logical
    AddIn_ProcessCommandUri = PyAddinProcessCommandUri(mbAddIn,
commandUri)
End Function
```

Registering a Python Add-in

You can now register a .py file as an add-in from the tool manager using the Register Tool dialog. Note that when the add-in is run, a .mbx file will still be created next to it, which means that the location must be write-able.

Setup Python Debugging using Visual Studio Code (VSCODE)

1. Install the Python and pylint extensions and restart VSCODE.
2. Initialize configurations. A configuration drives VS Code's behavior during a debugging session. Configurations are defined in a launch.json file that's stored in a .vscode folder in your workspace.
3. To initialize debug configurations, first select the Debug View in the sidebar. If you don't yet have any configurations defined, you'll see "No Configurations" in the drop-down list, and a dot on the settings icon.
4. To generate a launch.json file with Python configurations:
 - Select the Settings button or use the Debug > Open configurations menu command.
 - In the Select Environment drop-down list that appears, select Python.

The Python extension then creates and opens a launch.json file that contains number of pre-defined configurations. You can modify configurations (to add arguments, for example), and also add custom configurations.

Python: Attach or Python: Remote Attach configuration must be defined like this.

```
{
  "name": "Python: Remote Attach",
  "type": "python",
  "request": "attach",
  "port": 5678,
  "host": "localhost",
  "pathMappings": [
    {
      "localRoot": "${workspaceFolder}",
      "remoteRoot": "${workspaceFolder}"
    }
  ]
}
```

```
]
}
```

5. After the initial configuration is done, setup VSCODE for remote debugging.
 - Install ptvsd using `python -m pip install --upgrade ptvsd` into your environment.
 - For debugging the default Port for the ptvsd use is 5678. You may need to open the port for debugging in the appropriate firewall or other networking configuration.

For debugging the default Port for the ptvsd use is 5678. You may need to open the port for debugging in the appropriate firewall or other networking configuration.

For more details refer to VSCODE python debugging :

<https://code.visualstudio.com/docs/python/debugging>

Debugging Python Scripts in MapInfo Pro

1. In VSCODE open the folder where your python script is located and then open the python script file from VSCODE Explorer.
2. Add the following lines near the top of your script. It is fine to have comments above them.

```
from mi_py_debugger import *
pro = attach_debugger()
```

3. Run the python script (.py) in MapInfo Pro. You will notice a wait cursor denoting that the process is waiting for some debugger to attach to it.
4. Switch to Debug View in VS Code, and select Python: Attach configuration.
5. Start the VS Code debugger using the modified Python Attach configuration. VS Code should stop on your locally-set breakpoints, allowing you to step through the code, examine variables, and perform all other debugging actions. Expressions that you enter in the Debug Console are run on the remote computer as well.
6. Start the VS Code debugger using the modified Python Attach configuration. VS Code should stop on your locally-set breakpoints, allowing you to step through the code, examine variables, and perform all other debugging actions. Expressions that you enter in the Debug Console are run on the remote computer as well.
7. During remote debugging, the debugging toolbar appears. On this toolbar, the disconnect button (Shift+F5) stops the debugger and allows the remote program to run to completion.

Debugging a Python Add-in for MapInfo Pro

1. In VSCODE, open the folder of your python add-in or any python add-in sample (for example, .\SAMPLES\RIBBONINTERFACE\Python\HelloPython).
2. Compile the add-in *.mbx using MapBasic IDE or Notepad++, etc.
3. In your python add-in source code, add the following lines:

```
import ptvsd
# Allow other computers to attach to ptvsd default port.
ptvsd.enable_attach()
# Pause the program until a remote debugger is attached
ptvsd.wait_for_attach()
```

4. Run the add-in MBX in MapInfo Pro v17.0.3 or above. Now once MBX is run in MapInfo Pro, you will notice a wait cursor denoting that the process is waiting for some debugger to attach to it.
5. Switch to Debug View in VS Code, and select Python: Attach configuration.
6. Set a breakpoint in the code where you want to start debugging. Setting a single breakpoint on the statement immediately following the ptvsd.wait_for_attach() line may not work. Set at least one other breakpoint on another statement.
7. Start the VS Code debugger using the modified Python Attach configuration. VS Code should stop on your locally-set breakpoints, allowing you to step through the code, examine variables, and perform all other debugging actions. Expressions that you enter in the Debug Console are run on the remote computer as well.
8. During remote debugging, the debugging toolbar appears. On this toolbar, the disconnect button (Shift+F5) stops the debugger and allows the remote program to run to completion.

Python Console Window

MapInfo Pro supports writing add-ins in the Python language. This allows developers to take advantage of the Python language and its existing libraries/modules when writing MapInfo Pro add-ins.

Like MapBasic, you can now edit and execute Python code interactively from within MapInfo Pro using the **Python** console window. On the **HOME** tab, open the **Tools Windows** gallery in the **Windows** group and click **Python** to open the **Python** console window. You can also open this window using the **Ctrl+Shift+Y** short-cut key.

You can also use the **SQL** window to create and manage Python scripts in the same way as SQL statements or MapBasic scripts. In the **Scripts** pane, click **Create new script** and select **Python** to

start writing a Python script. All the helper drop-down options from the **Assist** section, except **Joins** and **Variables**, are available for use with the Python scripts.

Python Global Scope Changes

A new python global scope method is now available to attach a command URI to a button created in python script.

```
attach_command_uri(button, uri) ' Attaches a MapInfo Pro command uri to a
button.
' Parameters:
' button: Button control to which MapInfo Pro command uri will be attached.
' uri: Uri to process
```

Example:

