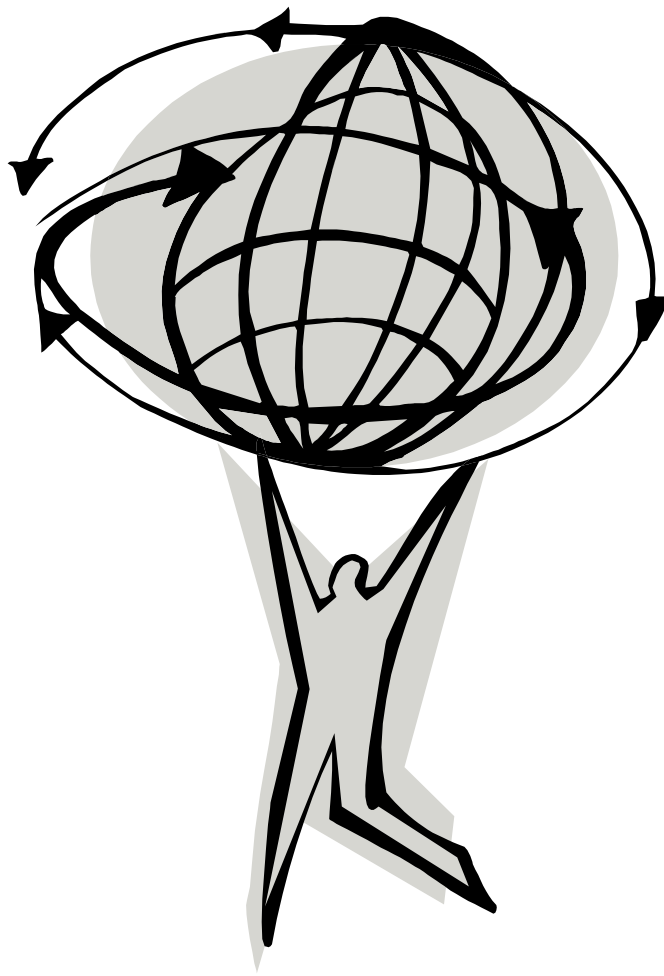




# MapOCX Pro v7.1

## Reference Manual



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MapPro OCX, ActiveX Mapping Control for Windows, Version 7.0 User's Manual

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## **INTRODUCTION**

MapOCX Pro (sometimes also referred to as MapPro) is a complete programming toolkit for incorporating detailed maps and spatial information in the Microsoft Windows environment. The self-contained ActiveX control was designed for quick and simple integration of high-quality, detailed map displays into any Windows visual environment, and facilitates brief development and deployment cycles. The latest version of the control is v7.1 (filename MapPro71.OCX).

This document is intended as an aid to developers, designers, and programmers in developing and integrating sophisticated map content into their applications. It is not meant for distribution to the end-users of applications based on this technology. It contains everything you need to use the MapOCX Pro toolkit. It also assumes you already are familiar with Microsoft's Visual Basic, and/or Borland's Delphi Integrated Development Environments (IDEs).

The sample code provided in this document is for demonstration purposes ONLY. As such, it is subject to modifications on a continuous basis as the MapOCX Pro evolves. The sample code does not constitute a software product, nor is it supported as such.

The MapOCX Pro 32-bit ActiveX control permits users to interface to an extensive vector database of roads, rivers, streams, ponds and other water bodies. The control has built-in behaviors which enable the user to dynamically zoom in or out, pan the map image, search for addresses, places, Zip Codes, Counties, perform Geocoding and Reverse Geocoding, and in general gives the developer/user the means of accessing vast amounts of geographical data.

The MapOCX Pro control has published properties, methods, events and dialogs. All parts of the control are written in Borland's Delphi.

### **Map Data**

Two self-contained mapping databases may be licensed from Undertow Software, for use with MapPro OCX. One of these databases is based on the TIGER/Line data, from the Census Bureau, and the other is based on Premium Mapping Data supplied from Geographic Data Technology (GDT). Both data sets provide coverage for the Continental USA, Hawaii, Puerto Rico and US territories. The GDT data set also provides coverage for Canada.

Although both data sets provide resolution down to neighborhood roads, the GDT-based premium data set provides much more detailed address range coverage, additional resolution in the vector data, one way street information, exit ramp information, and in general a significantly higher degree of detail.

In addition to the detailed USA and Canadian data available with MapOCX Pro, a basic World reference data set is also provided, based on GDT data, and enhanced with data from a number of other sources. This world data set, is meant to be used as a reference layer for users that may want to use their own underlay bitmaps, for example, to produce maps for other parts of the world.

### **Stock Dialogs, Toolbars,...**

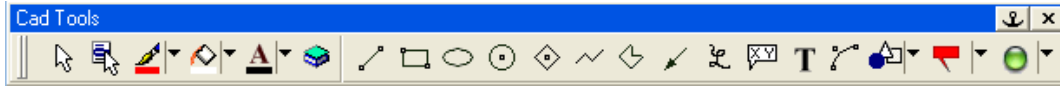
Using just a single line of code, to access one of the numerous built-in stock dialogs and toolbars, provides the user with the ability to perform searches, print, perform street-level routing, set display options, and much more.

### **Map Rotation**

On-the-fly map rotation, and a specialized "Heads-Up" mode allows the user to rotate map data to the preferred orientation, ideal for in-vehicle navigation.

## Underlays & Overlays

Users can also load underlay bitmaps (satellite or aerial photography, BMP, JPG or GIF), and can create, load and edit overlays of CAD objects (lines, boxes, circles). Loaded overlay files may be of the older MapPro formats (.OVR or .CMX), of the new, advanced native CAD format, with support of attributable objects. A built-in CAD toolbar makes it easy for the developer to add vector elements that become part of the user CAD layer which is painted on top of the map surface.



The new CAD interface also allows the user to Group CAD objects in logical sets, modify individual or group object attributes, use built-in markers and wmf symbols to identify map locations, import wmf objects, and more. All these capabilities, are also available programmatically, for the developer that is interested in building their own CAD interface.

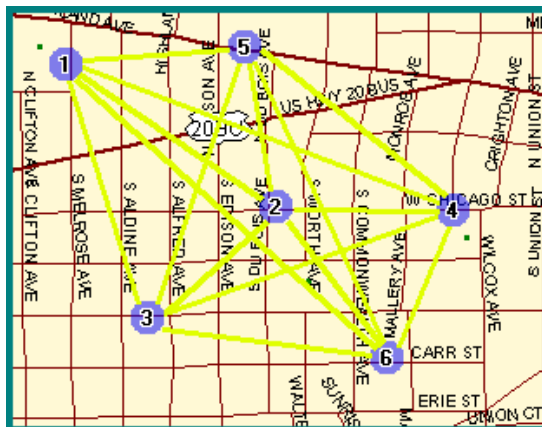
## Geocoding and Reverse Geocoding

Although not designed as a dedicated geocoder, A variety of built-in search methods allow the user to Geocode based on an address, and the control also has built-in methods that permit the user to enter latitude and longitude coordinates and find the closest street, address, city, etc.

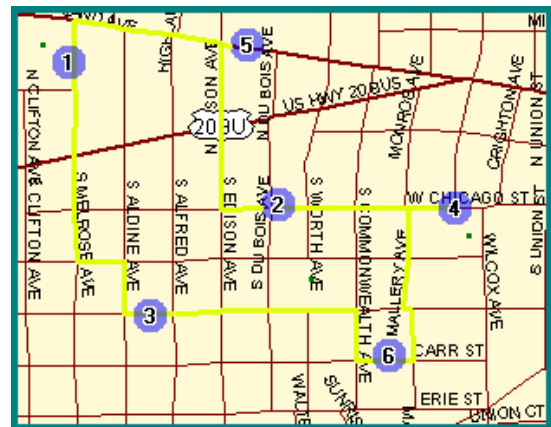
## Route Optimization

A whole collection of new capabilities were added to the Map control in the new release, MapPro71. One of the most important additions is the Optimized Route Solution (ORS), many times referred to as the Traveling Salesman Problem (TSP).

This is the solution to the problem where a number of points need to be visited, and the user is interested in the optimized set of routes to all those points. In this implementation, the ORS can use either a closed circle path, i.e., a complete closed path is generated between **all** the user-specified points, or it can use fixed Start and Finish points. Although it may seem to be a trivial problem, for a couple of points, one can quickly see that the number of possible solutions that need to be examined, even for 6 points, can quickly get very high.



Possible Routing Combinations for 6 points



ORS result for the same point

The ORS is implemented as a collection of Interfaces, Properties and Methods, described in the Optirouter section of this manual. below. Its capabilities can be selected both programmatically, or by invoking the Route Optimizer built-in dialog.

## **User Registration**

The MapOCX control is registered in each development project, using the licensing information obtained from Undertow Software, at the time of purchase. No further interaction with Undertow is needed, by the developer. (See section on installing and using the control).

All distributed copies of applications developed with MapOCX Pro, on the other hand, need to be registered with Undertow Software, individually, within 15 days of installation. The user is reminded upon startup of the application; they can register by phone or over the internet. This allows the developer to monitor the usage of their application and at the same time automates the licensing procedure.

## ***What's Included in the Developers Toolkit***

The MapOCX Pro Package contains the following:

- TIGER/Line Street-level Data Set for USA, or GDT Prime street-level Data for the USA (and /or Canada if licensed)
- Auxiliary files containing coarse world, state, county, place, hydro and roads data
- MapPro71.OCX ActiveX Component
- Developer's Users Manual
- REGSVR32.exe
- OC30.DLL
- Vendor Product Code and Developer Password

## ***Minimum Requirements***

The following represent the minimum operating requirements for MapOCX Pro.

<b>Minimum OS: Operates On:</b>	Windows 98B Windows 98/NT/2000/ME/XP
<b>CPU</b>	Pentium 600 or equivalent
<b>RAM</b>	64 MB
<b>HD</b>	20 MB (see note below)
<b>CD-ROM</b>	4x
<b>Video</b>	640x480 256 colors

**NOTE:** 20 MB is assumed to be available in order to accommodate the OCX and associated files. The data is assumed to remain on the CD-ROM. If the data is transferred to the HD, then approximately 655 MB (for Tiger Data) or 1+ GB (for GDT) of space is required.

## ***Coordinate System***

The coordinate system used in the data accompanying the OCX, is a Lon/Lat (x,y), Cartesian coordinate nprojected map system. The system treats longitude and latitude as a simple rectangular coordinate system. Scale, distance, area, and shape, in such a projection, are all distorted with the distortion increasing as one moves toward the poles.



## ***Installing and Using the Control***

The steps required to install and use MapPro71.OCX control are briefly described below:

1. Create a folder (subdirectory) and copy the MapPro71.OCX and associated files from the distribution disk to the folder. It is recommended that you retain the structure of the data directories (e.g., Data1, Data2, ...) which makes it easier to troubleshoot problems should they arise later on.
2. Although some IDEs may transparently take care of this, it is recommended that you register the OCX with Windows. To do so, you may go to the command line, navigate to the folder where you installed MapPro71.OCX and REGSVR32.EXE, and

Type: REGSVR32.EXE MAPPRO71.OCX

And press ENTER.

3. Start your Development environment. If your IDE requires it (such as Delphi or Visual Basic, for example), then make sure you install the component in that environment. Refer to your IDE's documentation on installing components if necessary.
4. Create a new form and place the control on it.
5. Before you can create an application, you must enter in your Vendor Code (XXXX-XXXX) and your Password (XXXXXX). This information would have been supplied when you purchased the MapPro71 distribution package. In design mode, right mouse click on the MapOCX and select "Properties", then select the "Installation" tab where you can enter this information. If you are not yet a licensed developer or have lost your Developer ID, please contact Undertow Software at 1-815-521-9950 or 1-800-257-9244 for further information. Note that this process, of entering Vendor Code and password, will need to be repeated every time you place a new instance of the control on a form in your project.
6. In the FormCreate event, or equivalent, set the Data Path properties so the OCX can find the data files (refer to Path\_Data1, Path\_Data2, Path\_Data3, Path\_States0, and Path\_States1 in this manual for further information). Immediately following the path properties, also set the DataSource property for the appropriate licensed set of data you will be using. It appears the loading sequence of some IDEs may interfere with loading sequence of the control. It is therefore recommended that in the FormCreate event, the developer also programmatically set the Vendor Code and Vendor Password.