```
from MapInfo.Types import IMapInfoPro, ControlType, PaperUnits,
DimensionedValue,
NotificationObject, NotificationType
from System import Uri, UriKind
tab = pro.Ribbon.Tabs.Add("Python")
group = tab.Groups.Add('pytab', 'Custom')
button = group.Controls.Add("ButtonEdit", "Edit Script", ControlType.Button)
button.IsLarge = True
button.LargeIcon =
Uri("pack://application:,,,/MapInfo.StyleResources/component/Images/Mapping/infoTool_32x32.png",
UriKind.RelativeOrAbsolute)
# attach command uri to the button
attach_command_uri(button,
"MapInfoPro://application:PythonConsole.mbx;edit/{0}".format(get_current_module_path()))
```

Running Tasks in the Background

You can run tasks in the background while you continue working in MapInfo Pro. This is useful for long-running object processing, to generate event logs, and for reoccurring tasks.






Creating tasks requires some MapBasic programming to create a shell for the commands you want to process. To ensure there is no conflict on a table running in a background task, use the **Set Table** statement to set tables as in use: use the **InUse** clause to specify **ReadAccess** or **WriteAccess** on a table. This ensures that anyone working in MapInfo Pro and accessing the table, cannot write to it while the task is running.

Tasks are run in MapInfo Pro in the **Tasks** window. To open this window on the **HOME** tab, in the **Windows** group, click **Tool Windows**, and click **Tasks** from the list. The **Tasks** window contains a search field, a **Sorting by** drop-down list, and a list panel that displays running and completed tasks. You can sort the tasks in the list panel in ascending and descending order, by the current status,




name, start time, end time, or elapsed time. Right-clicking on a task in the task list opens a context menu with the following options for managing the task or the task list:

- **Pause**
- **Cancel**
- **Remove**
- **Remove All Inactive**
- **Remove All completed**

You can manage a task using the following buttons:

Icon	Command	Description
	Pause	Click to pause a running task.
	Resume	Click to resume running a task.
	Cancel	Click to cancel running a task.
	Remove	Click to remove a task from the Task window.
	View Log	Click to see the log file for a task.

Indicators show the status of a task on completion:

Icon	Status	Description
	Successful	Task completion was successful.
	Warning	Task completion with a warning notice.
	Errors	Task failure due to errors.

13 - Useful Tables and Information

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MapInfo Map Interchange Format

This section describes the data interchange format for MapInfo Pro. This versatile format allows generic data to be attached to a variety of graphical items. Since it is ASCII, it is editable, relatively easy to generate, and works on all platforms supported by MapInfo Pro. Perhaps the best way to understand the MapInfo Interchange Format (MIF) is to study the sample file at the end of this section in conjunction with the explanation of the file format. You can also create samples of your own by exporting files to MIF and then examining those files in a text editor.

File Versions and TAB, MIF/MID, and WOR Support

The following tables list changes (and their implications) to versions in .TAB, workspace, and other files used by MapInfo Pro.

- TAB files are always saved as 300 unless noted in the table
- WOR files are always saved as 400 unless noted in the table
- Once a table is 'upgraded' to a later version, MapInfo Pro does not 'downgrade' it to an earlier version if the feature which forced the 'upgrade' is removed.
- Workspaces are written fresh each time, and Workspace versions can be decreased if there are no features in them that require using a higher version.
 - Pen(0,0,0) and Brush(0,0,0), which were valid in MapInfo Pro 4.1 tables are not valid in MapInfo Pro 4.5 and later.
 - Line widths in points is encoded in the Pen clause by multiplying the line width value by 10 and adding 10 to the result (.2 -> 12, 1.0 -> 20, etc.). This forces a 450 in the MIF file header.
 - Interleaved line styles are encoded in the Pen clause by increasing the line style value by 128. This does not force a 450 workspace, it is 4.x compatible, and is saved as 400 TAB.

Version 2019

TAB	MIF-MID	WOR	Action
		X	Notifications window state saved in WOR.
		X	Query Builder window state saved in WOR.

TAB	MIF-MID	WOR	Action
		X	If saved query has Limit clause.
		X	Using new SQL syntax for column alias, table alias, aggregate spatial functions, cross join, table.* or object map.

Version 17.0.2 (1702)

TAB	MIF-MID	WOR	Action
X			GeoMap base map tile server tables.

Version 17.0.0 (1700)

TAB	MIF-MID	WOR	Action
		X	Smart Guides are enabled by default. When disabled for a Layout window, the workspace version increases to 1700 and includes the MapBasic statement: Set Layout Window uniqueLayoutWin Smart Guides Off .

Version 16.0.1 (1601)

TAB	MIF-MID	WOR	Action
X			XML in WFS and WMS TAB files is written using the UTF-16 character set (charset).

Version 16.0.0 (1600)

TAB	MIF-MID	WOR	Action
		X	Using the Layers or Explorer window to un-check some of the range items in a ranged theme.
X	X		MapInfo Extended format table (NativeX) with more than 250 columns.
		X	Create Designer Legend statement containing a legend frame for a layer based on an Advanced Raster table.

Version 15.2.4 (1524)

No file version change.

Version 15.2.3 (1523)

No file version change.

Version 15.2.2 (1522)

TAB	MIF-MID	WOR	Action
		X	When using the Gridline command, options to set which side of the map to label grid lines, and to set labels to be Lat/Long with positive or negative numbers of a compass direction (N, S, E, or W).

Version 15.2.1 (1521)

No file version change.

Version 15.2.0 (1520)

TAB	MIF-MID	WOR	Action
X			NativeX (MapInfo Extended) *.Tab files
X			SHP\TAB files opened with MapInfo Extended (TAB) persistent cache

TAB	MIF-MID	WOR	Action
X			ODBC tables opened live with MapInfo Extended (TAB) cache
	X		MIF\MID files exported from NativeX Tab files (with data larger than 2GB in size)
X	X		TAB and MIF\MID files using UTF8 or UTF16 charsets (Unicode support)
		X	Workspace using the UTF8 charset (Unicode support)
		X	When a workspace has more than one page for a Layout window
X	X	X	When Encode Workspaces and Tab Files preference is checked on the PRO tab, under Options, System Settings
		X	Rotating an image frame in a Layout window
		X	Drawing polylines, polygons, or points onto a Layout window
		X	When saving a custom frame into a workspace
X	X		Geopackage table (uses the UTF8 charset by default)

Version 15.0.3 (1503)

TAB	MIF-MID	WOR	Action
	X	X	Geocentric Datum of Australia (GDA 2020 Datum) #1028, see note below ***

***GDA 2020 Datum support using Datum #1028 was introduced in MapInfoPro 16.03 and 17.0. In these two versions NTV2 conversion is available for use as preferred method. If you are using MapInfo Pro 15.x, you will be able to use a custom datum definition based on 7-parameter similarity transformation published by ICSM.

NTv2 Transformations will NOT be available for use with MapInfoPro 15.x.

GDA 2020 technical manual can be found here: <http://www.icsm.gov.au/gda2020>

The projection entries below can be added to **mapinfow.prj** file for use with MapInfo Pro 15.x to support GDA 2020 datum:

For Longitude Latitude systems::

- "Longitude / Latitude (Australia GDA 2020)\p7842", 1, 1028

For Map Grid of Australia:

"--- Map Grid of Australia 2020 (MGA2020) ---"

- "MGA2020 Zone 46\p7846", 8, 1028, 7, 93, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 47\p7847", 8, 1028, 7, 99, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 48\p7848", 8, 1028, 7, 105, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 49\p7849", 8, 1028, 7, 111, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 50\p7850", 8, 1028, 7, 117, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 51\p7851", 8, 1028, 7, 123, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 52\p7852", 8, 1028, 7, 129, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 53\p7853", 8, 1028, 7, 135, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 54\p7854", 8, 1028, 7, 141, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 55\p7855", 8, 1028, 7, 147, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 56\p7856", 8, 1028, 7, 153, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 57\p7857", 8, 1028, 7, 159, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 58\p7858", 8, 1028, 7, 165, 0, 0.9996, 500000, 10000000
- "MGA2020 Zone 59\p7859", 8, 1028, 7, 171, 0, 0.9996, 500000, 10000000

Version 15.0.1 (1501)

TAB	MIF-MID	WOR	Action
X	X	X	GSK-2011 Ellipsoid #56, see note below **

TAB	MIF-MID	WOR	Action
X	X	X	PZ-90.1 Ellipsoid #57, see note below **

** MapInfo Pro 15.2.x and 16.0 cannot use these tables correctly when they are versioned to 1501. The ellipsoid definition does not exist in MapInfo Pro 15.2.x and 16.0, so the following occurs when using these versions of MapInfo Pro with a 1501 table:

- Opening a table causes the CoordSys of the table to default to the WGS84 ellipsoid definition.
- Opening a workspace that uses a **Set Map CoordSys** statement with the new ellipsoid generates an invalid ellipsoid error and the map CoordSys defaults to the WGS84 ellipsoid definition.
- Issuing a **MapBasic Set CoordSys** from an MBX or MapBasic Window generates an invalid ellipsoid error.
- Importing a MIF file that uses a new ellipsoid in a **Coordsys** clause generates an invalid ellipsoid error.

Version 15.0.0 (1500)

TAB	MIF-MID	WOR	Action
		X	When updating a layer name to make it easier to read. Friendly layer names can be assigned manually when you rename a layer, or automatically when any of your .TAB files contain a <i>Description</i> field. To turn off automatic friendly names, uncheck Use Description Field for Friendly Name on the PRO tab, select Options , and Layers .
		X	When using the Layout Frames menu to draw a new empty frame
		X	When using MapBasic statements to create a layout frame with the optional Name clause, or to assign a Name to an existing frame (Alter Designer Frame statement)

Version 12.5.2 (1252)

TAB	MIF-MID	WOR	Action
X	X	X	Added support for the Rectified Skewed Orthomorphic projection used in Malaysia: Peninsular RSO GDM2000 datum #35
	X	X	Added Japanese JGD2011 datum #162
	X	X	Added Malaysian Timbalai 1948 datum #163
	X	X	Added Malaysian GDM2000 datum #164
	X	X	Added Colombia MAGNA-SIRGAS datum #165

Version 12.5.1 (1251)

TAB	MIF-MID	WOR	Action
		X	Open or Set Window commands used with Tool Windows, the Explorer Window, Move Map To, Table List, and Layers Window

Version 12.5.0 (1250)

TAB	MIF-MID	WOR	Action
		X	Layout windows force a workspace version to 12.5 (1250).
	X	X	Updated Hungarian Datum 1023
	X	X	Updated Czech Datum 1024
	X	X	JTSK03 (Slovak Republic) Datum 1025

Version 12.0.3 (1203)

TAB	MIF-MID	WOR	Action
X	X	X	GCS_Sphere Datum #161
X	X	X	GCS_Sphere Ellipsoid #55

Version 12.0 (1200)

TAB	MIF-MID	WOR	Action
X	X	X	Extended Transverse Mercator projection. In MapBasic, using CSYS_TM_EXTENDED (34).
		X	Saving a Map window with a Cartographic scale, and calling the MapBasic Set Map statement with the Display Scale Cartographic clause.
		X	Auto position turned on for polygon labels.
		X	Auto position along line or fallback position turned on for curved labels.
		X	Abbreviations turned on for labels.
X	X		Tables with record lengths that exceed 4000 bytes.
		X	The MapBasic Set Map statement with Label Selection or Label Priority clauses.
	X		Exporting a table that is using SIRGAS 2000 datum.

TAB	MIF-MID	WOR	Action
		X	When the coordinate system of the map is using SIRGAS 2000 datum.

Version 11.5.2 (1152)

TAB	MIF-MID	WOR	Action
X			Saving SQLite tables
X			Saving tables containing Autodesk Text Objects
		X	Browser window that is sorted with a five column sort condition

Version 11.5.1 (1151)

TAB	MIF-MID	WOR	Action
		X	Legend Designer window with hidden toolbar (Set Window FrontWindow() Toolbar Off statement)
		X	The Create Designer Legend statement with a sorted legend (Create Designer Legend statement with an Order clause inside a Frame clause), or a legend specifying visibility of individual rows (Create Designer Legend statement with a Display clause inside a Style clause)

Version 11.5.0 (1150)

TAB	MIF-MID	WOR	Action
	X	X	MGI 1901 Datum #1021

TAB	MIF-MID	WOR	Action
	X	X	CH1903 Datum #158
	X	X	Schwarzeck (updated) datum for Namibia #159
	X	X	North Sahara #1022
		X	Browser window with Filter conditions (Set Browse Filter statement)
		X	Browser window with hidden toolbar (Set Window FrontWindow() Toolbar Off statement)
		X	Legend Designer legend windows (Create Designer Legend statement)

Version 11.0.3 (1103)

TAB	MIF-MID	WOR	Action
		X	Any Browser that is sorted via the Browser Context menu

Version 11.0.0 (1100)

No file version change.

Version 10.5.0 (1050)

TAB	MIF-MID	WOR	Action
X			TileServer Table
		X	Stacked Style

TAB	MIF-MID	WOR	Action
		X	Style Override
		X	Label Override
		X	Multiple Style Override (Stacked Styles)
X	X	X	Equidistant Cylindrical Projection #33

Version 10.0.0 (1000)

TAB	MIF-MID	WOR	Action
X			Table from a PostGIS Database
X			Table from a SQL 2008 Database
X			Table containing UTF-8 charset definition
X			Table that opens Excel 2007 *.xlsx file
X			Table that opens Access 2007 *.accdb file
		X	Workspace with a Group Layer
		X	Workspace with ScaleBar Adornment
		X	Workspace that uses USNG Grid reference system

Version 9.5.0 (950)

TAB	MIF-MID	WOR	Action
		X	Enhanced Labels (on the MAP tab, in the Options group, click Map Options).
		X	Enhanced Layouts (Smoothed Text, Smooth Lines and Borders, Image smoothing)
		X	Translucent Labels (Requires Enhanced Mappers)
		X	Set Map Layer Label Percent Over token for curved labels
		X	Enhanced Browsers (smoothed text, antialias)
		X	Enhanced Mappers (Smoothed Labels and Text, Smooth Lines and Borders, Image smoothing)
		X	Vector Translucency (Mapper Layers and Layout Objects)
	X	X	Datum#: 155 Name: LGD 2006) - Used in Libya Datum#: 156 Name: Dealul Piscului 1970 - Used in Romania
		X	Addition to Create Text statement for Pen clause for callout lines
X	X		WFS-T
X	X	X	Popular Visualization Ellipsoid #54
X	X	X	Popular Visualization Datum #157
X			Oracle's Annotation Text type

Version 9.0.0 (900)

TAB	MIF-MID	WOR	Action
X	X	X	Date, Time, and DateTime types.
X	X	X	JTSK Projection #32.
	X	X	Datum# 1020 Name: S-JTSK (Ferro Prime Meridian).
		X	New to MapBasic: <ul style="list-style-type: none"> RegionInfo - The GELink tool needs a way to determine the orientation of points in polygons SystemInfo - Extend SystemInfo to return the build number
		X	Curved Labels.
X			Open Universal Tables (using Safe Software FME).

Version 8.5.0 (850)

TAB	MIF-MID	WOR	Action
		X	Open Table as VMGrid or VMRaster.
		X	Raster Image Reprojection, Image Resampling.
		X	Export with Anti-Aliasing.
		X	Redistricting with Percentages.

Version 8.0.0 (800)

TAB	MIF-MID	WOR	Action
		X	Workspaces using custom ordered Individual Value Legends.
		X	Workspaces using Replace layer style.
		X	Workspaces using different legend swatch styles.
		X	Workspaces using thematic Legend alignment.
X	X	X	Ellipsoid#: 53 Name: Xian 1980 - used in China.
	X	X	Datum#: 1017 Name: XIAN 1980 - based on Xian 1980 ellipsoid #53 for China.
	X	X	Datum#: 154 Name: Beijing 1954 - used in China.
	X	X	Datum#: 153 Name: HGRS87 - used in Greece.
	X	X	Datum#: 1018 Name: Lithuanian Pulkovo 1942 - used in Lithuania.
	X	X	Datum#: 1019 Name: Belgian 1972 7 parameters - used in Belgium.
	X		Objects with greater than 1M nodes in MIF file, >32K polygons\polylines per region and/or polyline.
X			Objects with greater than 1M nodes, >32K polygons\polylines.
X			SHP\TAB files that contain Z\M values.

Version 7.8.0 (780)

TAB	MIF-MID	WOR	Action
X		X	TAB files can include Web Feature Service (WFS) data.
		X	Workspaces can include cartographic legends. The workspace will always include a clause for swatch size that cannot be parsed by earlier versions of MapInfo Pro.
		X	Workspaces can include mappers with dot-density thematics. The workspace will always include a clause for dot size that cannot be parsed by earlier versions of MapInfo Pro.

Version 7.5.0 (750)

TAB	MIF-MID	WOR	Action
X			TAB files can include Web Map Service (WMS) data.
		X	Workspaces can include Advanced Printer settings (scale patterns).
		X	Workspaces can include cartographic legends with custom layouts.

Version 7.0.0 (700)

TAB	MIF-MID	WOR	Action
X			TAB file linked to a shapefile.

TAB	MIF-MID	WOR	Action
X	X	X	<ul style="list-style-type: none"> • #152 - JGD2000 datum used in Japan. • #1012 - PZ90 datum based on PZ90 ellipsoid. This datum is used in Russia. • #1013 - SK42 datum based on PZ90 ellipsoid. This datum is used in Russia. • #1014 - SK95 datum based on PZ90 ellipsoid. This datum is used in Russia. • "Longitude / Latitude (Russia PZ90)", 1, 1012. • "Longitude / Latitude (Russia SK42)", 1, 1013. • "Longitude / Latitude (Russia SK95)", 1, 1014. • Double Stereographic projection. • ATS77 (which uses ATS77 ellipsoid). • Prince Edward Island and New Brunswick Projection.
		X	ROP Method selected for advanced options for Save Window As or printing

Version 6.5.0 (650)

TAB	MIF-MID	WOR	Action
X	X		New object types: Multipoint and Collection (actually !edit_version 650 and !version 300).
X	X		Cassini-Soldner projection (number 30).
X	X		Lambert Azimuthal Equal-Area projection - Oblique aspect (number 29).
		X	Cassini-Soldner projection for the map window.
		X	Lambert Azimuthal Equal-Area projection (Oblique aspect) for the map window.
		X	New object types (Multipoint and Collection) created in a cosmetic layer or in a layout.

TAB	MIF-MID	WOR	Action
		X	Save a workspace with a Prism Map.

Version 6.0.0 (600)

TAB	MIF-MID	WOR	Action
		X	Save a workspace with a 3D Map.
X	X		Azimuthal Equidistant projection, Oblique aspect - number 28.
X	X		Everest (Pakistan) ellipsoid - number 50.
X	X		ATS 77 ellipsoid - number 51.
			<p>New Datums introduced in Version 6.0. Their numbers are in a range 115-150 (115 and 150 included) and 1004-1011 (1004 and 1011 included).</p> <p>As of this release MapInfo Pro writes the Datum number if all the parameters match to the parameters of our internal Datum table. The application writes the FIRST datum number with these parameters, that are in our internal table. That means that if a table was created using Datums EUREF89 (115), GDA94 (116) or NZGD2000 (117), the MIF file will have Datum GRS 80 (33) written into it and MIF file version would not be incremented.</p> <p>Since MapInfo Pro does not write datum number into TAB file, version will be incremented only if ellipsoid is new.</p> <p>As of version 8.0, MapInfo Pro writes a datum index number into MAP file, so this is no longer always the case.</p>
		X	Workspace includes Advanced Printer settings.
		X	Workspace includes a Hotlink.

TAB	MIF-MID	WOR	Action
		X	Workspace includes a 3D Mapper window.
		X	Workspaces that include new clip region settings.
X	X		Table uses a Datum or ellipsoid released in a specific version.

Version 5.5.0 (550)

TAB	MIF-MID	WOR	Action
X	X		Polyconic projection - number 27.
X	X		Irish (WOFO) ellipsoid - number 49.
X	X		Table is a linked\live Oracle 8i table.
		X	Workspaces with Oracle 8i connection information.
		X	Workspaces that include surface thematics with Hillshading.
X	X		Table uses a Datum or ellipsoid released in a specific version.

Version 5.0.0 (500)

TAB	MIF-MID	WOR	Action
X	X		Table specifies a 'grid' file (*.MIG, raster style = 6 1)

TAB	MIF-MID	WOR	Action
		X	Workspaces that contain surface thematic layers (inflection).
		X	Workspaces that contain cartographic legends (Create Cartographic Legend).

Version 4.5.2 (452)

TAB	MIF-MID	WOR	Action
X	X		Regional Mercator projection - number 26.

Version 4.5.0 (450)

TAB	MIF-MID	WOR	Action
X	X		Region and polyline objects, that have more than 32K nodes (actually !edit_version 450 and !version 300).
X	X		Table uses point sized line widths.
X	X		Table is a query table.
		X	Workspaces that specify dot density color (shade ... density... color).
		X	Workspaces that specify interleaved line style, width in points (Pen (1,2,x)).
X	X		Table uses a Datum or ellipsoid released in a specific version.

Version 4.1.0 (410)

TAB	MIF-MID	WOR	Action
X	X		Table uses Microsoft Access DB's.

Version 4.0.0 (400)

TAB	MIF-MID	WOR	Action
X			Table is a linked ODBC table.
X	X	X	Tab version stays at 300 with interleaved.
		X	Saved queries are implemented as straight Select statements. (Saved queries are controlled on the PRO tab, by clicking Options , and Startup . Select the Save Queries in Workspaces check box.)

CharSet

The CharSet clause specifies which character set was used to create text in the table. For example: Specify "WindowsLatin1" to indicate that the file was created using the Windows US & Western Europe character set; specify "MacRoman" to specify the Macintosh US & Western Europe character set; or specify "Neutral" to avoid converting the text into another character set. If you are not using one of these character sets, you can determine the correct syntax for your character set by exporting a table and examining the .MIF file in a text editor.

Delimiter

Specify the delimiting character in quotation marks, for example:

```
DELIMITER ";"
```

The default delimiter is Tab; if you are using the default, you do not need the DELIMITER line.

Unique

Specify a number. This number refers to a database column; 3 is the third column, 7 is the seventh column, and so forth. What happens to columns in the UNIQUE list is subtle. For example, imagine that you have a database with highways in it. Each highway has only one name, but it might be

represented by several segments. You would put the NAME column in the UNIQUE list, while the column containing data for the individual segments would not be in that list. This has the effect of creating two related tables; one with names, and one with the other attributes of the objects. This is how our various street maps (StreetPro) are prepared.

Index

To indicate that columns in the table are indexed, include a number (or a comma-separated list of numbers) in the Index clause. Each number refers to a database column; 3 is the third column, 7 is the seventh column, and so forth. Columns in the INDEX list will have indexes prepared for them.

CoordSys Clause

Specify the COORDSYS clause to note that the data is not stored in longitude/latitude form. When no COORDSYS clause is specified, data is assumed to be stored in longitude/latitude form.

All coordinates are stored with respect to the northeast quadrant. The coordinates for points in the United States have a negative X while coordinates for points in Europe (east of Greenwich) have a positive X. Coordinates for points in the Northern hemisphere have a positive Y while coordinates for points in the Southern hemisphere have a negative Y.

```
Syntax1
CoordSys Earth
[ Projection type,
  datum,
  unitname
  [ , origin_longitude ]
  [ , origin_latitude ]
  [ , standard_parallel_1 [ , standard_parallel_2 ] ]
  [ , azimuth ]
  [ , scale_factor ]
  [ , false_easting ]
  [ , false_northing ]
  [ , range ] ]
[ Affine Units unitname, A, B, C, D, E, F ]
[ Bounds ( minx, miny ) ( maxx, maxy ) ]
```

Syntax2

```
CoordSys Nonearth
[ Affine Units unitname, A, B, C, D, E, F ]
Units unitname
Bounds ( minx, miny ) ( maxx, maxy )
```

Syntax3

```
CoordSys Layout Units paperunitname
```

Syntax4

```
CoordSys Table tablename
```

Syntax5

```
CoordSys Window window_id
```

type is a positive integer value representing which coordinate system to use

datum is a positive integer value identifying which datum to reference

unitname is a string representing a distance unit of measure (for example, "m" for meters); for a list of unit names, see Set Distance Units

origin_longitude is a float longitude value, in degrees

origin_latitude is a float latitude value, in degrees

standard_parallel_1 and *standard_parallel_2* are float latitude values, in degrees

azimuth is a float angle measurement, in degrees

scale_factor is a float scale factor

range is a float value from 1 to 180, dictating how much of the Earth will be seen

minx is a float specifying the minimum x value

miny is a float specifying the minimum y value

maxx is a float specifying the maximum x value

maxy is a float specifying the maximum y value

paperunitname is a string representing a paper unit of measure (for example, "in" for inches); for a list of unit names, see Set Paper Units

tablename is the name of an open table

window_id is an Integer window identifier corresponding to a Map or Layout window

A performs scaling or stretching along the X axis.

B performs rotation or skewing along the X axis.

C performs shifting along the X axis.

D performs scaling or stretching along the Y axis.

E performs rotation or skewing along the Y axis.

F performs shifting along the Y axis.

Transform Clause

When you have MIF files with coordinates stored with respect to the northwest quadrant (quadrant 2), you can transform them to the northeast quadrant (quadrant 1) with a transform clause.

Quadrant 2: Northwest Quadrant	Quadrant 1: Northeast Quadrant
Quadrant 3: Southwest Quadrant	Quadrant 4: Southeast Quadrant

The transform clause has the following syntax:

```
TRANSFORM Xmultiplier, Ymultiplier, Xdisplacement, Ydisplacement
```

To transform quadrant 2 data into quadrant 1 data, use the following transform clause:

```
TRANSFORM -1, 0, 0, 0
```

The zeroes instruct MapInfo Pro to ignore that parameter.

When you have an application which creates MIF files in quadrant 2, you can:

- Add the TRANSFORM clause to the MIF files
- Change the application so that it creates coordinates in quadrant 1
- Change the application so that it adds a TRANSFORM clause to the MIF files

Columns

Specify the number of columns. Then, for each column, create a row containing the column name, the column type, and, for character and decimal columns, a number to indicate the width of the field.

Note: Field names cannot have spaces.

Valid column types are:

- char (width)
- integer (which is 4 bytes)
- smallint (which is 2 bytes, so it can only store numbers between -32767 and +32767)
- decimal (width,decimals)
- float
- date
- logical

This is an example of the columns section of the header:

```
COLUMNS 3
STATE char (15)
POPULATION integer
AREA decimal (8,4)
```

For the database specified in this header, the MID file has three columns:

- a 15 character field that represents the STATE column,
- an integer field that represents the POPULATION column,
- an AREA column that consists of a decimal field with up to 8 total characters (digits, decimals points, and optional sign) and 4 digits after the decimal.

MIF File Header

MapInfo data is in two files - the graphics reside in a .MIF file and textual data is contained in a .MID file. The textual data is delimited data, with one row per record and either Carriage Return, Carriage Return plus Line Feed, or Line Feed between lines. The MIF file has two areas - the file header area and the data section. Information on how to create MapInfo tables is in the header; the graphical object definitions are in the data section.

This is a description of MIF file header with optional information in square brackets.

```
VERSION n
NAME
[ no spaces allowed in the column name ]
Charset "characterSetName"
[ DELIMITER "<c>" ]
[ UNIQUE n,n.. ]
[ INDEX n,n.. ]
[ COORDSYS... ]
[ TRANSFORM... ]
COLUMNS n
  <name> <type>
  <name> <type>
  .
  .
DATA
```

MIF Import/Export Information

MapInfo Pro Interchange Format (MIF) is an ASCII file format that can fully describe a MapInfo Pro database. Both graphic and tabular data are exported into MIF files. The graphic data is in a file with a ".mif" extension, and the tabular data is in a file with an ".mid" extension. MIF files can be created by MAP2MIF, BDY2MIF, MapInfo Pro, and other programs. You can also create your own MIF files in any ASCII text editor to later import into MapInfo Pro.

MapInfo Pro Interchange Format files can be translated into other formats with other programs.

MIF Data Section

The MIF file data section follows the header and must be introduced with DATA on a single line:

```
DATA
```

The data section of the MIF file can have any number of graphical primitives, one for each graphic object. MapInfo Pro matches up entries in the MIF and MID files, associating the first object in the MIF file with the first row in the MID file, the second object in the MIF file with the second row in the MID file, and so on.

When there is no graphic object corresponding to a particular row in the MID file, a "blank" object (NONE) must be written as a place holder in the corresponding place in the MIF file.

```
NONE
```

The graphical objects that can be specified are:

- point
- line
- polyline
- region
- arc
- text
- rectangle and rounded rectangle
- ellipse
- multipoint
- collection

A point object takes two parameters; an X coordinate and a Y coordinate. As an option, specify the symbol that represents the point. Symbols are designated by numbers. If you omit the SYMBOL clause, the current symbol is used.

```
POINT x y
[ SYMBOL (shape, color, size)]
```

Each MapInfo Pro version supports variations on the SYMBOL clause; see [Symbol Styles](#) in this section.

A line object requires four parameters; an X and a Y coordinate for each end point. As an option, specify a pen type. When no pen type is specified, the current pen type is used.

```
LINE x1 y1 x2 y2
[ PEN (width, pattern, color)]
```

A polyline object consists of one or more sections. If the polyline has more than one section, include the **MULTIPLE** keyword, followed by the number of sections. For each section, specify a **numpts** argument (which indicates the number of nodes in that section), followed by an x/y coordinate pair for each node. Use the optional **PEN** clause (described later in this section) to specify the line style. If you include the optional **SMOOTH** keyword, the polyline is smoothed.