**Note:** Once the OCX control is placed on a form, clicking the right mouse button, while the mouse cursor is on the control, will open the "Properties" dialog. If this "Properties" dialog is exited by clicking on the O.K. button, a new configuration file (MapPro71.CFG) containing the new options is saved to the disk. Furthermore, if any of the properties controlling the map view port are modified from the object inspector, the control is updated and a new MapPro71.CFG file is written to the disk.

### ***Properties, Methods, Events***

Only Properties, Methods and Events explicitly documented in this manual are supported and controlled by the OCX. Other inherited Properties, Methods and Events are available to the user through the control, depending on the development environment used. However, these are not controlled by the OCX and as

such, support for them is beyond the scope of this document. There are also Reserved Methods that, although sometimes visible, are not supported for user access through the OCX.

### Internal Data Structure

The data file structure of the map data, overlays, underlays, configuration files, and other support files used are proprietary. The format of some of these files is described in the appendices to this document.

### Default Mouse Actions

#### Left Click (Re-centering)

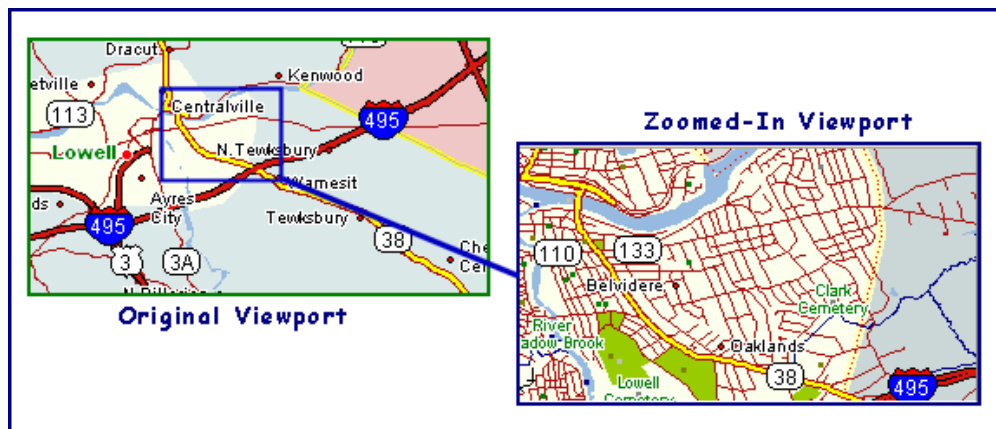
Pressing the Left mouse button, while in the default mode (mapMode=MdZoom), pans and repositions the map so that the clicked point is in the center of the ViewPort..

#### Right Click (Zooming Out)

Pressing the Right mouse button, while in the default mode (mapMode=MdZoom), zooms the map out by a factor of 2.

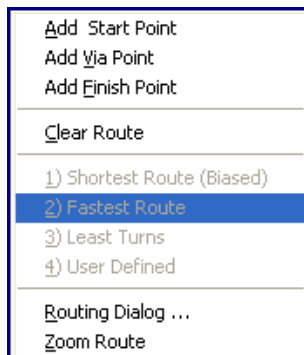
#### Left Click & Drag (Zooming In)

Pressing the Left mouse button, while in the default mode (mapMode=MdZoom), and dragging the mouse pointer, while holding the mouse button down, draws a dynamic rectangle on the screen. Once the mouse button is released, the map is zoomed in so that the area included in the selection polygon, fills the viewport.



#### Shift & Left Click (Quick Routing)

Pressing the Left mouse button, while holding down the Shift key, marks the current cursor location with a routing point marker, and pops up the Quick Routing menu.

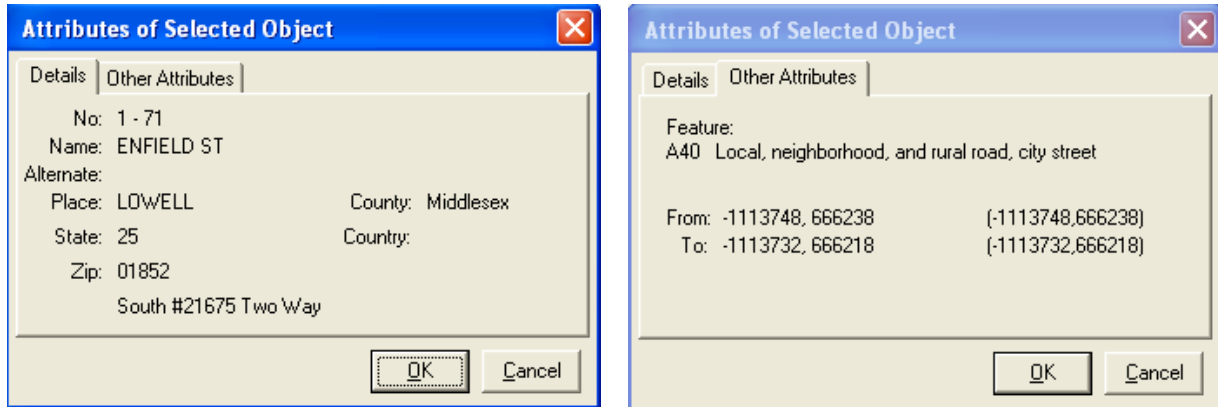


The quick routing menu allows you to add the Start, a Via or the End point for a routing calculation, Clear the currently calculated route, Zoom to the currently calculated route extents, open the main routing dialog, or perform a calculation using the currently defined points (the calculation options are disabled if at least two routing points have not been defined).

Note that points added this way are also accessible from within the OptiRouter dialog, as well.

### Control & Left Click (Attributes)

Pressing the Left mouse button, while holding down the Control key, opens a dialog displaying additional attribute data about the object at the clicked point. Note that this behavior is available only when the map is zoomed in to the point where local streets are visible, i.e., ~ 2 mile scale.



It should be pointed out that a number of other mouse-click behaviors are also available, when the map is not in its default mode, i.e., MapMode<math>\leftrightarrow</math>mdZoom, but those are described in the individual sections where the MapMode options are discussed.

## **Files in this package...**

This section summarizes the various files distributed as part of the MapOCX Pro v7.0 developer's package with short description of their contents. Please, note that these files are subject to change without notice, as data gets modified/updated. For the latest files available at any given time, you may want to visit the Undertow Software web site, at [www.undertowsoftware.com](http://www.undertowsoftware.com).

### **Root Directory of Distribution CD-ROM/DVD**

MapPro71.OCX      The main mapping Active-X control.

### **Data1 Directory of Distribution CD-ROM/DVD**

mAIR.ZPX              Airports points file  
mCITY.ZPX             City/Place Points File  
mCNTY.ZPX            Shaded County Polygons, below 2 mi scale  
mCNTYL.ZPX          Shaded County Polygons, above 2 mi scale  
mHYDRO.ZPX          Hydrographic features file  
mRTE.ZPX             USA Interstate and State Highways file (used for routing)  
mRTE03.ZPX          Canada Interstate and State Highways file (used for routing and rendering)  
mSHORE.ZPX          World Shoreline boundary, high definition  
mSTATE.ZPX          State and County shaded polygons, above 2 mi scale  
mWORLD.ZPX          High resolution shaded country polygons  
mHWY.ZPX            USA Interstate, State, and Local highways, used for rendering  
mPARK.ZPX            USA Parks shaded polygons, above 2 mi scale.

### **Data2 Directory of Distribution CD-ROM/DVD**

mLAND.ZPX            USA Landmarks file (used for rendering)  
mLAND03.ZPX        Canada Landmark files (used for rendering)

### **Data3 Directory of Distribution CD-ROM/DVD**

cities.BIN            Old, USA binary cities index file, used for searching  
cities03.BIN         USA and Canada binary cities index file used for searching  
fon.bin                Old USA binary phone area code index file, used for searching  
zip.BIN                Old, USA binary ZiCode index file, used for searching  
zip03.BIN            USA and Canada binary Zip/Postal Code index file used for searching

### **States Directory of Distribution CD-ROM/DVD**

nnnnnnnn.ZPG        A series of state and Province files containing the high resolution Street level GDT Data.  
  
nnnnnnnn.ZP5        A series of state and Province files containing the high resolution Street level TIGER/Line based Data.  
  
nnnnnnnn.SIG        A series of signature files required for end-user registration and use of any distributed applications. **Note:** End-user applications will not be operational if the appropriate \*.SIG files are NOT presents in the states directorie(s).

### **Underlays Directory of Distribution CD-ROM/DVD**

\*                      Contains a number of underlay files (vary from release-to-release)

**Sample Source Code** **Directory of Distribution CD-ROM/DVD**

\*

Contains sample Source code the demonstrates the use of the ActiveX control in a number of different development environments, in different archives. Each archive is named according to the development environment it is for, and contains all the necessary files for the user to compile and run a sample project.

## ***Development Considerations – Quick How To's***

### **Rotated Maps**

When working with rotated maps, screen updates may be slightly slower due to the additional vector manipulations required for the rotation.

### **Shading**

When using DirectDraw, the shading of places and MCD areas is based on a dynamic, "First-Come-First-Served" basis. Two DirectDraw processes on two different surfaces on the screen could result in different shades for the same place or MCD area.

### **Sample Code**

Any samples of code provided in this manual are for Delphi or Visual Basic, and are not part of any integral application. Each example is meant solely as an illustration of the procedure or property for which it is given and not necessarily in combination with the other code snippets in this documentation.

### **Searching for Places & Geocoding**

There are a number of different methods that may be used for searching. The most versatile method is using **GeoFind**, primarily for visual environments, or the **GeoFindFirst/Next** and **GeoFindArray** for non-visual environment. The **GeoFind** collection of methods attempts to perform a fuzzy search based on a partial street address string specified by the user. Other more specific, explicit, methods are the **FindCity**, **FindZip** and **FindStr**. The results from these method-based searches can be parsed and used to locate a Lat,Lon set of coordinates for a specific address location.

If a visual interface is of interest, then a collection of dialog based, specific searches are available through the **ExecSearch** tabbed dialog interface. There are also the **ExecStreet**, **ExecPlace** and **ExecZipCode** search dialogs, which use older technology and older index files. They are not recommended and were only left in the newer releases of the OCX for compatibility with older applications.

### **Reverse Geocoding**

One of the most powerful features of this ActiveX control, is it's ability to Reverse Geocode, i.e. find the street address or place name closest to a specified set of coordinates. This is achieved through the use of the **FindClosest** and **FindClosestPlace** methods.

### **Displaying Data Points**

A number of methods are available for the user to display their own data points on the map. A built-in marker can be displayed at a given Lon,Lat, by using the **DrawObject** method (if called in the **OnPaintAfter** event, then it will be painted at those coordinates every time the screen updates). A built-in symbol can be placed at the desired coordinates using one of the methods in the **.CAD** interface (**.CAD.Marker**, **.CAD.MetaObject**, etc.). Large sets of user specified points may also be displayed through the **ExecDbImport** method, which plays the items on the map, therefore not using precious memory resources for rendering. Finally, maximum flexibility is provided to the user by being able to use and manage a set of user items, that can be placed at any Lon,Lat location, accompanied by a user-specified bit-map, an identifying string, etc. This is achieved through a collection of methods, **SetItem**, **SetItemString**, **SetItemBitmap**, **SetItem Angle**, etc.

### **Adding your own streets**

Although the streets databases are updated on a on-going basis, given the tens of millions of road segments, and the continuous additions of new housing developments, new roads, etc., and the time necessary for such information to be collected by the Census Bureau (or our prime data suppliers),

verified, processed, etc., it's possible that you may find localized road issues that you need to address, by temporarily augmenting the built-in database. The MapOCX Pro control enables you to do that by setting **MapMode=2**, and then using the steps described in Appendix –K.