```
PLINE [ MULTIPLE numsections ]
numpts1
x1 y1
x2 y2
:
[ numpts2
x1 y1
x2 y2 ]
:
[ PEN (width, pattern, color)]
[ SMOOTH ]
```

A region object consists of one or more polygons. Specify the number of polygons through the **numpolygons** argument (immediately after the **REGION** keyword). For each polygon, specify a **numpts** argument (which indicates the number of nodes in that polygon), followed by an x/y coordinate pair for each node. Use the optional **PEN** and **BRUSH** clauses (described later in this section) to specify the object's style. Use the optional **CENTER** clause to define the object's centroid explicitly. The centroid must be within the object.

```
REGION numpolygons
numpts1
x1 y1
x2 y2
:
[ numpts2
x1 y1
x2 y2 ]
:
[ PEN (width, pattern, color)]
[ BRUSH (pattern, forecolor, backcolor)]
[ CENTER x y ]
```

An arc requires the diagonally opposite corners of its bounding rectangle and the beginning (a) and ending (b) angles of the arc in degrees, moving counter-clockwise with zero at three o'clock. As an

option, specify the pen type. (An arc specifies a section of an ellipse, the corners of which are determined by the bounding rectangle.)

```
ARC x1 y1 x2 y2
  a b
  [ PEN (width, pattern, color)]
```

A text object consists of a text string, up to 255 characters long. To make the text string wrap onto multiple lines, insert the characters `\n` within the textstring argument (for example, "First line \nSecond line \nThird line"). The `x1`, `y1`, `x2`, and `y2` arguments specify the location of the text on the map. Spacing can be 1.0 (single spacing), 1.5, or 2.0 (double spacing). Use the Font clause (described later in this section) to control the typeface, etc.

```
TEXT "textstring"
  x1 y1 x2 y2
  [ FONT...]
  [ Spacing {1.0 | 1.5 | 2.0}]
```

```
[ Justify {Left | Center | Right}]
[ Angle text_angle]
[ Label Line {simple | arrow} x y ]
```

A rectangle requires the coordinates of the diagonally opposite corners. As an option, specify pen and brush types.

```
RECT x1 y1 x2 y2
  [ PEN (width, pattern, color)]
  [ BRUSH (pattern, forecolor, backcolor)]
```

A rounded rectangle requires the coordinates of the diagonally opposite corners and the degree of rounding (`a`). As an option, specify pen and brush types. Degree of rounding is expressed in coordinate units.

```
ROUNDRECT x1 y1 x2 y2
  a
  [ PEN (width, pattern, color)]
  [ BRUSH (pattern, forecolor, backcolor)]
```

An ellipse object requires the coordinates of the diagonally opposite corners of its bounding rectangle. As an option, specify pen and brush types.

```
ELLIPSE x1 y1 x2 y2
  [ PEN (width, pattern, color)]
  [ BRUSH (pattern, forecolor, backcolor)]
```

A multipoint object takes multiple parametrics, consisting of `xy` coordinate pairs. The number of points is indicated by the `num_points` parameter as an option, specify the symbol that represents the

multipoint. Symbols are designed by numbers. If you omit the SYMBOL clause, the current symbol is used.

```
MULTIPOINT num_points
  x1 y1 x2 y2 x3 y3 ...
```

Example:

```
Multipoint 7
-3.113504 10.532464
-2.113504 11.532464
-1.113504 12.532464
-0.113504 14.532464
-4.113504 11.532464
-0.113504 8.532464
0.886496 13.532464
  Symbol (35,0,12)
Collection format
Collection num_parts
Region
.....
Pline
.....
Multipoint
.....
```

A collection object takes multiple parameters, consisting of the parameters of the object types included in the collection. Individual formats for the Region, Pline, and Multipoint parts of the collection are the same as those for the corresponding object type. The num_parts parameter is required if the number of parts in the collection is less than three. If this number is omitted, it is assumed that the collection contains all three parts.

In exports, MapInfo Pro always writes this number into the MIF file.

```
COLLECTION num_parts
Region
Pline
Multipoint
EXAMPLE:
Collection 3
Region 3
  5
4.850832 10.077456
5.850832 11.077456
6.850832 13.077456
12.850832 19.077456
4.850832 10.077456
  4
-5.149168 0.077456
-4.149168 1.077456
-3.149168 3.077456
-5.149168 0.077456
```

```

4
14.850832 20.077456
15.850832 21.077456
16.850832 23.077456
14.850832 20.077456
Pen (1,2,0)
Brush (2,16777215,16777215)
Center 8.850832 14.577456
Pline 3
-7.149168 0.077456
-3.149168 -2.922544
-2.149168 2.077456
Pen (1,2,0)
Multipoint 2
-6.149168 -0.922544
-5.149168 0.077456
Symbol (35,0,12)

```

Pen Styles

The Pen clause specifies the width, pattern, and color of a linear object, such as a line, polyline arc, or the border of a region. The Pen clause has the following syntax:

```
PEN (width, pattern, color)
```

Width is a number from 1 to 7. 1-7 is the width in screen pixels. 11-2047 are values that will be converted to points:

$\text{penwidth} = (\text{number of points} * 10) + 10$

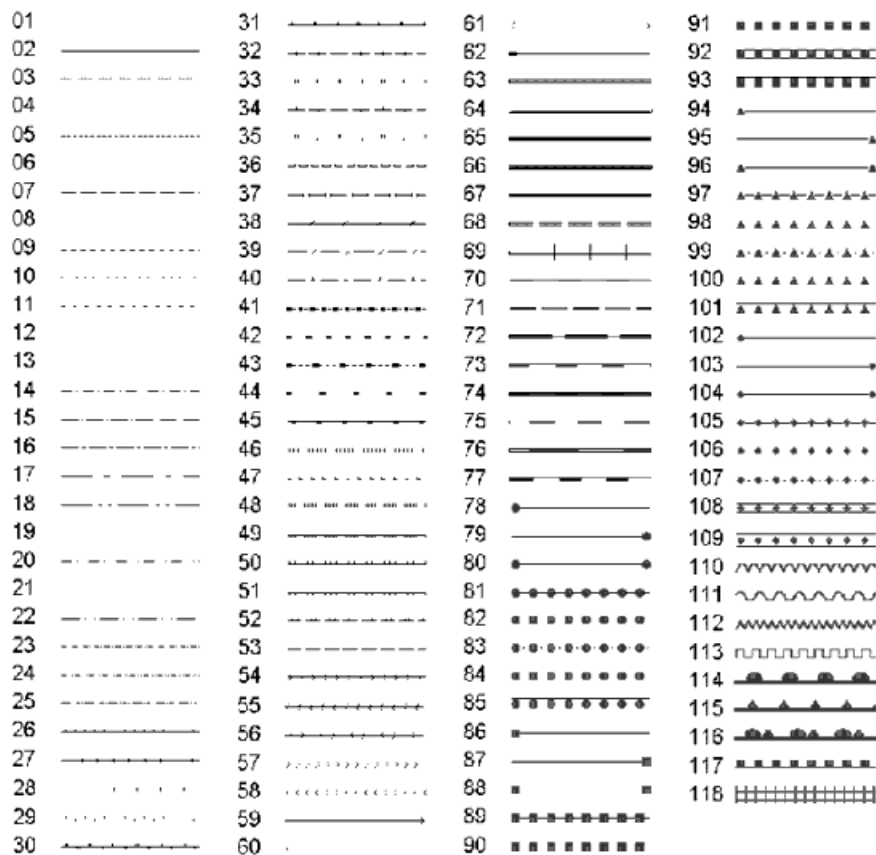
0 is only valid when the pen pattern is 1 for invisible lines.

Color is an integer, representing a 24-bit RGB color value.

Pattern is an integer from 1 to 118; pattern number 1 is invisible. The pattern number corresponds to a pen number in the pen file. The pen file can be modified using a pen editor.

Valid pen numbers are from 1 to maximum number of pens in the pen file, which should not exceed 127. If a pen style is interleaved, 128 will be added to the pen number. Interleaved styles are in the range 129-255. Because the pen file can be modified, and interleaved can be specified, the pen pattern can be a number between 1-255.

The following table lists the available line styles by default:



Brush Styles

Brush specifies the pattern, foreground color, and background color of a filled object, such as a circle or region. The Brush clause has the following syntax:

```
Brush (pattern, forecolor [, backcolor ])
```

The forecolor and backcolor arguments are both integers, representing 24-bit RGB color values.

Pattern is a number from 1 to 71. Note: Pattern number 1 is "no fill," and pattern number 2 is a solid fill. Pattern numbers 9-11 are reserved.

Note: To specify a transparent fill style, use pattern number three or larger, and omit the backcolor argument. For example: Brush(5, 255)

Symbol Styles

The Symbol clause specifies the appearance of a Point object. There are three different forms of the Symbol clause:

- MapInfo 3.0 Syntax
- TrueType Font Syntax
- Custom Bitmap File Syntax

Symbol Clause-MapInfo 3.0 Syntax

The Symbol clause specifies the appearance of a Point object. There are three different forms of the Symbol clause. To specify a symbol style using "Old MapInfo Symbols" (the symbols that were used in earlier versions of MapInfo Pro), use the following syntax:

```
SYMBOL (shape, color, size)
```

The shape argument is an integer value, 31 or larger; 31 represents a blank symbol (for example, the object will not be visible). The standard set of symbols includes symbols 32 through 67, inclusive, but the user can customize the symbol set by using the Symbol application.

The color argument is an integer representing a 24-bit RGB color value.

The size argument is an integer from 1 to 48, representing a point size.

The following table lists the default symbols provided with MapInfo Pro:

31		41	☆	51	✱	61	🛡
32	■	42	△	52	✈	62	🛡
33	◆	43	▽	53	🚩	63	🚩
34	●	44	■	54	🚩	64	✂
35	★	45	▲	55	🏠	65	🚩
36	▲	46	●	56	+	66	🚩
37	▽	47	👉	57	🏠	67	🚩
38	□	48	👉	58	⚓		
39	◇	49	+	59	🔍		
40	○	50	✕	60	🏠		

Symbol Clause - TrueType Font Syntax

To specify a symbol style based on a character from a TrueType font, use the following syntax:

```
SYMBOL (shape, color, size, fontname, fontstyle, rotation)
```

The fontname argument is a text string that identifies the name of a font (for example, "Wingdings").

The fontstyle argument is an integer that controls settings such as Bold. The following table lists the values you can use as fontstyle.

fontstyle value	Effect on Symbol style
0	Plain text
1	Bold text
16	Black border around symbol
32	Drop shadow
256	White border around symbol

To specify two or more style attributes, add the values from the left column. For example, to specify Bold and Drop Shadow, use 33.

The rotation argument is a floating-point number, representing a rotation angle, in degrees.

Symbol Clause - Custom Bitmap File Syntax

To specify a symbol style based on a character from a TrueType font, use the following syntax:

```
SYMBOL (filename, color, size, customstyle)
```

The filename argument is a text string that identifies a bitmap file (for example, "ARROW.BMP") in the CustSymb directory.

The customstyle argument is an integer that controls whether color and background attributes are used. The following table lists the values you can use as customstyle:

customstyle value	Effect on Symbol style
0	Both the Show Background setting and the Apply Color setting are off; symbol appears in default state. White pixels in the bitmap appear transparent, allowing whatever is behind the symbol to show through.
1	The Show Background settings is on; white pixels in the image are opaque.
2	The Apply Color setting is on; non-white colors in the image are replaced with the Symbol's color value.
3	Both Show Background and Apply Color settings are on.

Font Styles for Symbols

The Font clause specifies the appearance (typeface, color, etc.) of text objects and has this syntax:

```
FONT ("fontname", style, size, forecolor [, backcolor] )
```

Fontname in double quotation marks is the typeface to be displayed. Style is the text attribute of the typeface as shown in the following table. Size must be 0 in a MIF file, because each text object on a Map is attached to the map itself (thus the text size changes as you zoom in or out). Forecolor is an integer representing a 24-bit RGB color. The background color is optional; if you include it, MapInfo Pro fills the area behind the text with the color you specify.

style value	Effect on Font Appearance
0	Plain
1	Bold
2	Italic

style value	Effect on Font Appearance
4	Underline
16	Outline (only supported on the Macintosh)
32	Shadow
256	Halo
512	All Caps
1024	Expanded

To specify two or more style attributes, add the values from the left column. For example, to specify Bold and All Caps, use 513.

Colors for Symbols

Colors are often defined in relative concentrations of red, green, and blue. Each color is a number from 0 to 255, inclusive; the RGB value of a color is calculated by the following formula: $(red * 65536) + (green * 256) + blue$

These are some often used colors and their values:

- Red: 16711680
- Green: 65280
- Blue: 255
- Cyan: 65535
- Magenta: 16711935
- Yellow: 16776960
- Black: 0

MID File

The MID file contains data, one record of data per row, delimited by the character specified in the delimiter statement. The default delimiter is Tab. Each row in the MID file is associated with a corresponding object in the MIF file; first row with first object, second row with second object.

If delimiter character is included as part of the data in a field, enclose the field in quotation marks.

The MID file is an optional file. When there is no MID file, all fields are blank.

Data and Settings Management

Data and Settings Management - Application Data Files

Application data (appdata) files are the non-executable data files that MapInfo Pro uses during execution. The following files/directories are considered appdata:

Filename	Description
MAPINFOW.PRF	Preference file
MAPINFOPRO.WOR	Default workspace
STARTUP.WOR	Startup workspace
ADDUSER.WOR	Startup workspace *
MAPINFOW.CLR	Color file
MAPINFOW.PEN	Pen file
MAPINFOW.FNT	Symbol file

Filename	Description
CUSTSYMB	Custom symbol directory
THMTMPLT	Theme template directory

* You can create a workspace file, named `AddUser.wor`, that contains initial setup commands for MapInfo Pro.

Install application data files in a per-user location and search for them in other areas to allow support for sharing application data files between MapInfo Pro versions/products.

The application searches for appdata files in the following directories, in this order:

1. `appdata_dir`
2. `local_appdata_dir`
3. `pref_dir`
4. `common_appdata`
5. `program_dir`

Note: Refer to the Glossary for definitions of each of these directory types.

The following table gives the default (installed) location for each appdata file:

Filename	Default installed location
MAPINFOW.CLR	<code>appdata_dir</code>
MAPINFOW.PEN	<code>appdata_dir</code>
MAPINFOW.FNT	<code>appdata_dir</code>
MAPINFOW.ABB	<code>program_dir</code>
MAPINFOW.PRJ	<code>program_dir</code>
MAPINFOW.MNU	<code>program_dir</code>

Filename	Default installed location
CUSTSYMB	appdata_dir
THMTMPLT	appdata_dir
GRAPHSUPPORT	common_appdata_dir
MAPINFO.PRF	pref_dir*

*This file is not created during installation. It is created the first time you exit MapInfo Pro.

After installation, you can manually move appdata files between the predefined locations. For example, by manually relocating `MAPINFOW.PRJ` a user can share one customized projection file among different MapInfo Pro versions. The default installed location of one or more of the appdata files/directories can be modified by defining a `MODE.INI` file prior to the installation.

For details on controlling the location of application data files during Installation, see the *MapInfo Pro Install Guide* for particulars on the `mode.ini` file.

Registry Changes

MapInfo Pro's use of the registry must be organized to allow each user to work with their own data. The following supports this organization:

- The Tools Manager entries are installed under `HKEY_CURRENT_USER`.

A Glossary for Upgrading Applications

You will find the following definitions useful:

<user profile root>

The root of the user directory structure. Each user has write access to the subdirectories of this area. The location is:

`C:\Users\<YourUserName>`

appdata_dir

This is a per-user directory. Many of the application data (AppData) files will be installed in this location:

`C:\Users\<YourUserName>\AppData\Roaming\MapInfo\MapInfo\Professional\2021`

Note: If this directory does not exist at startup, MapInfo Pro does not create it. Programmers must not assume this represents a valid path. If you do not see the AppData folder, because it is hidden, then on the Microsoft **Start** menu in the **Search programs and files** field type `%AppData%` to locate it.

common appdata_dir

This directory is shared by all users on a machine:

`C:\ProgramData\MapInfo\MapInfo\Professional\2021`

local_appdata_dir

This is also a per-user directory, similar to `appdata_dir`, except files here do not roam.

`C:\Users\<YourUserName>\AppData\Local\MapInfo\MapInfo\Professional\2021`

Note: If this directory does not exist at startup, MapInfo Pro does not create it. Programmers must not assume this represents a valid path. If you do not see the AppData folder, because it is hidden, then on the Microsoft **Start** menu in the **Search programs and files** field type `%AppData%` to locate it.

pref_dir

MapInfo Pro writes out `MAPINFOPRO.WOR`, `STARTUP.WOR`, and `MAPINFOW.PRF` by default to:

`C:\Users\<YourUserName>\AppData\Roaming\MapInfo\MapInfo`

If this directory does not exist at startup, then MapInfo Pro creates it.

program_dir

MapInfo Pro expects to find many of the application data (AppData) files in this location.

- location of `MAPINFOPRO.EXE`

List of Changes by Version

For a list of changes (and their implications) to versions in `.TAB`, workspace, and other files used by MapInfo Pro, see [File Versions and TAB, MIF/MID, and WOR Support](#).

Sample Data Provided for Microsoft Access Support

File Name:	CAP_DATA.TAB
File type:	Registered Microsoft Access Table
Data type:	Thematic data and Demographic data
Description:	Registered Microsoft Access table with the locations of the capital cities for each state in the United States (point map data for each state).
Uses:	Used for demonstrating direct Microsoft Access functionality and to provide state capital information for your maps.
Compatible Maps:	USA_DATA.accdb, ST_DATA.TAB
File Name:	CTY_DATA.TAB
File type:	MapInfo Pro Native database format
Data type:	Thematic data and Demographic data
Description:	Standard data (has no map object data). Can be opened in MapInfo Pro and geocoded.
Uses:	This table can be joined with ST_DATA to create a table with map object information.
Compatible Maps:	ST_DATA.TAB, CAP_DATA.TAB

File Name:	ST_DATA.TAB
File type:	Registered Microsoft Access Table
Data type:	Thematic data and Demographic data
Description:	Registered Microsoft Access table with the state boundaries for the United States. Includes map object data of US map.
Uses:	Used for demonstrating direct Microsoft Access functionality and to provide information about state boundaries for the United States.
Compatible Maps:	CAP_DATA.TAB
File Name:	USA_DATA.accdb
File type:	Microsoft Access database
Data type:	Contains the following tables: CAP_DATA, Cty_Data, ST_DATA
Description:	Microsoft Access database containing 3 tables of demographic data.
Uses:	The Access tables can be opened and used in MapInfo Pro.
Compatible Maps:	CAP_DATA.TAB, ST_DATA.TAB
File Name:	US_CUST.MDB
File type:	Microsoft Access Database

Data type:	Contains the table: <code>Us_Customers</code> . Thematic data of Sales data per customer.
Description:	Sample Customer database in Access database format that has not been geocoded in MapInfo Pro. Does not contain map object data.
Uses:	Thematic Mapping, Redistricting, Training, Reference
Compatible Maps:	The States table.
File Name:	<code>DC_CUST.MDB</code>
File type:	Microsoft Access Database
Data type:	Contains the table: <code>DC_Customers</code> . Thematic data of Sales information.
Description:	Sample Customer table in Access database format for the DC area. Can be opened in MapInfo Pro and geocoded.
Uses:	The Access tables can be opened and used in MapInfo Pro.
Compatible Maps:	<code>DC_ZIPS.TAB</code> , <code>DC_STRTS.TAB</code> , <code>DC_BDYS.TAB</code>

See Also:

[Opening a DBMS Table in MapInfo Pro](#)

Manually Creating a MapInfo_MapCatalog

These instructions are for manually creating a MapInfo Map Catalog and making a remote table mappable, two procedures that are necessary for geocoding remote tables. This information is designed for users who do not have access to MapInfo Pro.

MapInfo Pro users would create a MapInfo Map Catalog automatically.

- **Creating a Map Catalog in the DBMS**
- **Making a DBMS Table Mappable to Display it on a Map**

You or your database administrator must create one MapInfo Map Catalog for each database you wish to access in MapInfo Pro.

Manually Creating a MapInfo_MapCatalog

To create a MAPINFO_MAPCATALOG manually:

1. If the RDBMS requires owners and users, then create the user MAPINFO with the PASSWORD MAPINFO in the specific database where the mappable tables are located.
2. Create the table MAPINFO_MAPCATALOG in the database.

The Create Table statement must be equivalent to the following SQL Create Table statement:

```
Create Table MAPINFO_MAPCATALOG (
```

SPATIALTYPE	Float,
TABLENAME	Char(32),
OWNERNAME	Char(32),
SPATIALCOLUMN	Char(32),
DB_X_LL	Float,
DB_Y_LL	Float,
DB_X_UR	Float,
DB_Y_UR	Float,
VIEW_X_LL	Float,
VIEW_Y_LL	Float,
VIEW_X_UR	Float,
VIEW_Y_UR	Float,
COORDINATESYSTEM	Char(254),
SYMBOL	Char(254),
XCOLUMNNAME	Char(32),
YCOLUMNNAME	Char(32),
RENDITIONTYPE	Integer,
RENDITIONCOLUMN	VarChar(32),
RENDITIONTABLE	VarChar(32),
NUMBER_ROWS	Integer