### **Single Instantiation – Many Map Views**

The system is set up for a single MapPro control instance in the user's application. Users are warned not to use a second control, as they tow controls would share some of the data segments, thus corrupting each other. Instead, they should use either the **DirectDraw**, or better yet, the **DirectView** methods to create additional map views in a single application. Note that in some IDEs, the user may also have to issue a FormX.Show, followed by a FormX.Hide, prior to using a FormX.ShowModal when using more than one form.

### **Distribution Files**

When distributing your application to end-users, you need to include all files in the States, Data1, Data2, and Data3 directories, in the distribution disk(s) you received from Undertow Software. Files in other directories may be optional, depending on the feature set your application is using.

It is strongly recommended that **Regsvr32.exe** and **oc30.dll** should be distributed with your application's setup and installed in the Windows System directory. Although most operating systems contain these files, some do not. It is also recommended that you install the MapPro71.OCX in the application directory when distributing your application, and if possible, automate the Windows OCX registration process through your installation procedure.

### **\*.SIG Files**

The data sets distributed with this package, contain a number of files with the extension **SIG** in the states folder. These files **need** to be there for the street level data to be accessible. These SIG files need to also be present in the street-level data folder, in the any distribution application package to the end user. Note, however, that if you are not using Canadian data in your distributed application, then you should NOT include the Canada04.SIG file in your distribution package. If you do, then the end-user registration process will automatically charge your vendor account for the Canadian data use, for every end-user that registers with Undertow Software, Inc.

### **Upgrading from an earlier Version**

- If you are upgrading from an earlier version of the control, you should be aware that the MapPro71.OCX uses a new CLSID and can therefore co-exist with prior versions of the control, installed on the same system.
- If you are replacing an instance of an older version of the control in one of your projects, with this one, you should note that depending on your IDE, you may have to re-link all events in your project. Note that in most IDEs, in order to have a new control interface registered, the IDE has to be shut down first, as it will not permit a new OCX file to replace an existing one, and/or to be registered, if an instance of the control is currently being used.
- If you are replacing an old build of MapPro71.OCX, with a more recent one, it is recommended that you re-import the interface, to make sure that any new interface additions to the control are properly registered.

### **Street Level Data Visibility Problems**

One of the most common problems developers encounter, is that the OCX appears to work as expected, only when they zoom in, there is no street level data visible. 99% of such problems reported, it turns out to be a data path issue. If you experience such problems, before you contact technical support, please make sure that you check the data settings, by echoing the respective OCX properties at the point in your code where you'd expect the street-level data to be visible. Echo the properties Path\_States, Path\_Data1, Path\_Data2,

Path\_Data3, and DataSource, and make sure they are what you'd expect them to be at the point. Do not assume that because you set them somewhere in code, they must be so. Different IDE timing considerations in autoloading the control's configuration files, or default directories at the time of execution, may be affection what the above properties are pointing to.

### **Drawing on the Maps**

Although use of the built-in .CAD interface is straight forward, and does not require the developer to manage the CAD objects, there may be instances when the developer needs to draw their own lines, on the map. This can be achieved by using the built-in **DrawLine** method. Note that if you want to give the line(s) a "sticky" behavior, i.e., be drawn every time the map is redrawn, then any such user-controlled drawing should be done in the **OnPaintAfter** event. The additional benefit is that the event also makes the map's dc available to the user, so they do not have to get and release dc's. The user may also use the various Windows APIs (**MoveToEx**, **LineTo**, etc.) to draw on the surface of the map, either in the OnPaintAfter event (since the dc is available), or anywhere in their application by using the Windows **GetDC** and **ReleaseDC** APIs.

### **MapOCX Pro Licensing**

MapOCX Pro is only licensed for development purposes. Before you distribute an application which contains MapOCX Pro or use the control in a server environment, you need to obtain a licensing and distribution contract from Undertow Software. A sample license agreement is included in this document. Call 815-521-9950 for further information and pricing.

### **Technical Support**

In the event you have a technical question about the MapOCX, support is available at [techsupport@undertowsoftware.com](mailto:techsupport@undertowsoftware.com), [www.undertowsoftware.com](http://www.undertowsoftware.com) or call (815)521-9950.

When you call, you should be at your computer, have the appropriate product documentation, and prepared with the following information:

- The product and version you are using
- The hardware and operating system you are using
- The exact wording of any messages that appeared
- A description of what happened and what you were doing when the problem occurred

### **Updates**

It is recommended you frequent our web site, [www.undertowsoftware.com](http://www.undertowsoftware.com), where maintenance releases of the MAPOCX71.OCX will be placed from time to time.



## OCX Reference Section

---

**AboutBox()****Procedure**

---

Displays a dialog showing the OCX name, version and copyright information. This information is required to be displayed in the about box of any application using the OCX.

**VB Example**

```
Private Sub Command1_Click()  
    ' Open the About Box  
    MapPro1.AboutBox  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button3Click(Sender: TObject);  
begin  
    {Display the OCX name, version, etc.}  
    MapPro1.AboutBox;  
end;
```

---

**AddViaPoint(x,y:Double; s:String)****Procedure**

---

Adds the specified point to the list of Via points that are used for routing. Note that Via points can be added, and managed, from within the Routing dialog, as well.

**X,Y** - Lon/Lat coordinates (decimal degrees)  
**S** - Identifying string

**VB Example**

```
Private Sub Command84_Click()  
    ' Add three points to the Via points array  
    MapPro1.AddViaPoint -89.4, 43, "MyViaPoint1"  
    MapPro1.AddViaPoint -112.4, 42.12, "MyViaPoint2"  
    MapPro1.AddViaPoint -118.23, 35.55, "MyViaPoint3"  
End Sub
```

---

**AutoConfig:Boolean****Property**

---

When this property is FALSE, the configuration file is saved only when the Config procedure is called. If it is TRUE, the configuration file is saved automatically when a property is changed, and when the application is exited. The default config file name used by the control is MapPro71.cfg. The configuration file may also be loaded by the user, at will, using the LoadConfig property.

**Note:** Depending on the development environment, the sequence of instantiation and initialization of the OCX, and loading the Config file may be different. If during your development testing, it appears that Properties being set in your code, at run time, appear to have different values once the

control is created, then set AutoConfig to False and repeat your testing. It could be that the loading of a config file happens *after* initialization of such properties.

**VB Example**

```
Private Sub Command1_Click()
    MapProl.AutoConfig = true
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button3Click(Sender: TObject);
begin
    MapProl.AutoConfig:=true;
end;
```

---

## AutoPaint: Boolean

## Property

When this property is FALSE, the surface of the OCX control is NOT painted unless a Redraw or Repaint command is issued. The value of this property may be set when designing the application, or at run time. If the value of this property is true, then all zoom operations and any other operation that is deemed to have changed any of the viewport properties results in automatically repainting the map.

Normally this is turned off by the developer if they know that a lot of operations affecting the viewport are going to take place - in order to avoid time-consuming map repaints, and then set to True again at the end to finally update the map.

**VB Example**

```
Private Sub Command1_Click()
    ' force a repaint of the map
    MapProl.AutoPaint = true
End Sub
```

**Delphi Example**

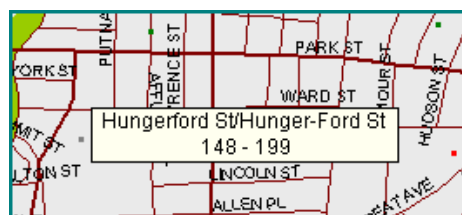
```
Procedure TForm1.Button3Click(Sender: TObject);
begin
    MapProl.AutoPaint := False;
    MapProl.Miles := 0.03;
    MapProl.GotoPoint(-88.5,41.56);
    MapProl.AutoPaint:=true;
    MapProl.Redraw; //Map changes scale & goes to point in 1 step
end;
```

---

## AutoQuery: Boolean

## Property

When this property is TRUE and the zoom scale is below 2 mile, visible features with a name are described by a floating hint window, when the cursor is placed on them. In addition if the feature is a road or street with an address range, this information will appear below the name. The value of this property may be set when designing the application, or at run time.



**VB Example**

```
Private Sub Command1_Click()  
    MapProl.AutoQuery = false  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button5Click(Sender: TObject);  
begin  
    MapProl.AutoQuery:=false;  
end;
```

---

## **BevelInner:Integer**

## **Property**

Sets the state of the inside bevel of the OCX control and is used to create 3D effects. The value of this property may be set from the properties editor, when designing the application, or at run time.

Valid states are

- 0 - BvNone
- 1 - BvLowered
- 2 - BvRaised

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.BevelInner = 1  
    (or MapProl.BevelInner = BvLowered could be used)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button5Click(Sender: TObject);  
begin  
    MapProl.BevelInner:=1;  
    { or MapProl.BevelInner:=BvLowered; could be used }  
end;
```

---

## **BevelOuter:Integer**

## **Property**

Sets the state of the outside bevel of the OCX control and is used to create 3D effects. The value of this property may be set from the properties editor when designing the application, or at run time.

Valid states are

- 0 - BvNone
- 1 - BvLowered
- 2 - BvRaised

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.BevelOuter = 0  
    (or MapProl.BevelOuter = BvNone could be used)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button6Click(Sender: TObject);  
begin  
    MapProl.BevelOuter:=0;  
    { or MapProl.BevelInner:=BvNone; could be used }  
end;
```

---

**BevelWidth:Integer**

---

**Property**

Sets the width of the inner and outer bevels of the OCX control, in pixels.

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.BevelWidth = 2  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button7Click(Sender: TObject);  
Begin  
    MAPPRO1.bevelwidth:=4;  
End;
```

---

**BorderWidth:Integer**

---

**Property**

Sets the width of the border around the OCX control, in pixels.

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.BorderWidth = 2  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button3Click(Sender: TObject);  
begin  
    MapProl.Borderwidth:=2;  
end;
```

---

**CAD:Interface**

---

**Interface**

Allows the user access to the CAD interface, in order to draw CAD objects on the map surface. See later sections in this document for a detailed description of this interface.

**VB Example**

```
Private Sub Form_Activate()  
    MapProl.InitNonVis  
    QrMode = 0  
    ` Display the CAD toolbar mode  
    MapProl.Cad.Toolbar.Mode = TbFix  
    List1.AddItem MapProl.PostUnderlay  
End Sub
```

---

**CenterView(X,Y:Integer)**

---

**Procedure**

Takes the x,y cursor position, in device coordinates relative to the OCX, calculates the Lon/Lat equivalent to that position and centers the map about the point with the calculated coordinates, at the current scale factor.

**Note:** The GotoPoint Procedure can be used to locate the viewport using Lon/Lat coordinates instead.

**VB Example**

```
Private Sub Command1_Click()
    MapProl.CenterView(20,20) 'Center the viewport at screen
    'coordinates 20,20 from top left corner.
End Sub
```

**Delphi**

```
Procedure TForm1.Button7Click(Sender: TObject);
begin
    {Center the viewport at screen coordinates 20,20 from the
    top left corner of the control}
    MapProl.CenterView(20,20);
end;
```

---

## ClearExclusion()

## Procedure

Clears the current exclusion boundaries from memory. These boundaries are used to exclude enclosed road segments from routing calculations. See the SetExclusion, SaveExclusion and LoadExclusion methods as well, for more information.

**Delphi Example**

```
Procedure TForm1.Button34Click(Sender: TObject);
// Clear the current exclusion list
begin
    Pmap61.ClearExclusion;
    ExcludeRt:=false;
end;
```

---

## ClearStreets()

## Procedure

Clears memory of currently loaded User streets file. (see SaveStreets, LoadStreets). Also, see Appendix-K for details on the Street-Editing mode, and how to create and load these User street files, which can be used to augment supplied mapping data for new streets added since the generation of the datasets..

**VB Example**

```
Private Sub Command2_Click()
    MapProl.ClearStreets
End Sub
```

---

## ClearOverlay()

## Procedure

Clears memory of the currently loaded User Overlay file. (See OpenOverlay). Also, see Appendix-A for details on the format of the overlay file. It only applies to the older type OVR/CMX overlays.