```
)
```

It is important that the structure of the table is exactly like this statement. The only substitution that can be made is for databases that support varchar or text data types; these data types can be substituted for the Char data type.

3. Create a unique index on the TABLENAME and the OWNERNAME, so only one table for each owner can be made mappable.
4. Grant Select privileges to all users on the MAPINFO_MAPCATALOG. This allows users to make tables mappable. The Update, Insert, and Delete privileges must be granted at the discretion of the database administrator.

Spatial Index Types

The spatial index type applies to the column that has the spatial information in the DBMS table. The spatial index provides a fast way for MapInfo Pro to access the spatial data in the table. The index types to choose from are.

Spatial Index Type	Type Number
MapInfo MICODE schema (any database)	1
XY schema (any database)	4
Oracle Spatial Geometry	13
SpatialWare for SQL Server	14
Oracle Spatial Annotation Text	16
SQL Server Spatial (for geometry)	17
SQL Server Spatial (for geography)	18
PostGIS for PostgreSQL	19
SQL Server Spatial with M and Z values (for geometry)	20
SQL Server Spatial with M and Z values (for geography)	21

You use the XY Coordinates option when there is no index

Manually Making a Remote Table Mappable

For each spatial table in the remote database that you want to access in MapInfo Pro, you must add a row to the MAPINFO_MAPCATALOG table. This is carried out in MapInfo Pro when on the **TABLE** tab, in the **Maintenance** group, you click **Maintenance**, and **Make DBMS Table Mappable**.

If you do not use MapInfo Pro to manage the Map Catalog, you must manually add rows to the MAPINFO_MAPCATALOG table for each spatial table in the database that you want to geocode. Each entry must contain the following information about the table.

Column Name	Values to Assign	Example
SPATIALTYPE	<p>SPATIALTYPE values are constructed from the spatial index type from this table and the value that represents the table contents as described here:</p> <ul style="list-style-type: none"> • 0 - points only • 1 – lines • 2 - regions • 3 - all geometries • 4 – text 	4.2
TABLERNAME	Name of the table.	Drainage
OWNERNAME	Owner name.	Georgetown
SPATIALCOLUMN	<p>Name of the column, if any containing spatial features. The name is:</p> <ul style="list-style-type: none"> • NO_COLUMN (for mappable tables using X,Y) 	NO_COLUMN
DB_X_LL	X coordinate of the lower left corner of the layer's bounding rectangle, in units indicated by the COORDINATESYSTEM as defined by MapInfo Pro.	-360
DB_Y_LL	Lower left bounding Y value.	-90
DB_X_UR	Upper right bounding X value.	360
DB_Y_UR	Upper right bounding Y value.	90

Column Name	Values to Assign	Example
VIEW_X_LL	X coordinate of the lower left corner of the view's bounding rectangle, in units indicated by the COORDINATESYSTEM as defined by MapInfo Pro.	-360
VIEW_Y_LL	Lower left bounding Y value.	-90
VIEW_X_UR	Upper right bounding X value.	360
VIEW_Y_UR	Upper right bounding Y value.	90
COORDINATESYSTEM	A string representing a MapInfo-supported coordinate system that specifies a map projection, coordinate units, etc. For Example: Earth Projection 1,33 (for NAD 83) or	Earth Projection 1,0
SYMBOL	A MapInfo Symbol clause (for a layer containing points)	Symbol (35,0,12)
XCOLUMNNAME	Specify the name of the column containing X coordinates.	NO_COLUMN
YCOLUMNNAME	Specify the name of the column containing Y coordinates.	NO_COLUMN
RENDITIONTYPE	Specify 1 if on, 0 if off.	1
RENDITIONCOLUMN	Specify the name of the rendition column.	

Column Name	Values to Assign	Example
		MI_STYLE
RENDITIONTABLE	Specify the name of the rendition table. This field is not used.	left empty
NUMBER_ROWS	Specify the number of rows in the table.	11

Glossary of Terms

Term	Definition
3DMap	A window that allows you to view your maps containing continuous grids from various viewpoints in 3D Format.
address dictionary	The search dictionary used for matching addresses during geocoding.
adornment	A map decoration, such as a title, scale bar, or company logo, that provides contextual information for the map view.
alias	The name assigned to an expression or a column when you are working in the Select Columns field in the SQL Select dialog box. This name appears as the column title for that expression or column in a Browser.
application	A computer program used for a particular kind of work, such as word processing. Application is often interchangeable with the word program.

Term	Definition
ASCII	The acronym for American Standard Code for Information Interchange. ASCII is a standard code used in most microcomputers, computer terminals, and printers for representing characters as numbers. It not only includes printable characters, but also control codes to indicate carriage return, backspace, and so forth.
Assign District command	Use to permanently assign all selected map objects to the target district.
attribution text	Text added to a tile server table definition that automatically displays when a tile server layer is in a Map window. Some tile servers require attribution text, such as origin and copyrights information (the tile server author or distributor provides attribution text requirements).
bar chart	A type of thematic map that displays a bar chart of thematic variables for each record in a table from which the map is based.
base map	Usually the dominant or underlying layer in a given map. (These are typically the data layers that Precisely offers as ready products.) Users usually layer their own data on top of these base maps or use these base maps to geocode or to make new layers. Examples are joining industry data to postal code boundaries for analysis and then combining arrangements of the postal codes into new territory layers.
base table	A permanent table, which is part of a map, as opposed to a query table, which is temporary. You can edit the contents of base tables, and you can change their structure (by editing, deleting, reordering columns and adding or deleting graphic objects).
Bitmap	A screen image displayed as an array of dots or bits. Software usually generates either bit-mapped (raster) or object-oriented (vected) files. MapInfo Pro can work with both.

Term	Definition
boundary region	In GIS a boundary is a region on a map enclosed by a border. Cambria County, Manitoba, and Argentina would all be represented as boundaries on a map. Note that a single boundary could encompass several polygons. Thus, Indonesia is a single boundary but consists of many polygons.
Boundary Selection command	Use to search for and choose all the objects within a given region, such as a state or county boundary, a police patrol district, a sales territory, and so forth.
browser	A window for viewing a table (or database, spreadsheet or text file) in tabular form.
buffer	A type of proximity analysis where areas or zones of a given distance are generated around selected map objects. Buffers are user-defined or can be generated for a set of objects based on those objects' attribute values. The resulting buffer zones form region objects representing the area that is within the specified buffer distance from the object.
cadastral	A map set used to graphically define the cadastre or land ownership in a given area. A tax map is an example of a cadastral map. The land registration, assessment roles, and tax maps comprise the cadastre.
Cancel button	A command button for closing a dialog box without making changes.
Cartesian	A coordinate system using an x,y scale not tied to any "real-world" system. Most CAD drawing uses this method of registering objects (for example, a drawing of a ball-bearing assembly, floor plans). If a drawing uses Cartesian coordinates, one corner of the drawing probably has coordinates 0, 0.
Cartesian Coordinates	The conventional representation of geometric objects by x and y values on a plane.

Term	Definition
cartographic scale	A map scale that does not include distance units, such as 1:63,360 or 1:1,000,000.
cartography	The art and science of making maps. In GIS it is also the graphic presentation and visual interpretation of data.
centroid	<p>Usually the center of a map object. For most map objects, the centroid is located at the middle of the object (the location halfway between the northern and southern extents and halfway between the eastern and western extents of the object). In some cases, the centroid is not at the middle point because there is a restriction that the centroid must be located on the object itself. Thus, in the case of a crescent-shaped region object, the middle point of the object may actually lie outside the limits of the region; however, the centroid is always within the limits of the region.</p> <p>In MapInfo Pro, the centroid represents the location used for automatic labeling, geocoding, and placement of thematic pie and bar charts. If you edit a map in Reshape mode, you can reposition region centroids by dragging them.</p>
Change View button	This button allows you to change the zoom, map scale, and window centering aspects of the Map window that currently displays.
check box	A small square box that appears in a dialog box. You can click in the check box or on the text in order to select the option. Check boxes are generally present when multiple options can be selected at one time.
click	To press and release a mouse button quickly.
column	A column in a Browser corresponds to a field in a table. A column contains a specific type of information about an object, such as Name, Abbreviation, Land area, Price, Population, and so forth. The information for each object is listed on a row in the Browser.
command	A word or phrase, usually found in a menu, that displays a dialog box and/or carries out an action.

Term	Definition
conflict resolution	When conflicts exist between the data residing on a remote database and new data that you want to upload to the remote database via a MapInfo Pro linked table. The conflict resolution process is invoked whenever an attempt to save the linked table detects a conflict in an update.
Control menu	A menu activated through the Control Menu Box located in the upper left corner of all windows. The control menu is used to resize, move, maximize, minimize, or close the window.
control points	The points on a raster image whose coordinates serve as a reference for associating earth coordinates with any location on the image. See registration .
coordinate	An x,y location in a Cartesian coordinate system, or a Latitude, Longitude location in an earth coordinate system. Coordinates represent locations on a map relative to other locations. Earth coordinate systems may use the equator and the Greenwich prime meridian as fixed reference points. Plane coordinate systems describe a two-dimensional x,y location in terms of distance from a fixed reference and are usually in the first quadrant so that all coordinates are positive numbers.
coordinate system	A coordinate system is used to create a numerical representation of geometric objects. Each point in a geometric object is represented by a pair of numbers. Those numbers are the coordinates for that point. In cartography, coordinate systems are closely related to projections. You create a coordinate system by supplying specific values for the parameters of a projection. See Cartesian Coordinates , projection , and spherical coordinates .
cosmetic layer	The topmost layer of a Map window. Objects may be placed in this layer such as map titles and graphic objects. It is always displayed, and all objects placed in the Cosmetic Layer must be saved to a new or existing layer.

Term	Definition
data aggregation	A process that occurs when combining separate map objects into a single object. MapInfo Pro calculates what the column values for the new object should be, based on sums or averages of the values of the original objects.
data disaggregation	A process that occurs when splitting a map object(s) into smaller parts where MapInfo Pro splits the data associated with the map object(s) into smaller parts to match the new map objects.
data sources	An ODBC data source is an SQL database and the information you need to access that database. For example, an SQL Server data source is the SQL Server database, the server on which it resides, and the network used to access that server.
database	Any organized collection of data. The term is often used to refer to a single file or table of information in MapInfo Pro.
decimal degree	The decimal representation of fractions of degrees. Many paper maps express coordinates in degrees, minutes, seconds (for example, 40_30/10/), where minutes and seconds are fractions of degrees. 30 minutes equal half a degree, and 30 seconds equal half a minute. MapInfo Pro, however, expresses coordinates in decimal degrees (for example, 72.558 degrees), where fractions of degrees are expressed as decimals. Thus, the longitude: 40 degrees, 30 minutes, would be expressed in MapInfo Pro as 40.5 degrees.
default	The value or option used in the absence of explicit specification. Often the original setting or value for a variable.
degrees longitude, degrees latitude, decimal degrees	Degrees (longitude and latitude) are coordinates used to represent locations on the surface of the earth. Longitude, or X-coordinate, represents a location's east-west position, where any location west of the prime meridian has a negative X value. Latitude, or Y-coordinate, represents a location's north-south position, where any location south of the equator has a negative Y value.

Term	Definition
derived column	In a table created through the SQL Select, a derived column is one created by using an expression. The column is derived in the sense that it is not just a copy of the data in one of the tables being accessed by the SQL Select command.
derived field	The same as a derived column.
deselect	The process of undoing a selection. The object or area you deselect will not be affected by subsequent commands. Performed by selecting another area, by clicking in a blank area, or by executing the Clear command on the TABLE , MAP , or SPATIAL tabs.
digitizer, digitizing tablet	An electronic device that lets you trace a paper map into a GIS or CAD package. The digitizer consists of a table (or tablet) onto which you attach a paper map. You then can trace the map by moving a hand-held, mouse-like device known as a cursor, or puck, across the surface. Digitizing a map produces vector data as the end result.
districts browser	A special browser that displays when redistricting. It differs from other Browser windows in the following respects: one row can only be selected at one time, one row is always selected, and the selected row becomes the target district into which you can add other objects.
dot density map	A type of thematic map that carries information by showing a large number of tiny dots, wherein each dot represents some specific unit quantity. For example, for a population dot density map each dot might represent 10,000 people.
edit handle	The small boxes that appear at the four corners of the minimum bounding rectangle of an object in an editable layer of a Map window or in a Layout window.
export	The process whereby a program saves information in a file to be used by another program.

Term	Definition
expression	A statement containing two parts: 1) column names and constants (for example, specific data values), and 2) functions (for example, area) and operators (for example, +, -, >), in order to extract or derive information from a database. Expressions are used in <i>Select</i> , <i>SQL Select</i> , <i>Update Column</i> , <i>Create Thematic Map</i> , and <i>Label with Column</i> .
field	A field in a table corresponds to a column in a Browser. A field contains a specific type of information about an object, such as, name, abbreviation, land area, price, population, and so forth. The record for each object consists of that object's values for each of the fields in the database.