**VB Example**

```
Private Sub Command2_Click()
    MapProl.ClearOverlay
End Sub
```

---

<b>ClearViaPoints()</b>	<b>Procedure</b>
-------------------------	------------------

---

Clears All currently defined Via (routing) points, from the Via points list. It also clears the point markers and the highlighted route from the map surface. Also see the AddViaPoints and the routing dialog descriptions about adding via points to a routing calculation.

---

<b>ClrStrBubble()</b>	<b>Procedure</b>
-----------------------	------------------

---

Clears the bubble that appears on the screen following a Street search operation using the ExecStreet procedure. This is needed because the bubble object intentionally remains on the screen once it has been created through the ExecStreet call. This way, a street “searched for” by the user can remain identified, as the user pans the map around.

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.ClrStrBubble  
    MapProl.Redraw  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button7Click(Sender: TObject);  
begin  
    {Execute the ExecStreet procedure and locate a street}  
    MapProl.ExecStreet;  
    { After the ExecStreet procedure has been executed and  
    the street has been located, eliminate the bubble }  
    MapProl.ClrStrBubble;  
end;
```

---

<b>Color:Integer (or enumerated ColorName)</b>	<b>Property</b>
--	-----------------

---

Inherited Property. Color of the background, i.e., the color for Mexico and Canada. The default color is yellow.

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.Color = vbGreen  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button1Click(Sender: TObject);  
begin  
    { Set Background color to System Green}  
    MapProl.color:=clGreen;  
end;
```

---

<b>Coords:Integer</b>	<b>Property</b>
-----------------------	-----------------

---

Sets the coordinate notation in the ExecSearch and ExecLonLat dialogs as well as the echo area in the toolbar.

If Coord is set to:      0 (or 'CdLonLat')  
                            The **Lon,Lat** convention is used, consistent  
                            with the rest of the OCX.

                            1 (or 'CdLatLon')  
                            The ExecSearch and ExecLonLat dialogs and  
                            the coordinates echoed in the toolbar  
                            area use the **Lat,Lon** form.

**VB Example**      Private Sub Command1\_Click()  
                            MapProl.Coords = 1  
                            End Sub

**Delphi Example** Procedure TForm1.Button21Click(Sender: TObject);  
begin  
    { Set Coordinate format to lat/Lon}  
    MapProl.Coords:=1;  
end;

---

## Cursor:Integer

## Property

---

Cursor type. Meaningful only when the MapMode property is set to MdUser. A positive value will use one of the pre-defined cursor types in the OCX. If no cursor type is defined for that value, then a stock Windows pointer cursor will be returned. Zero or a negative value will use one for the Windows stock cursor types. "-1" results in a non-visible cursor. However, if the "edgepan" property is true, even if Cursor=-1, the standard MdZoom OCX cursor will be selected.

Although cursor types can be selected using this property, it is recommended that the 'Custom' property is used to select the cursor type, instead, as it gives more control to the user.

**Note:** The cursor types defined in the OCX are subject to change without notice. It is recommended that either Windows stock cursors or user-created ones are used.

**VB Example**      Private Sub Command12\_Click()  
                            CurId = 105  
                            MapProl.MapMode = MdUser  
                            ' Load Cursor from Resource File  
                            Picture = LoadResPicture(CurId, vbResCursor)  
                            MapProl.Custom = Picture.Handle  
                            End Sub

**Delphi Example** Procedure TForm1.Button4Click(Sender: TObject);  
begin  
    {\* Set User mode and the left arrow cursor  
    defined in the OCX \*}  
    MapProl.mapmode:=MdUser;  
    MapProl.cursor:=17;  
end;

```

procedure TForm1.Button3Click(Sender: TObject);
// Another example of using a custom cursor.
var h1,custCursorNo:integer;
begin
  custCursorNo:=strtoint(edit2.Text);
  if custCursorNo in[1..2] then
  begin
    PMap61.MapMode:=mdUser;
    if custCursorNo=1 then h1:=loadcursor(0,IDC_NO)
      else h1:=loadcursor(0,idc_APPSTARTING);
    PMap61.Custom:=h1;
  end else PMap61.MapMode:=mdZoom;
end;

```

---

### Custom:Integer

### Property

---

It sets the handle to the Cursor type, when the MapMode property is set to MdUser. If this property is undefined, when MdUser is set, the cursor type defaults to the Windows CR\_Default type. The handle used for setting this property may be obtained by the Windows API calls, CreateCursor, or LoadCursor.

**Notes:** This property may be set at any time, and not just prior to setting MapMode to MdUser. It will remain set and become active when MapMode = MdUser.

#### VB Example

```

Private Sub Command1_Click()
  MapProl.Mapmode=mduser
  h1=loadcursor(0,idc_wait) ' any valid "*.ani" or "*.cur"
  MapProl.custom=h1
End Sub

```

#### Delphi

```

procedure TForm1.Button3Click(Sender: TObject);
var h1,custCursorNo:integer;
begin
  custCursorNo:=strtoint(edit2.Text);
  if custCursorNo in[1..2] then
  begin
    PMap61.MapMode:=mdUser;
    if custCursorNo=1 then h1:=loadcursor(0,IDC_NO)
      else h1:=loadcursor(0,idc_APPSTARTING);
    PMap61.Custom:=h1;
  end else PMap61.MapMode:=mdZoom;
end;

```

---

### DataSource:txDataSource

### Property

---

Enumerated variable specifying the dataset to use used. The available choices are shown below. Please not that in some IDEs, the enumerated values are not accessible and the integer values (from the left column shown below) need to be used.



#	Enumeration	Data Set to Use	Files
0	Z NONE	No Data	None
1	ZP5_TIGER	Tiger USA Data Set	*.ZP5
2	ZPG_GDTUSA	GDT USA Data Set	*.ZPG
3	ZPG_RESV1	Reserved	None
4	ZPG_CDN	GDT CANADAData Set	*.ZPG
5	ZPG_RESV2	Reserved	None
6	ZPG_GDTUSACDN	GDT USA and CANADA Data Set	*.ZPG

It should be noted that each data set contains files in different format, and they are not interchangeable. Also note that a signature file needs to be present in the directory with the state files.

It is recommended that this property is set in your code, not just in the property inspector to ensure consistent data access.

**Delphi Example**

```

procedure TForm1.Button37Click(Sender: TObject);
// Toggle use of datasets
begin
  if pmap61.DataSource=ZP5_TIGER then
  begin
    pmap61.DataSource:=ZPG_GDT;
    Button37.caption:='Data:GDT';
    Label3.Caption:='Using: GDT, Set Data Paths...';
    button38.enabled:=false;
    button11.click;
  end else
  begin
    pmap61.DataSource:=ZP5_TIGER;
    Button37.caption:='Data:TIG';
    Label3.Caption:='Using: TIGER, Set Data Paths...';
    button38.enabled:=true;
    button11.click;
  end;
end;

```

---

### DbFile:String

Property

Sets the database file (dbf format) to be used for displaying pints on the screen. (Also see the ExecDbImport method).

---

### DegFormat:TxDegFormat

Property

Sets the format for the string labeling Grid lines displayed on the map.

0 or dfDEC	=	Decimal degrees (dd.ffffff)
1 or dfDECMIN	=	Degrees, decimal minutes (dd mm.ffffff)
2 or df DMS	=	Degrees, minutes, seconds (dd mm ss)

**VB Example**

```
Private Sub Command80_Click()
    If i=0 then MapProl.DegFormat = dfDEC
    MapProl.refresh
End Sub
```

---

<b>DeleteAllItems()</b>	<b>Procedure</b>
-------------------------	------------------

---

Clears all objects from the Object layer (the user layer where all user created bitmap items are placed).

**Note:** See the SetItem and related procedures for information on how to place user created bitmaps on the control surface, or other surfaces in the user's application.

**VB Example**

```
Private Sub Command1_Click()
    MapProl.DeleteAllItems
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button8Click(Sender: TObject);
begin
    {Delete all user created bitmaps from the displayed map}
    MapProl.DeleteAllItems;
end;
```

---

<b>DeleteItem(ID:Integer)</b>	<b>Procedure</b>
-------------------------------	------------------

---

Deletes object with a given ID from the object layer.

**Note:** See the SetItem and related procedures for information on how to place user-created bitmaps on the control surface, or other surfaces in the user's application.

**VB Example**

```
Private Sub Command1_Click()
    Call MapProl.DeleteItem(5)
    'Or
    MapProl.DeleteItem 5
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button11Click(Sender: TObject);
begin
    {* Deletes the fifth item created by the user *}
    MapProl.DeleteItem(5);
end;
```

---

<b>DeleteItemRange(ID1,ID2:Integer)</b>	<b>Procedure</b>
---	------------------

---

Deletes all user created items from id1 to id2. Id1 must be less than id2. If id1 is greater or equal to id2, no action takes place.

**Note:** See the SetItem and related procedures for information on how to place user created bitmaps on the control surface, or other surfaces in the user's application.

**VB Example**

```
Private Sub Command1_Click()  
    Call MapProl.DeleteAllItemRange(3,11)  
    Or  
    MapProl.DeleteItem 3,11  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button3Click(Sender: TObject);  
begin  
    {Deletes items 3 to 11, inclusive, created by the user}  
    MapProl.DeleteAllItemRange(3,11);  
end;
```

---

**DeleteViaPoint(ID:Integer)****Procedure**

---

Deletes specified Via point from the routing list. Also see the AddViaPoint method, and the Routing dialog for adding/deleting Via points interactively.

**VB Example**

```
Private Sub Command101_Click()  
    ' Delete Via point #1 (note 0-based list)  
    MapProl.DeleteViaPoint 1  
End Sub
```

---

**DevCode:String****Property**

---

The value is assigned to each unique customers product. This is used in conjunction with DevPass to unlock the OCX for development. This property is only set within a non-visual environment. In a visual environment, you would normally enter the developer code and password by right mouse clicking on the control and selecting the properties menu item and then the installation tab. (Also see ExecRegister, DevPass)

**Note:** Contact Undertow Software for Developer Codes and Passwords (800) 257-9244.

**VB Example**

```
Private Sub Form_Load()  
'Used to develop with the OCX is a non-visual environment  
MapProl.DevCode = "1234-1234"  
MapProl.DevPass = "134534"  
MapProl.ExecRegister (5432)  
End Sub
```

---

**DevPass:String**

---

**Property**

DevPass is a unique password to use the DevCode. This is used in conjunction with DevCode to unlock the OCX for development. This property is only set within a non-visual environment. In a visual environment, you would normally enter the developer code and password by right mouse clicking on the control and selecting the properties menu item and then the installation tab.

**Note:** Contact Undertow Software for Developer Codes and Passwords (800) 257-9244.

**VB Example**

```
Private Sub Form_Load()  
    'Used to develop with the OCX in a non-visual environment  
    MapProl.DevCode = "1234-1234"  
    MapProl.DevPass = "134534"  
    MapProl.ExecRegister (5432)  
End Sub
```

---

**DirectDraw(dc, offX, offY, Wd, Ht : Integer, Clear, Scale, BW : Boolean)**

---

**Procedure**

Draws the map onto the windows display context (DC) provided by the user. When the DirectDraw procedure finishes painting, it triggers an OnDirect event, prior to resetting the scale that was used to map the OCX control size to the user specified DC size (if scale was set to true). This allows the user to use Windows API calls to draw to the same output device specified by the DC, without having to worry about scaling problems.

The DirectDraw process works as follows:

- Determines scale needed to map the OCX to the DC
- Clears the background (if specified by the user)
- Triggers the OnDirectBefore event
- Paints the Map
- Paints the overlay
- Triggers an OnDirect event
- Paints the user layer
- Resets scale

**dc:** Device context

**offX, offY:** The X and Y offsets from the top left corner of the control.

**Wd, Ht:** The width and height of the output in device units.

**Clear:** A boolean flag that instructs the OCX to clear the control background prior to drawing on it. This is very useful when sending output to a printer device (generally, Clear should be true). It might be set to false if the user wants to paint his own background on the control, prior to issuing the DirectDraw command. Note that the current viewport will be adjusted to fit the specified output dimensions.

**Scale:** A boolean flag (True/False), which indicates whether the DirectDraw output should be scaled or not. It is recommended that when printing, this flag should be TRUE. Note, however, that when this is TRUE, the quality of the printout depends on the size of the OCX control surface. The smaller the OCX surface, the larger the scaling that needs to be applied, creating the possibility of jagged, coarse lines.

**BW:** A boolean flag (True/False) that defines if the printout is monochrome (TRUE), or color (FALSE).

**Notes:** When using the DirectDraw procedure, it is up to the user to determine whether the print device supports direct bitmap scaling, which affects the print quality of user-created objects. This could be done through the Windows API call `GetDeviceCaps` (consult your Windows documentation for more details). DirectDraw uses the `BitBlt` API, however, when the scale flag is set to true, Windows internally uses the `StretchBlt` API.

It should also be noted that the user should make certain the color mapping mode of a B&W print device is correctly set when printing color bitmaps. It is recommended that monochrome bitmaps be used when attempting to print. If a color bitmap is used, the color of the lower left corner pixel of the bitmap is assumed to be the background color (white), and every other color maps to black.

The Windows API in DirectDraw uses a variable of type `TRect` to identify the size and position of the scaleable polygons used for highway shield bitmaps and other bitmaps placed on the control surface. It assumes that the input coordinates are in device units - not Twips. The user must ensure that the mapping mode for the control is set to `mmText`. Furthermore, when operating under Visual Basic, the user must ensure that the parent form of the control has its map mode set to device units.

When creating large bitmaps using Directdraw, the user should be conscious of the resources required. For example, using DirectDraw to create a bitmap to be eventually be printed on a high resolution color device could cause the system to run out of resources. Mono bitmaps are recommended in such situations. See Appendix-L for sample code on how to use DirectDraw for printing.

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.directdraw(dc,0,0,Image1.Picture.bitmap.width,  
        Image1.Picture.bitmap.height,true,true,true)  
    MapProl.redraw  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button10Click(Sender: TObject);  
{ Simply draws the map directly to an image control. Note  
  that in this simple example, the width and height in  
  device units do not need to be calculated, they are  
  obtained from the image control properties }  
var dc:hdc;  
begin  
    dc:=Image1.Picture.bitmap.canvas.handle;  
    MapProl.directdraw(dc,0,0,Image1.Picture.bitmap.width,  
        Image1.Picture.bitmap.height,true,  
        true,true);  
    MapProl.redraw;  
end;
```

---

**Distance(x1,y1,x2,y2: Variant):integer**

---

**Function**

Calculates the distance between two points given their Lon/Lat coordinates. The calculated distance is in thousandths of a mile, using a modified Great Circle distance formula, optimized for speed.

**x1,y1:** Lat, Lon coordinates of first point

**x2,y2:** Lat, Lon coordinates of second point

**VB Example**

```
Private Sub Command1_Click()  
    MapProl.Distance(x1,y1,x2,y2)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button3Click(Sender: TObject);  
var ax,bx,ay,by:real;  
begin  
    ax:=-123;  
    bx:=-121.35;  
    ay:=43.756;  
    by:=35.1927;  
    with MapProl do  
    begin  
        Panell.caption:='Distance: '+str(Distance(ax,ay,bx,by)*1000);  
    end;  
end;
```

---

**DirectView(dc, w, h:integer; var LonL, LatB LonR, LatT: Double; var DvScale:Double)**

---

Draws a map using the current viewport settings, on a control surface specified by the user. Ideal for situations where more than one map need to be visible, at different scales and viewport extents. (See Appendix-L for a sample Delphi project using DirectView.

Where: **dc** – handle of the control surface onto which the DirectView map will be drawn

**W, H** – The width and height of the control Surface

**LonL,LatB,LonR,LatT** – the longitude and latitude coordinates of the desired map.

**DvScale** – Option that specifies the criteria to be used for determining the Viewport extents.

- (1) If the DvScale parameter is zero, then the method sets the DirectView viewport extents to those passed by the user, modifying them for any needed aspect ratio adjustments, and returns the adjusted extents and the calculated pmap61.miles property as DvScale.

- (2) If the DvScale parameter is NOT zero, then the method uses the extents passed by the user to calculate a DirectView viewport centerpoint, sets the mappPro61.miles parameter to the value of DvScale and returns the calculated extents of the DirectView window.

**Delphi Example**

```

Procedure TForm1.DoWindow1(image:timage;f:double);
// Use Picture box for DirectView image
var dc:integer; bmp:tbitmap; x1,y1,x2,y2:double;
sf:double;
begin
  // Create default bitmap if not present
  if image.picture.bitmap.width=0 then
  begin
    bmp:=tbitmap.create;
    bmp.width:=image1.width;
    bmp.height:=image1.height;
    image.picture.bitmap:=bmp;
  end;
  // The handle to the bitmap obtained this way is transient,
  // Lock it to ensure it remains usable by DirectView
  image.picture.bitmap.canvas.lock;
  dc:=image.picture.bitmap.canvas.handle;
  with pmap61 do
  begin
    x1:=lonleft;
    x2:=lonright;
    y1:=latbottom;
    y2:=lattop;
  end;
  messagebeep(0);
  sf:=pmap61.miles /f;
  label6.caption:=floattostr(x1);

  pmap61.DirectView(dc, image1.width, image1.height, x1, y1, x2, y2, sf);
  label8.caption:=floattostr(x1);
  image1.picture.bitmap.canvas.unlock;
  image1.Refresh;
end;

```

---

**DMS(x: OleVariant): string**

---

**Function**

---

Converts a double value from decimal degrees to a DEG:MIN:SEC String (also see See LLMode, Coords)

**VB Example**

```

Private Sub Command1_Click()
  Text1.Text = "Lat: " + CStr(MapProl.DMS(MapProl.Ycord))
             + ", Lon: " + CStr(MapProl.DMS(MapProl.Xcord))
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button9Click(Sender: TObject);
begin
  with MapProl do
  begin
    ax:=xcord;
    ay:=ycord;
  end;
end;

```

```

end;
{Set Panel2 to display the coordinates given by xcord,
 ycord, in Deg:Min:Sec format}
Panel3.caption:=DMS(ax)+' ', '+DMS(ay);
end;

```

---

### **DrawBubble(dc:integer; x,y:integer; S:string)**

### **Procedure**

---

Draws a text bubble at the user specified Lat/Lon (x,y)coordinates, containing specified text. Using a CR (CHR(12)), will act as a line break and a carriage return.

**Note:** The object created by DrawBubble is NOT part of the map; it is temporarily drawn on the screen. If the user wanted to retain the object, for subsequent drawings, provisions would have to be made for storing it and repainting it on the screen, or the user should draw it in the OnPaintAfter event handler.

**VB Example**

```

Private Sub Command1_Click()
    Call MapProl.DrawBubble(Dc,-125,45, "Sample" & Chr(13) &
"Break")
    'Or
    MapProl.DrawBubble Dc,-125,45, "Sample" & Chr(13) & "Break"
End Sub

```

**Delphi Example**

```

Procedure TForm1.MapProlpaintAfter(Sender: TObject;dc: Integer);
begin
    {Draw a text bubble on top of the map surface,
    at -125,45 Lon/lat coordinates }
    MapProl.Drawbubble(dc,-125,45,'Sample');
end;

```

---

### **DrawLine(dc:integer; x1,y1,x2,y2:OleVariant;w,cl,mode: Longint)**

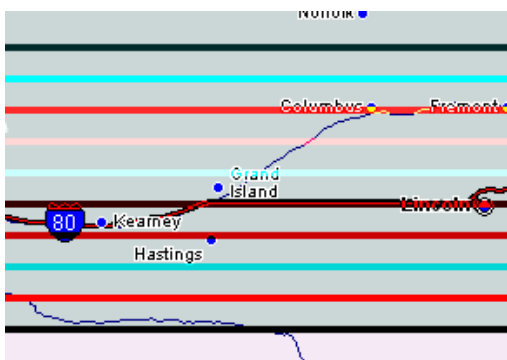
### **Procedure**

---

Draws a line between two points using the dc and the parameters specified by the user and described below. The object created by DrawBubble is NOT part of the map; it is temporarily drawn on the screen. If the user wanted to retain the object, for subsequent drawings, provisions would have to be made for storing it and repainting it on the screen, or the user should draw it in the OnPaintAfter event handler.

x1,y1 = Coordinates of point #1 in Longitude and Latitude.  
x2,y2 = Coordinates of point #2 in Longitude and Latitude.  
w = Width of the line in pixels.  
cl = RGB color of the brush  
mode = Any of the supported Windows raster operations,  
e.g. R2\_CopyPen, R2\_MAskPen, R2\_Black,... The graphic below show the result of a number of Raster Operations with a Red color line. From top to bottom they are:  
R2\_BLACK, R2\_COPYPEN, R2\_MASKNOTPEN, R2\_MASKPEN,  
R2\_MASKPENNOT, R2\_MERGENOTPEN, R2\_MERGE PEN, R2\_MERGE PENNOT  
R2\_NOTCOPYPEN, R2\_NOTMERGEPEN.





**Note:** The drawn line is clipped against the edges of the drawing window.

**VB Example**

```
Private Sub Command1_Click()
    MapPro1.DrawLine(dc, -87.65, 41.84, -118.24, 34.05, W, Color, Mode)
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button18Click(Sender: TObject);
{-----}
{ Draw a line using the control's DrawLine Method}
{-----}
var dc,w,color,mode:longint;
begin
    {get the dc for the map object}
    dc:=getdc(MapPro1.handle);
    {set the color to blue}
    Color:=clblue;
    {set the mode to raster operation to R2_MergePen}
    Mode:=R2_MergePen;
    {set the width to 10 pixels}
    W:=10;
    {Draw a line from Chicago to LA. Note that if the screen}
    {is updated, the line is not redrawn unless it's tied to}
    {the OnPaintAfter event}
    MapPro1.DrawLine(dc, -87.65, 41.84, -118.24, 34.05, W, Color, Mode);
    {finally, release the dc}
    releasedc(handle, dc);
end;
```

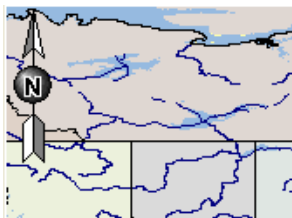
---

**DrawNorth(dc,x,y:integer)**

---

**Procedure**

Draws an arrow indicating the North direction, using the device context and the screen coordinates (X,Y) specified by the user. The X,Y=0,0 point is the top left corner of the dc, consistent with the Windows convention.





bottom status bar similar to that displayed in Precision Mapping Streets. (Also see the ScaleBar property for an alternative way of displaying a scale bar on the map, without using a DC)

**VB Example**

```
Private Sub Command41_Click()
    MapProl.DrawScaleBar GetDC(MapProl.Handle), 5, 8
End Sub
```

**DelphiExample**

```
Procedure TForm1.MapProlpaintAfter(Sender: TObject;dc: Integer);
begin
    { Since this is part of the OnPaintAfter event, which is
      part of the OCX control, there is no need to get the
      device context. It's just 'dc'. The scale bar is drawn
      with its top left corner starting at 5 units horizontally
      and 8 units vertically from the top left corner of the map
      control }
    MapProl.drawscalebar(dc,5,8);
end;
```

Example:

```
Procedure TForm1.PaintBox1Paint(Sender: TObject);
begin
    { Here, the procedure paints using a paintbox canvas
      handle, rather than getting a dc }
    MapProl.DrawScaleBar(paintbox1.canvas.handle,8,2);
end;
```

---

### EdgePan: Boolean

### Property

Boolean property which when TRUE allows fixed edge pan behavior to operate. When active, this mode changes the cursor appearance when within 8 pixels from the frame edges. When the left mouse button is pressed, the viewport pans in the indicated direction.

**VB Example**