file	A collection of information that has been given a name and is stored on some electronic medium such as a tape or disk. A file can be a document or an application.
fill pattern	The design and color used to fill a closed object.
FLEXNet Operations module (FNO)	The Precisely database that maintains product entitlements and information about their activation.
font	A character set based on a particular style used for text characters.
generalization	The process of simplifying a data set to a size that can be easily manipulated and represented. For example, a river may have many twists and turns; however, if a map covers a very large area, the river may be represented as a straight line. Similarly, in a map of a very large area, a city might be represented as a point marker.
geocode	The process of assigning X and Y coordinates to records in a table or database so that the records can be displayed as objects on a map.

Term	Definition
Geographic Information System (GIS)	An organized collection of computer hardware and software designed to efficiently create, manipulate, analyze, and display all types of geographically or spatially referenced data. A GIS allows complex spatial operations that are very difficult to do otherwise.
Georegistered PDF	A PDF file that has geospatial information (bounds and coordinate systems) of Map or Layout window that it prints.
Pan command	The Pan command allows you to access the Pan command. Use the Pan command to reposition a map within its window or the contents of a map frame in the Layout window.
Graduated Symbols map	A type of thematic map that shows symbols (point objects) in a variety of sizes to indicate which objects have higher or lower numerical values.
graticule	A grid of horizontal (latitude) and vertical (longitude) lines displayed on an earth map, spaced at a regular distance (for example, every five degrees, every fifteen degrees). Used to establish a frame of reference.
Grid Surface map	A type of thematic map that displays data as continuous color gradations across the map. This type of thematic map is produced by an interpolation of point data from the source table. A grid file from the data interpolation is generated and is displays as a raster image in a Map window.
heads-up digitizing	A method of digitizing where the user creates vector objects by tracing over a raster image displayed on the screen. Thus, heads-up digitizing does not require a digitizing tablet.
Help Button bar	A bar located at the top of the Help Window that contains buttons you use to move to Help topics.

Term	Definition
horizontal scroll bar	The Horizontal scroll bar appears at the bottom of the MapInfo Pro window. Use the horizontal scroll bar to move left and right. The scroll box inside the scroll bar indicates your horizontal location. You can use the mouse to scroll to other parts of the window.
hot views	MapInfo Pro technology that automatically updates all the windows you have open for a particular table when you make a change in any one of the windows. For example, if an item is selected in a Map window, it will be selected in all other Map windows and Browsers you have open for that table.
import	The process whereby a program loads a file that is the output of another program.
Individual Values map	A type of thematic map that shades records according to individual values.
inflection	<p>The process of deviating the color in ranged thematic maps to emphasize some numerical significance. In thematic mapping we insert a new color between the top and bottom color for second interpolation of data.</p> <p>For example, suppose we were showing population growth with blue representing an increase in population growth and red representing a decrease in population growth.</p> <p>We could have white as the inflection color for a range that has zero or almost zero population growth, so that lighter shades of blue would represent a smaller population growth and lighter shades of red would represent a smaller decline in population.</p>
Info button	The Info button allows you to access the Info tool. Use the Info tool to select a location on your map, including multiple overlapping objects and display a list of all objects at that location. You can then choose an object from the list and view the tabular data for that object.
islands	Small areas outside the main boundary that can be reached within the specified time or distance.

Term	Definition
IsoChron	An IsoChron is a polygon or set of points representing an area that can be traversed from a starting point in a given amount of time along a given road network.
IsoDistance	An IsoDistance is a polygon or set of points representing an area that can be traversed from a starting point travelling a given distance along a given road network.
Isogram	An Isogram is a map that displays a set of points that satisfy a distance or time condition. Isograms are either IsoChrones or IsoDistances.
join	The process of creating a relational link between two tables (databases).
Latitude	The horizontal lines on a map that increase from 0 degrees at the Equator to 90 degrees at both the North (+90.0 degrees) and South (-90.0 degrees) poles. Used to describe the North-South position of a point as measured usually in degrees or decimal degrees above or below the equator.
layer	A layer is a basic building block of MapInfo Pro maps and consists of a table with graphic and text settings like style override, labeling, and zoom layering. Maps are made of one or more superimposed layers (for example, a layer of street data superimposed over a layer of county or postal code boundaries) which you can design to convey geographical or statistical information. Typically, each map layer corresponds to one open table. Cosmetic Layers contain map objects that represent temporary map annotations (for example, text objects). Cosmetic Layers contain map objects that represent temporary map annotations (for example, labels). See cosmetic layer and table .
Layers Window	The Layers command allows you to access the Layers window. This dialog box allows you to specify how the various tables in a Map window are layered and displayed. See Accessing Layer Control .

Term	Definition
Layout window	A window where you arrange and annotate the contents of one or several windows for printing.
legend	The part of a map, which explains the meaning of different colors, shapes, or fill patterns used on the map. See also What is a Legend? .
legend frames	Each Legend Designer window contains one or more legend frames each corresponding to a style or theme layer in the Map window.
Legend Designer window	A window containing legend frames. You can create more than one Legend Designer window for each map. The Legend Designer window can contain more than one frame. For example, you can have one Legend Designer window containing four legend frames, or you can have four Legend Designer windows, each containing one legend frame.
Legend Window button	Use the Legend command to display the floating thematic legend window.
line, line object	A map object defined by a set of sequential coordinates that may represent the generalized shape of a geographic feature (for example, street centerlines, railroads, cables). A Precisely street map is a collection of thousands of line objects.
linked table	A linked table is a special kind of MapInfo table that is downloaded from a remote database and retains connections to its remote database table. You can perform most operations on a linked table that you do for a regular MapInfo table.
Longitude	The vertical lines on a map, running from the North to South poles, used to describe the east-west position of a point. The position is reported as the number of degrees east (to -180.0 degrees) or west (to +180.0 degrees) of the prime meridian (0 degrees). Lines of longitude are farthest apart at the Equator and intersect at both poles, and therefore, are not parallel.

Term	Definition
Longitude/ Latitude	MapInfo Pro's default coordinate system for representing geographic objects in a map.
MapBasic	The programming language used to customize and/or automate MapInfo Pro. To create MapBasic applications, you need the MapBasic compiler, which is a separate product. However, you do not need the MapBasic compiler to run a compiled MapBasic application.
Map Catalog	<p>The MapInfo map catalog stores information about the location of spatial columns on the DBMS. There must be one catalog per database. The MapInfo EasyLoader application can create this catalog for each database: Oracle, SQL Server, PostGIS, and Microsoft Access. This is a one-time only task per database and is required before any tables on that database can be mapped in MapInfo Pro.</p> <p>you can create a map catalog manually, see Creating a Map Catalog Table Using MapInfo EasyLoader.</p>
map scale	<p>A statement of a measure of the map and the equivalent measure on the earth. Often expressed as a representative ratio of distance, such as 1:10,000. This means that one unit of distance on the map (for example, one inch) represents 10,000 of the same units of distance on the earth.</p> <p>The term <i>scale</i> must be used carefully. Technically, a map of a single city block is <i>large-scale</i> (for example, 1:12,000), while a map of an entire country is <i>small-scale</i> (for example, 1:1,000,000). A 1:1,000,000 map is considered small-scale because of the small numeric value obtained when you divide 1 by 1,000,000.</p>
map segment	In a street map, a segment is a single section of the street. In urban maps, segments are generally one block long. Address ranges are stored at the segment level.
map scale	<p>A ratio or representative fraction (RF), expressed as 1 inch = 63,360 mile or 1:1,000,000 (1 cm to 10 km), that indicates the relationship between a distance on the map and the distance on the ground.</p> <p>See also Cartographic Scale.</p>

Term	Definition
Map window	A window that allows you to view a table as a map.
meridian	A line or a portion of a line running from the North to the South pole. A longitudinal line.
Military Grid Reference System	<p>The U.S. Military Grid Reference System (MGRS) is a grid reference system that MapInfo Pro supports when displaying maps in a Map window. It is the military version of the civilian-use Universal Transverse Mercator (UTM) grid system. Military grid references are very similar to the mathematical Cartesian x,y system in which coordinates are giving in terms of x (easting) and y (northing).</p> <p>In this system, the world is generally divided into 6° by 8° geographic areas, each of which is given a unique identification, called the Grid Zone Designation. These areas are covered by a pattern of 100,000-meter squares. Each square is identified by two letters called the 100,000-meter square identifications. A reference keyed to a gridded map of any scale is made by giving the 100,000- meter square identification together with the numerical location. Numerical references within the 100,000-meter square are given to the desired accuracy in terms of the easting (E) and northing (N) grid coordinates for the point. The Grid Zone Designation usually is prefixed to the identification when references are made in more than one grid zone designation area.</p>
Minimum Bounding Rectangle (MBR)	For any given map object, the smallest rectangle that completely encompasses the object.
native projection	The projection in which a map's coordinate points are stored. MapInfo Pro allows you to display maps in other projections, but not as fast as displaying maps in their native projection.
node	An end-point of a line object, or an end-point of a line segment which is part of a polyline or region object.
Non-Earth map	A map in which objects are not explicitly referenced to locations on the earth's surface. Floor plans are typical examples.

Term	Definition
ODBC drivers	An ODBC driver is a dynamic-link library (.DLL) file that MapInfo Pro uses to connect to an SQL database. Each type of SQL database requires a different ODBC driver.
ODBC table	An ODBC table is a table residing in a remote SQL database.
OSGB MasterMap GML Files	<p>Many of our international customers want to display MasterMap GML files developed by the Ordnance Survey of Great Britain (OSGB). We provide support for some of the Topography features (OSGB version 2.0), Topographic Area, Lines and Points, Cartographic Symbols and Boundary Lines.</p> <p>We maintain support for these features and add support for Cartographic Text and Departed Features. MapInfo Pro will continue to support GML files as the OSGB updates the schema that underlies the GML technology.</p> <p>As the GML format gets more sophisticated in its support of additional layers, feature types, and attributes, we will continue to provide full support for those changes. Currently, we support the OSGB recommended styles by mapping the style definitions to existing MapInfo Pro styles. Where it is not possible to render complicated fill patterns, we use the simple dot screen that the OSGB recommended to us. The OSGB style mapping to MapInfo styles is hard coded so it cannot be changed.</p> <p>For more information about OS MasterMap, see https://www.ordnancesurvey.co.uk/businessandgovernment/products/mastermapprod.html</p>
outer join	A type of multi-table join where all the records in the specified tables are included in the result table, even records that do not match the join criteria. MapInfo Pro does not perform outer joins.
pack	The process of compressing MapInfo tables so that they use less disk space.
Pie Chart map	A type of thematic map that displays a pie chart of thematic variables for each record in the table from which the map is based.

Term	Definition
Pin Map, Push-Pin map	A type of map named after the practice of inserting push-pins into a wall map. A pin map features point objects. Geocoding a database is one way of creating a pin map.
pixel	The acronym for picture element. The smallest dot that can be displayed on a computer screen. If a screen is described as having a resolution of 1,024 x 768, the screen shows 1,024 pixels from right to left, and 768 pixels from top to bottom. Each character, object, or line on the screen is composed of numerous pixels.
point, point object	A map object defined by a single X,Y coordinate pair. Each point object is represented by a symbol style (for example, circle, square, triangle, etc.).
point size	A unit of measurement equal to 1/72 of an inch. Used to measure character size.
pointer	An arrow-shaped cursor on the screen that can be manipulated by a mouse.
polygon, polygon object	A simple bounded region, simple in the sense that it does not consist of more than one polygon (where a boundary can consist of more than one polygon). The Polygon tool creates a single polygon.
polygon overlay	A spatial operation that merges overlapping polygons from two layers to analyze those intersected areas or to create a third layer of new polygons.
polyline, polyline object	A linetype object made up of many line segments. It contains more than two nodes, that is, more than its end points. The Polyline tool creates a single polyline. In contrast, the Line tool only draws a single straight line (that is, a line defined by two nodes).

Term	Definition
projection	A mathematical model that transforms the locations of features on the earth's surface to locations on a two-dimensional surface, such as a paper map. Since a map is an attempt to represent a spherical object (the earth) on a flat surface, all projections have some degree of distortion. A map projection can preserve area, distance, shape or direction but only a globe can preserve all of these attributes. Some projections (for example, Mercator) produce maps well suited for navigation. Other projections (for example, equal-area projections, such as Lambert) produce maps well suited for visual analysis.