```
Private Sub Command39_Click()
    MapProl.EdgePan = True
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button2Click(Sender: TObject);
begin
    MapProl.EdgePan:=True;
end;
```

---

### EdgePanAmount: Double

### Property

The fraction of the viewport to advance during an EdgePan operation. For example, if EdgePan=0.5, then a pan operation will result in 50% of the viewport being panned.

**VB Example**

```
Private Sub Command39_Click()
    ' Set EdgePan to 25% of viewport
```

```

MapProl.EdgePanAmount = 0.25
End Sub

```

---

### EdgePanWidth:Integer

Property

The number of the pixels from the edge, defining the EdgePanZone. When the cursor is within EdgePanWidth pixels from the edge, and EdgePan is turned on, the cursor changes to the Edgepan mode and clicking it pans the map in the indicated direction.

**VB Example**

```

Private Sub Command92_Click()
    MapProl.EdgePanAmount = 0.5
    MapProl.EdgePanWidth = Val(Text26.Text)
    MapProl.EdgePan = Not (MapProl.EdgePan)
End Subb

```

---

### Enabled:Boolean

Property

Inherited property determines whether the OCX control will be able to receive mouse and keyboard messages.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.Enabled = True
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button2Click(Sender: TObject);
begin
    MapProl.Enable:=True;
end;

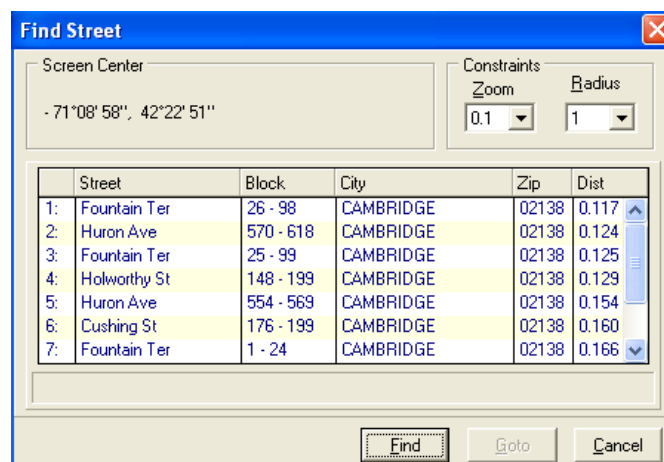
```

---

### ExecClosest()

Procedure

Presents the user with a dialog that permits the user to search and display the 10 street segments closest to the current view port center point (its coordinates displayed in the dialog). Double clicking on one of the 10 names will reposition the viewport around that point, at the Zoom scale specified by the user.



**VB Example**

```
Private Sub Command39_Click()
    MapProl.ExecClosest
End Sub
```

**Delphi Example**

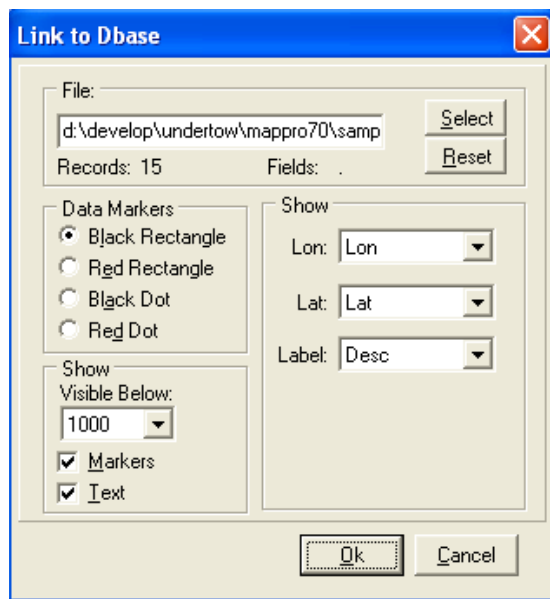
```
Procedure TForm1.Street3Click(Sender: TObject);
begin
    MapProl.ExecClosest;
End;
```

---

## ExecDbImport()

**Procedure**

Presents the user with a dialog that permits them to interface to a dbf database file, and display points from the file on the map. When the specified file is opened, it is searched for fields named LON and LAT, and if it finds them it assumes that they contain the corresponding coordinates for each record in the database (in decimal degrees). It also assumes that the field immediately following the LON and LAT fields is text and will be used for labeling the points. Note that the user can override these fields and has control over displaying a label, or not, as shown below. (Also see the `dfFile` property).



- The user may click `Select` to navigate to the desired dbf file.
- The fields in the “Show” panel are populated with the autodetected fields to be used for Lat, Lon and labeling, but the user may select from any of the available fields in the drop down list.
- The user may select the type of marker to use, select the upper visibility scale (in miles), and select whether to display a marker, the label, and/or both.

---

## ExecLonLat()

**Procedure**

Presents user with a dialog that permits the input of Latitude and longitude coordinates, and upon confirmation, places the viewport around the point specified by the user.



**VB Example**

```
Private Sub Command39_Click()
    MapPro1.ExecLonLat
End Sub
```

**Delphi Example**

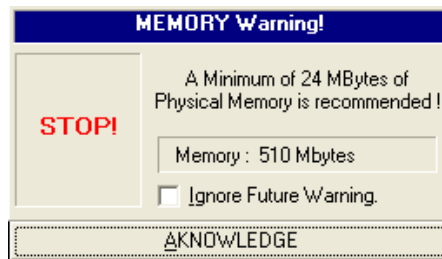
```
Procedure TForm1.Street3Click(Sender: TObject);
begin
    MapPro1.ExecLonLat;
end;
```

---

<b>ExecMem(X:LongInteger):LongInteger</b>	<b>Function</b>
---	-----------------

---

Returns the amount of RAM available on the system, in bytes. Furthermore, if the amount of memory detected is less than the number specified in the function call, then the OCX will display a message warning box indicating that the amount of memory available may be not enough to execute the application effectively. For example, here is the error message dialog that would appear with the call ExecMem(505000000) on 512 Mb system.



**Delphi Example**

```
procedure TForm1.Button5Click(Sender: TObject);
var i, j: LongInt;
begin
    // Check to see that at least 92 MB RAM is found
    i:=92*1024*1024;
    j:=PMAP21.ExecMem(i)
end;
```

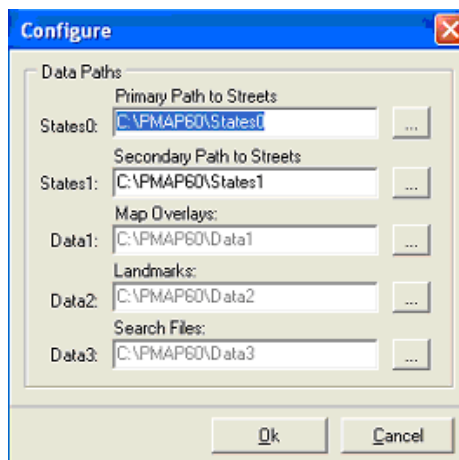
---

<b>ExecMethod(s:String)</b>	<b>Procedure</b>
-----------------------------	------------------

---

Invokes dialogs based on the standard dialogs of Precision Mapping Streets 4.0.

1. **s = CONFIG** Invokes the File, Config dialog which permits the user to set the data paths either by simply typing them in, or by navigating through their system (Clicking on the ellipses next to each data path)

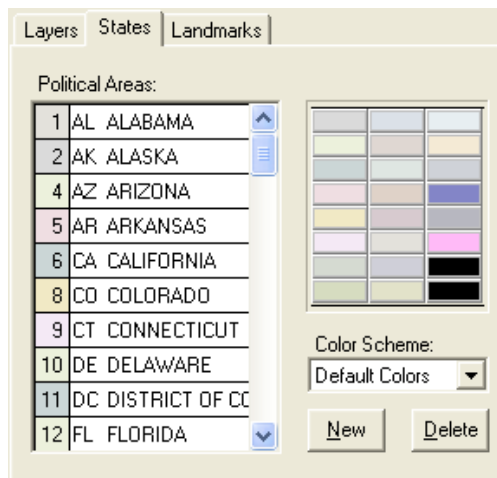


2. **s = LAYER** Invokes the Options, Screen\_Options dialog which is made up of three different tabs as described below.

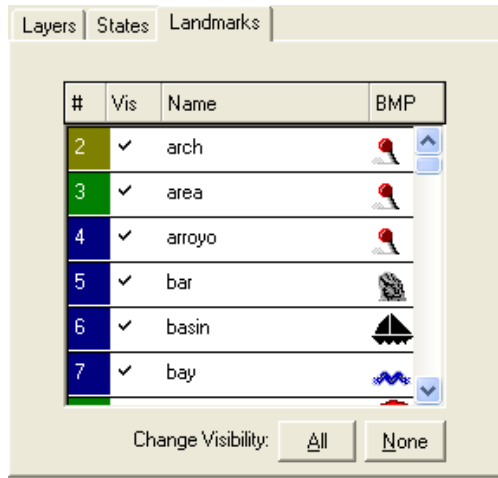
- o **Layers Tab**



- o **States Tab**



- **Landmarks Tab**

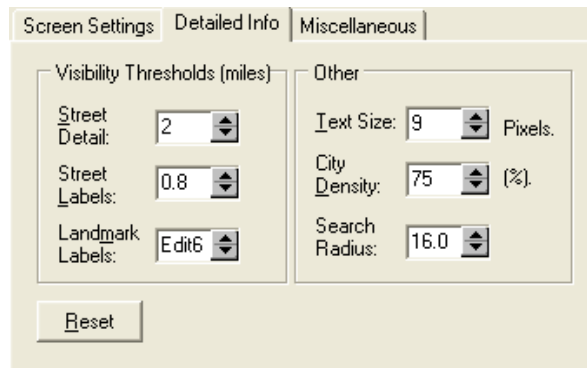


3. **s = DISPLAY** Invokes the Display Options dialog. This dialog is comprised of 3 tabs as shown and explained below:

- **Screen Settings**

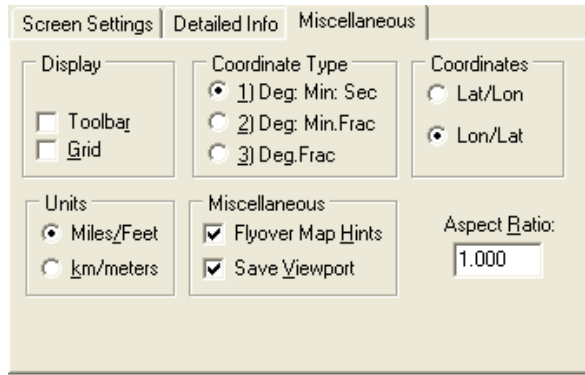


- **Detailed Info**





- **Miscellaneous**



**VB Example**

```
Private Sub Command_Click()
    MapProl.ExecMethod("Config")
End Sub
```

**Delphi Example**

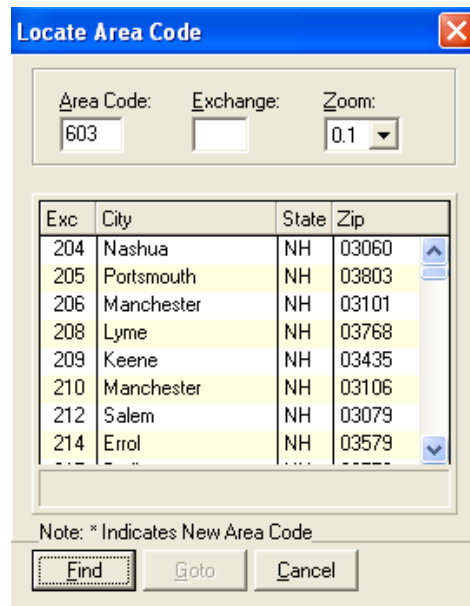
```
procedure TForm1.Button5Click(Sender: TObject);
Begin
    MapProl.ExecMethod('DISPLAY');
End;
```

---

## ExecPhone()

**Procedure**

Presents user with the standard Precision Mapping Streets phone search dialog. Once a AreaCode is specified and the search is completed, the user is presented with a listbox containing the retrieved matches. Selecting one of the listbox choices presented, by double clicking, will center the viewport at the Lon/Lat of the selected AreaCode centroid.