query table	A temporary table produced as the result of a Select, SQL Query, or by choosing objects in a Map window, or records in a Browser, and mapping or browsing that selection. You cannot make edits and structural changes on query tables, but you can edit a selected set of rows in your source table through a query table. See selection and base table .
Radius Selection command	Use this command to select all of the objects within a certain radius. See Using Radius Selection .
Ranged map	A type of thematic map that displays data according to ranges set by the user. The ranges are shaded using colors or patterns.
raster image	A type of computerized picture consisting of row after row of tiny dots (pixels). Raster images are sometimes known as bitmaps. Aerial photographs and satellite imagery are common types of raster data found in GIS. A computer image can be represented in raster format or in vector format. See scanning and vector image .
record	All the information about one object in a database or table. A record in a table corresponds to a row in a Browser.
redistricting	The process of assigning map objects to groups. As you assign map objects, MapInfo Pro automatically calculates totals for each group and displays the totals in a special Districts Browser. This process is sometimes known as load-balancing.

Term	Definition
reference grids	A matrix of letters and numbers that assist users in some style dialog boxes that identify specific line styles, colors, and patterns.
region, region object	An enclosed area defined by one or more polygons. If a region contains one or more lakes or islands, each lake or island is a separate polygon. A region is an object created with the Polygon tool.
registration	Usually the first stage of the digitizing process or when opening a raster image for the first time in MapInfo Pro. Before you can digitize a paper map or work with a raster image, you must point to several control points across the map, and enter their coordinates (for example, longitude, latitude). After you have registered the map, MapInfo Pro can associate a longitude, latitude position with any point on the map surface; this allows MapInfo Pro to perform area and distance calculations, and overlay multiple map layers in a single map. CAD systems as well as GIS systems utilize this process. See control points .
result code	Result codes indicate whether a geocode match was made and the type of match it was, and conveys information about the quality of the match. The result code is an alphanumeric code of 1-10 characters.
Ruler command	The Ruler command determines the distance between two points and the length of some path.
Run Program	The Run Program command accesses the Run MapBasic Program dialog box where you specify the MapBasic utility that you want to run.
scale bar	An adornment on the map that shows the scale of map representation relative to the portion of the Earth's surface.
scanning	The process of inputting data into a raster format using an optical device called a scanner.

Term	Definition
scroll Bar	Bars along the right and bottom sides of each window that allow you to scroll the window view. Clicking on the shaded area moves one window screen at a time.
seamless layer	A seamless layer treats a group of base tables as if they are one. It allows you to change display attributes, apply or change labeling or use the Layers window for an entire group of tables at once. A base table can be any regular MapInfo Pro table. Grid layers cannot be made seamless.
Select button	The Select button allows you to access the Select tool. Use the Select tool to select one or more objects or records for analysis. You can also use the Select tool to edit a map or browser. See Selecting a Single Object from a Map or Layout .
selection	A data item or set of data items chosen for inspection and/or analysis. Regardless of the kinds of windows on the screen, selections can be made using the Select and SQL Select Query commands in MapInfo Pro's Query menu. In Browser and Map windows, items can be placed in the selection set by clicking on them individually. Map windows also have special tools for selecting multiple items on a spatial basis.
Set Target command	Use this command to make the selected object's district the new target district. See redistricting .
Show MapBasic Window button	The MapBasic window button allows you to display or hide the MapBasic window. You can perform many different tasks by typing commands into the MapBasic window. Choosing items from MapInfo Pro's menus could instead perform those same tasks. There are times, however, when it is easier to type commands into the command window.
snap to nodes	A feature that helps in drawing, moving and positioning map objects. In Snap mode (S key) the cursor snaps to a node of a map object when it comes within a certain distance.

Term	Definition
source table	A permanent table, as opposed to a query table, which is temporary. You can edit the contents of source tables and you can change their structure (by editing, deleting, reordering columns and adding or deleting graphic objects). You cannot make edits and structural changes on query tables but you can edit a selected set of rows in your source table through a query table.
spatial analysis	An operation that examines data with the intent to extract or create new data that fulfills some required condition or conditions. It includes such GIS functions as polygon overlay or buffer generation and the concepts of contains, intersects, within or adjacent.
spherical coordinates	Latitude and longitude values that represent objects on the surface of the globe.
SQL (Structured Query Language)	A standard language used for analyzing information stored in relational databases. MapInfo Pro's database engine is based on the SQL standard.
SQL query	The selection of information from a database according to the textual attributes and object relationships of the items. In MapInfo Pro, queries are created with the <i>SQL Select</i> and <i>Select</i> commands or with MapBasic commands in the MapBasic window.
stacked style	A list of styles drawn on top of each other to create a more complex or interesting map feature. Stacked styles apply to points, polylines, and polygon features.
standard deviation	A measurement of the variation of a set of data values around the mean.
Statistics button	Use the Statistics command to display the Statistics window. The Statistics window tallies the sum and average of all numeric fields for the currently chosen objects/records. The number of records chosen is also displayed. As the selection changes, the data is re-tallied, and the Statistics window is updated automatically. See redistricting

Term	Definition
Statistics window	A window containing the sum and average of all numeric fields for the currently selected objects/records. The number of records selected is also displayed. As the selection changes, the data is re-tallied, and the Statistics window updates automatically.
StatusBar	A bar at the bottom of the screen that displays messages that help in using MapInfo Pro. The StatusBar also displays messages that pertain to the active window. In a Map window, the StatusBar indicates what layer is editable, the zoom display of the map, and the status of Snap and Digitizing modes. In a Browser window, the StatusBar indicates the number of records currently displaying and the total number of records. In a Layout window, the StatusBar indicates the zoom display as a percentage of the actual size of the map.
Structured Query Language (SQL)	A standard language used for analyzing information stored in relational databases. MapInfo Pro's database engine is based on the SQL standard.
subselect	A select statement that is placed inside the Where Condition field of the SQL Select dialog box. MapInfo Pro first evaluates the subselect and then uses the results of the subselect to evaluate the main SQL Select statement.
symbol, symbol object	A small, relatively simple shape (for example, square, circle, star, push-pin) used to graphically represent a point object (for example, a customer location).
table	A table is made up of data in rows and columns. Each row contains information about a particular geographic feature, event, etc. Each column contains a particular kind of information about the items in the table. You can display tables with graphic information stored in them as maps. See base table and query table . See also layer .
table row	In a table, a row contains all the information for a single item. It corresponds to a record in a table.

Term	Definition
target district	The district that is selected in a Districts Browser to be affected by subsequent redistricting operations.
text cursor	A blinking vertical bar that shows the position where text can be edited, inserted, or deleted.
thematic layer	A layer containing the thematic settings for a map layer. Thematic layers are drawn directly over the map layer on which the thematic settings are based. They are also drawn in a particular order, depending on the number of thematic layers you have and the type of thematic map objects you are creating.
thematic map	A type of map that uses a variety of graphic styles (for example, colors or fill patterns) to graphically display information about the map's underlying data. Thus, a thematic map of sales territories might show one region in deep red (to indicate the region has a large number of customers), while showing another region in very pale red (to indicate the region has relatively few customers).
thematic shading	Map objects - points, lines, regions - that have been shaded, using a pattern and/or color, according to some point of information about the object, or theme (population, size, annual rainfall, date, and so forth).
thematic variable	The data values displayed on a thematic map. A thematic variable can be a field or expression.
theme legend	MapInfo Pro's original style legend that allows you to display legends for thematic maps. MapInfo Pro automatically creates a theme Legend Designer window for a thematic map. Customize its display through the Modify Thematic Map dialog box. See What is a Legend? .

Term	Definition
tile server	A tile server is an online server that contains a collection of raster tile images that cover a place on the earth. Tiles are organized in a row and /or column grid fashion. There are multiple levels of tiles, each level representing a different resolution of data covering the same place on the earth. The level determines the number of tiles (number of rows and columns). Zooming in or out may change the level of data. Panning may change the number of tiles that are needed on the map.
transformation	The process of converting coverage coordinates from one coordinate system to another through programmatic translation. The transformation of CAD generated Cartesian coordinates into earth coordinates is an example.
ungeocode	The process of removing X and Y coordinates from records in a table or database. Can also describe a table that has not been geocoded, such as an ungeocoded table.
United States National Grid	The United States National Grid for Spatial Addressing (USNG) is a grid reference system that defines how to present Universal Transverse Mercator(UTM) coordinates at various levels of precision by specifying the use of those coordinates within the grid system defined by the Military Grid Reference System (MGRS). Additionally, it addresses specific presentation issues such as grid spacing. The UTM coordinate representation, the MGRS grid, and the specific grid presentation requirements together define the USNG.
vector image	A coordinate-based data structure commonly used to represent map features. Each object is represented as a list of sequential x,y coordinates. Attributes may be associated with the objects. A computer image can be represented in vector format or in raster format. See raster image .
vertical scroll bar	The Vertical scroll bar appears at the right of the most windows. Use the vertical scroll bar to move up and down. The scroll box inside the scroll bar indicates your vertical location. You can use the mouse to scroll to other parts of the window.

Term	Definition
Web Feature Services	<p>A Web Feature Service (WFS) client retrieves geospatial GML (Geography Markup Language) 2 data using HTTP GET and HTTP POST requests over the Internet or through a private intranet. The WFS client was developed in accordance with the 1.0.0, 1.1.0 and 2.0 OpenGIS Web Feature Service Implementation Specifications, which are available online at: http://www.opengeospatial.org/standards/wfs.</p>
Web Map Services	<p>A Web Map Service (WMS) is a technology that gives you a source for data over your Intranet or over the Internet. This innovation is based on a specification from the Open GIS Consortium (OGC) and allows you to use raster map images from servers that also comply with the specification. An important element of this is that the WMS images are registered using the data's coordinate system so the WMS layer can be used with vector and other registered raster images.</p> <p>This specification supports transparent pixel definition for image formats as well. This allows you to use the images you retrieve as overlays and not solely as the bottom layer of your map. This is a very new technology and WMS may not exist for the geography you are looking for. Further, the WMS Server determines the data that is provided. See <i>Retrieving Map Data from Web Map Services</i> in the <i>Help System</i>.</p>
Web Map Tile Services	<p>MapInfo Pro provides a Web Map Tile Service (WMTS) client that allows you to retrieve tiled mapping data through your local intranet or the Internet. MapInfo Pro provides a standardized manner for handling server specific details such as available number of zoom levels, image formats, tile sizes, etc. This innovation is based on standard specifications from the Open GIS Consortium (OGC).</p> <p>For more information about OpenGIS WMTS implementation standard, refer to: http://www.opengeospatial.org/standards/wmts.</p>
web service	<p>A web service is a software system that is accessible using an intranet or Internet connection. Web services allow you to retrieve data that others are sharing internally or world-wide. The power of web services is that you can use them to create more powerful maps or in the case of geocoding or drive region services get more accurate and precise results using the same data.</p>

Term	Definition
weighted average	<p>An average that gives more weight to one value over another when averaging. A method of averaging that uses a separate column of information to define the relative importance of each data value. The formula for a weighted average is:</p> $\text{SUM (DATA*WEIGHT) / SUM (WEIGHT)}$ <p>where DATA is the column of data values and WEIGHT is the column of weights. If WEIGHT contains all 1's (or other non-zero values) this reduces to a simple average.</p>
window	In MapInfo Pro, Map windows, Browser windows, Graph windows and Layout windows are the major types of windows. They display the data stored in tables. The map legends, and the Info window are other types of windows.
workspace	A saved configuration of open MapInfo tables and windows.
Zoom In button	The Zoom In button allows you to access the Zoom In tool. Use the Zoom In Tool to get a closer area view of a map. See zoom layering .
Zoom Out button	The Zoom Out button allows you to access the Zoom Out tool. Use the Zoom Out tool to get a wider area view of a map. See zoom layering .
zoom layering	A setting that determines the range (for example, 0-3 miles, 2-5 miles, etc.) at which a layer is visible in a Map window.



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