**VB Example**    Private Sub Command39\_Click()  
                  MapProl.ExecPhone  
         End Sub

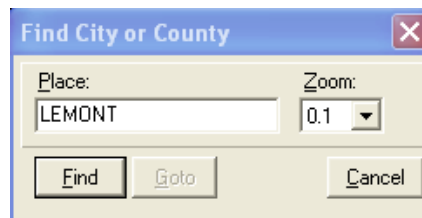
**Delphi Example** Procedure TForm1.Button1Click(Sender: TObject);  
begin  
          MapProl.execPhone;  
end;

---

## ExecPlace()

## Procedure

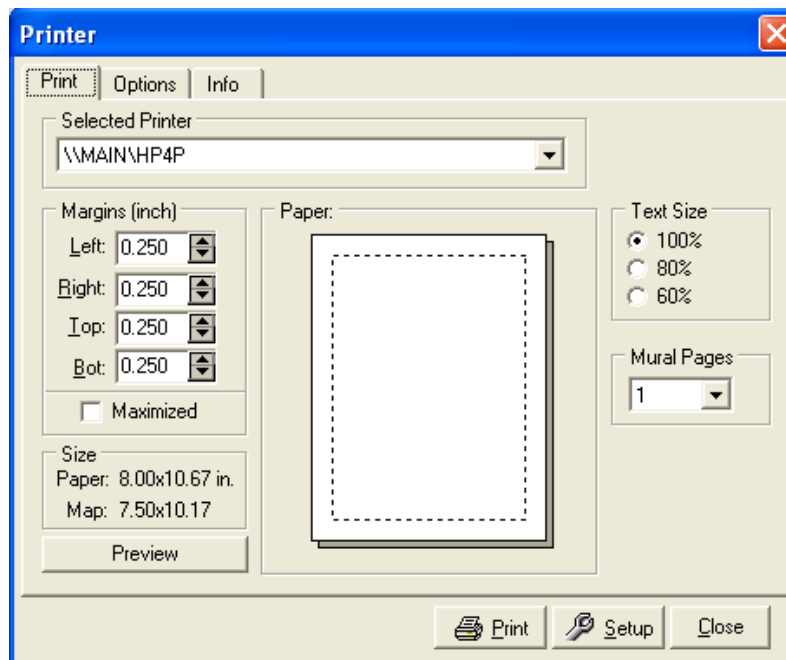
Presents user with the standard Precision Mapping Streets place search dialog. Once a Place is specified and the search is completed, the user is presented with a listbox containing the retrieved matches. Selecting one of the listbox choices presented, by double clicking, will center the viewport at the Lon/Lat of the selected Place centroid.



**VB Example**    Private Sub Command39\_Click()  
                  MapProl.ExecPlace  
         End Sub

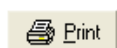
**Delphi Example** Procedure TForm1.Place1Click(Sender: TObject);  
begin  
          MapProl.execplace;  
end;

Presents user with a Print dialog, where the print device, margins, etc. may be specified. Note that for more control over the print process, the DirectDraw method may be used with a printer device as the output. Once the Print dialog opens, the following options are available to the user, arranged in 3 tabs.

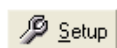


The first tab (Print) allows the user to...

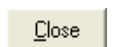
- Set the page margins. (clicking on maximize sets the margins to correspond to the maximum printable area for the currently selected print device)
- Select the Text size, as a percent of the default size.
- Preview the selected map area that would be printed
- Select the number of murals to use (up to 16). When selecting more than one mural, the control will print a key map showing the location of each mural grid, followed by the mural grids themselves. Note that when printing multiple tiles, the viewport is resized to retain the scale, but account for the different aspect ration of the control on the screen and the paper.



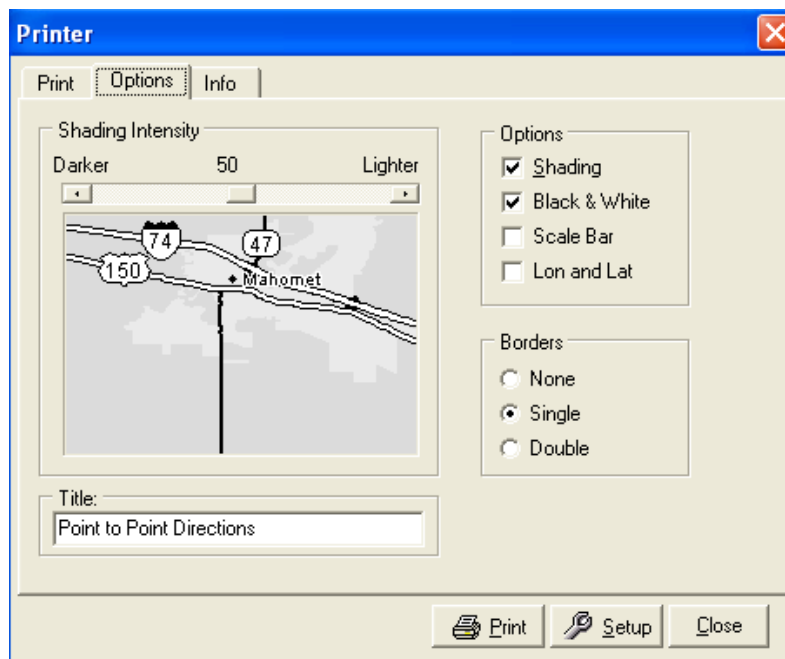
Print Prints the map using the current settings and the currently selected print device.



Setup Opens up the windows printer setup dialog



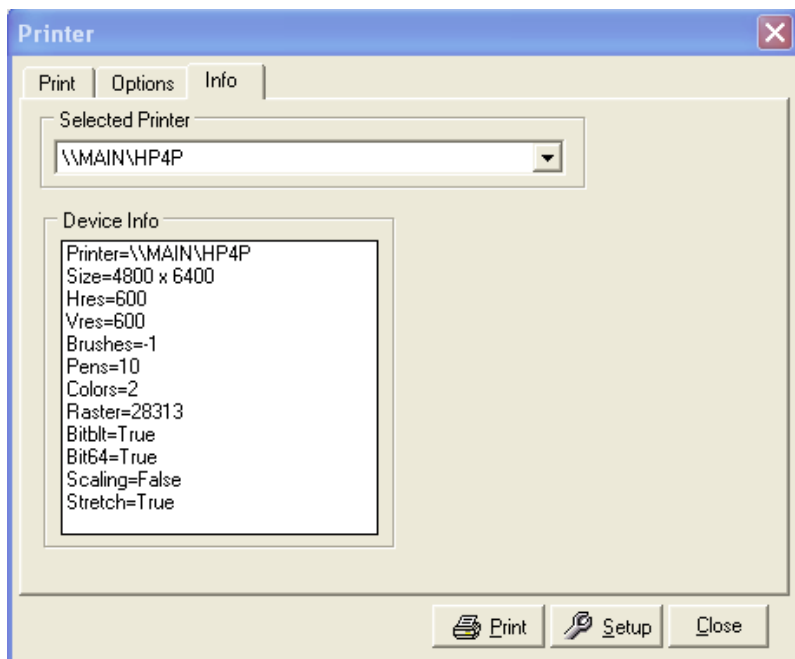
Close Returns control back to MapPro71.OCX.



The Options tab permits the user to:

- Set Shading intensity (this would affect the shading of parks, water bodies, and in general all filled polygons). As you change the Shade Intensity values, the Preview area reflects the current intensity of the image to be printed.
- Select whether to use Shading.
- Select whether to print color or B&W
- Select whether to print Lon/Lat lines, or not.
- Select whether to print the scale bar
- Select what type of borders to use
- Set the title to be printed on top of each printout of the map.

If the print dialog is invoked from the Routing dialog, then there are two extra options. One to print the Routing detailed, verbose directions, and the other to print key maps at every identified turn of the route.



The Printer tab contains detailed information regarding the currently selected printer device, which is obtained by directly querying the device. This information can be very helpful in identifying and solving printing problems.

---

### **ExecRegister(x:LongInt)**

### **Procedure**

ExecRegister(5432) will present the user with the registration dialog box if the MapOCX is not registered. This will allow them to enter the registration code if needed. The Registration process is managed by the OCX, so there should normally *\*not\** be a reason for the developer to call this routine, but it may be useful in some circumstances. Contact Undertow Software, Inc. for information regarding self-registering end-user applications.



```

VB Example Private Sub Form_Load()
                'Opens the registration dialog
                MapPro1.ExecRegister (1)
                MapPro1.ExecRegister (5432)
            End Sub
    
```

---

## ExecRoadOption()

Procedure

---

Allows the user to specify advanced options for calculating the optimum route between two points. Also see FindRoute, ExecRoute.

The options are organized in a number of tabs, as described below.

**Speeds:** In this dialog, the user may set the travel speeds (mph) for 6 different types of roads from Limited Access (Interstate) Highways, to Trails, etc.

Road Type	Priority	Speed
Interstates: (Restricted Access)	8	65
Major Highways:	4	50
Secondary Highways:	3	45
Minor Roads:	3	35
Trails, other:	1	5
Turn Factor		5

Default

**Priorities:** The user is permitted to set the travel preference priority for the 6 types of roads identified in the "Speeds" tab. A value of "1" sets the lowest priority while a value of "5" sets the highest. A value of "0" excludes that road type from routing calculations.

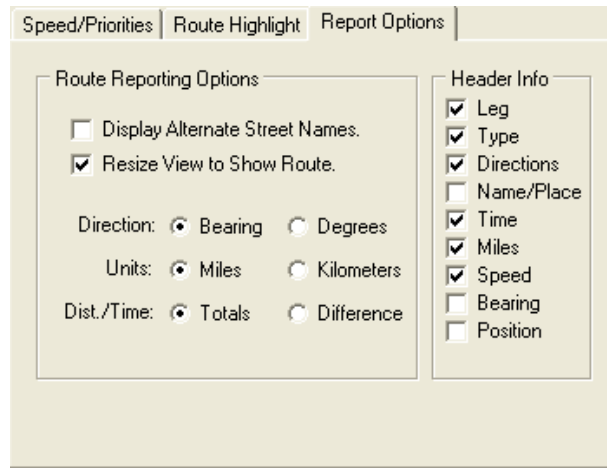
Sample Map

Color

Highlight (%)

Enhanced Route Line    More Info..

**Other:** In this dialog, the user is permitted to select the type of Route highlighting on the map: Dot(10%), Dot(25%), Dot(50%), Cross, Hatch, and Grid, as well as the color of the route highlight.



**Notes:** These are just the options to be used when doing routing calculations. The actual route calculation is done using either the FindRoute, or the ExecRoute methods. The user should be cautioned that the likelihood of routing failure increases when road types are totally excluded, i.e., when travel preference priority is set to "0" for one or more road types.

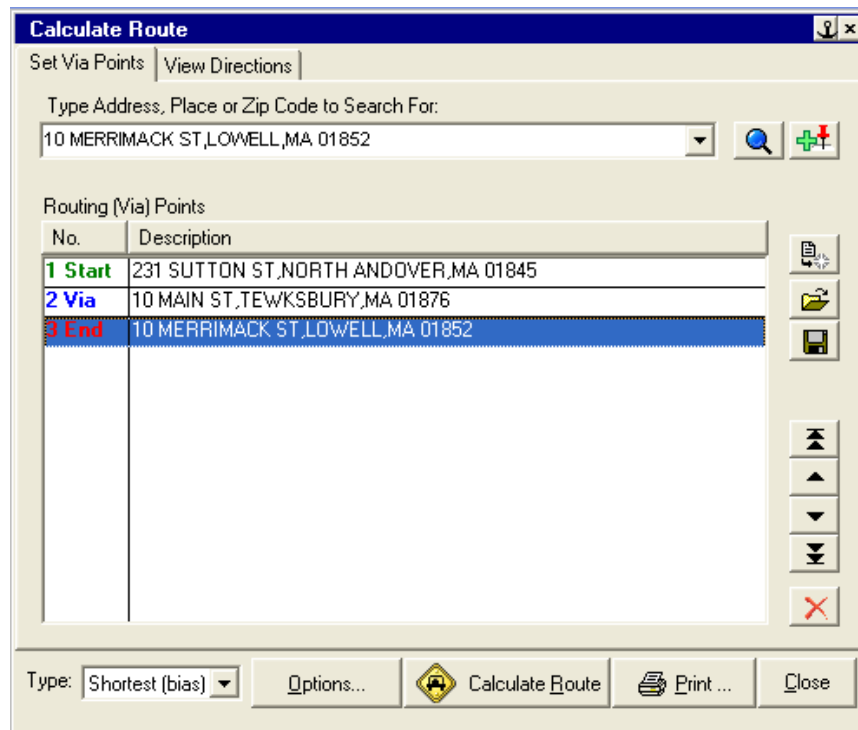
**VB Example**

```
Private Sub Command39_Click()
    MapProl.ExecRoadOption
End Sub
```


**Delphi**


```
Procedure TForm1.Button6Click(Sender: TObject);
{-----}
{ Invoke the Options Dialog }
{-----}
begin
    MapProl.ExecRoadOption;
end;
```


Presents user with a dialog that permits the input necessary to perform a Routing calculation This routing dialog may also be invoked by clicking on the routing icon of standard toolbar.




When the dialog is first opened, the focus is on the Set Via Points tab, which allows the user to perform the following operations.







 Search for the address or location entered by the user in the edit field of the combo box. If an exact match is found, then the located address is entered in the edit field. If multiple addresses (hits) are found, then the combo box opens up listing all of them. The user needs to select one of the returned hits, at which time the selected hit (address) is entered in the edit field of the combo box.

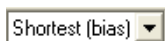
 Add the address in the edit field to the routing list. Note that this button is disabled until a search has been performed and a valid address or location has been returned and selected by the user. If this is the first point being added, it becomes the Starting point for the routing calculation. If it's the second point being selected, then it becomes the End (finish) point for the routing calculation. If it's the 3<sup>rd</sup>, 4<sup>th</sup>, point, etc. then it becomes the end point and the previous end point become a Via point for the routing calculation. Note that the points may also be moved up or down in the sequence, before performing the actual calculation, as explained further down.

 Clears the current route and all associated list boxes.

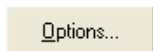
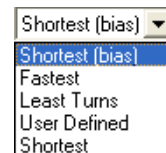
 Load a set of Routing points, and user set preferences from a file.



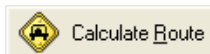
-  Save the current Routing points and associated user preferences to a file.
-  Move the highlighted Routing point to the top of the list, i.e., make it the starting point of the Routing calculation.
-  Move the highlighted Routing point up one position.
-  Move the highlighted Routing point down one position.
-  Move the highlighted Routing point to the bottom of the list, i.e., make it the Finish point of the Routing calculation.
-  Delete the currently selected Routing point.



Clicking on the down arrow of this combo box, allows the user to select the type of routing calculation to be performed.



Opens up the Routing options dialog (see below)



Calculate the route based on the currently selected routing points and options. When the calculation is finished, the dialog automatically switches to the View Directions tab (see below)



Opens up the standard print dialog of the OCX, which allows the user to print the calculated directions.

#	T	Directions	Time	Mile	Mph
1		231 SUTTON ST,NORTH ANDOVER,MA ...	0	0	
2		Starting on SUTTON ST head West Drive West for 0.5 miles (about 1 mins)	00:00:41	0.52	45
3		Continue onto MERRIMACK ST Drive West for 0.1 miles (about 5 secs)	00:00:46	0.58	45
4		Turn Left onto RAMP Drive Southwest for 0.3 miles (about 4 mins)	00:03:46	0.94	5
5		Continue onto Ramp Drive Southwest for 0.1 miles (about 20 secs)	00:04:07	1.07	20
6		Continue onto I-495 Drive Southwest for 8.5 miles (about 8 mins)	00:11:57	9.67	65
7		Continue onto Ramp Drive West for 0.3 miles (about 1 mins)	00:12:42	9.71	20
8		Bear onto MA SH 38 Drive Northwest for 0.1 miles (about 10 secs)	00:12:51	9.79	50

**Status:** Completed    **Total Miles:** 11.92    **Drive Time:** 15 Min 27 Sec

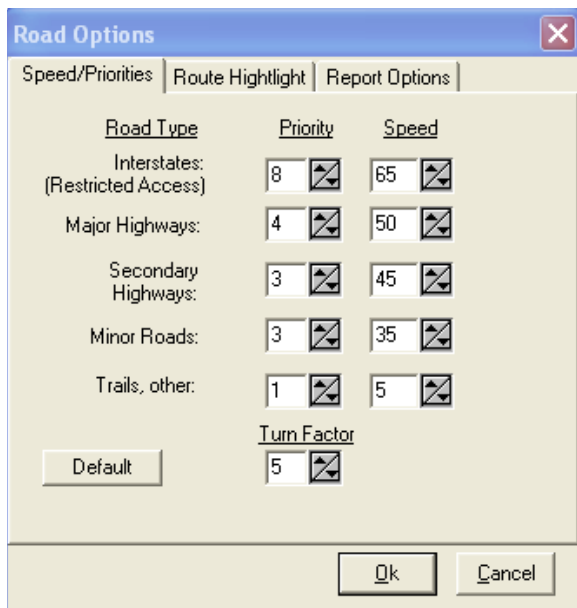
Type: Shortest (bias)    Options...    Calculate Route    Print ...    Close

The View Directions tab of the dialog, automatically appears when the routing calculations are finished, and it displays detailed driving directions, as well as the calculated distance and travel times for each segment. The format of each line is as follows...

4	Continue onto I-495 Drive East for 1.7 miles (about 2 mins)	00:02:24	2.09	65
	Verbose Directions	Segment Travel Time	Segment Distance	Segment Travel Speed
	Road type			
	Segment #			

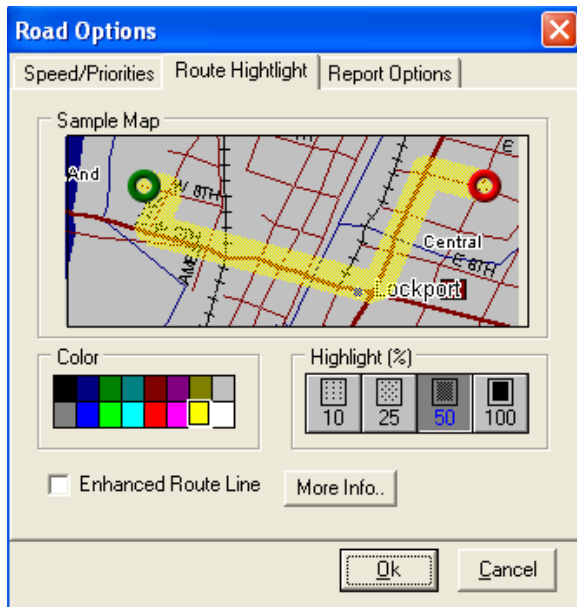
The actual type of information displayed depends on the options selected by the user. The total travel time, distance, etc. are also displayed in a panel, below the segment routing information listbox.

When the user clicks on the options button of the Set Waypoint tab, the following dialog is presented, allowing the user to set a wide range of routing options.



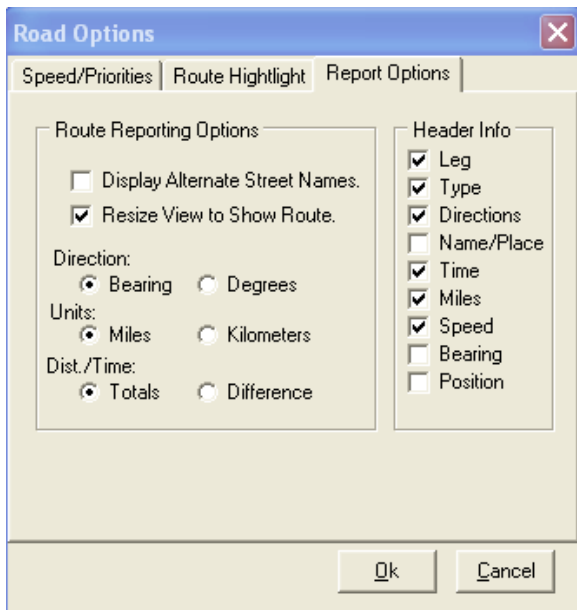
The Speed/Priorities tab allows the user to set the Priority and the travel speed for each major road type. The highest the priority for a certain road type, the more preference is given to that road type during the calculations. Note that even when the priority is set to zero, there is still a non-zero preference used internally, in order to avoid a situation of not being able to calculate a route because of priorities. **Only** priority is used when the user selects the shortest route option.

Turn Factor allows the user to select whether to give preference to a path of fewest turns, over other considered pathways (0-5, 0 uses no biasing). It only has an effect when the User-Defined routing option is used.



The Route Highlight tab allows the user to select the percent highlight to be used when marking the calculated route on the map surface.

The enhance Route Line option allows the user to bypass some the built-in smoothing of road segments, that is designed to speed up the routing calculations. Note that setting this option ON, can significantly increase the Routing calculation time. Even when it is ON, there is some smoothing done, using the Douglas-Pucker smoothing algorithm. Look at SetOption(\$EEED,n) for bypassing smoothing completely.



The Report options allows the user to select what information to be displayed in the List box containing the routing information for each Road segment.

**VB Example**

```
Private Sub Command39_Click()
    MapProl.ExecRoute
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button1Click(Sender: TObject);
{-----}
{ Invoke the Routing Dialog with the current default }
{ Lon/Lat Coordinates. }
{-----}
begin
    { Locate the viewport to the center point of the current }
    { Lon/Lat routing coordinates }
```

```

MapPro1.GotoPoint((defx1+defx2)/2,(defy1+defy2)/2);
{ Set the magnitude to 11 to ensure Tiger grids are loaded }
MapPro1.Magnitude:=11;
{ Execute the Dialog }
MapPro1.ExecRoute(defx1,defy1,defx2,defy2);
end;

```

---

## ExecSearch(Title:string;Option:Integer)

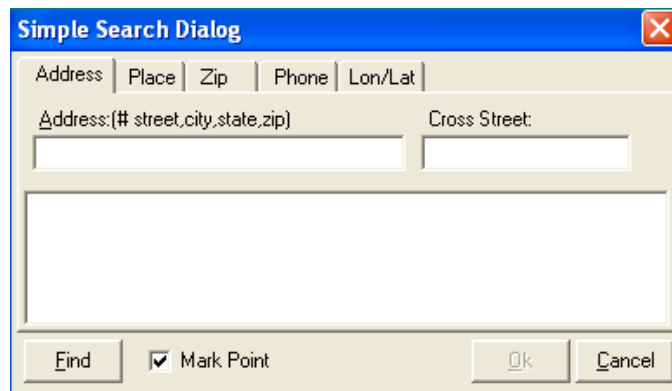
---

Procedure

Presents user with a generic tabbed search dialog similar to that used in the Routing dialog. The string specified in "Title" is used in the dialog caption, and 'Option' can have the value of 0..4, depending which tab the user wants active when the dialog opens.

### **Option=0**

Open the dialog with the Address Search tab selected.



Once the dialog appears on the screen, the user may type in an address to search for, in the form:

```
# Street,Place,State,ZipCode
```

And a cross street, if desired. The ZipCode is optional, but it can speed search significantly under certain conditions. In typing the # and Street name, the following forms are equivalent (for example if searching for "10 West Main Street"):

```

10 W. Main Street
10 West Main Street
10 W Main Street
10 W.Main Street
10 W. Main St
10 West Main St
10 W Main St
10 W.Main St

```

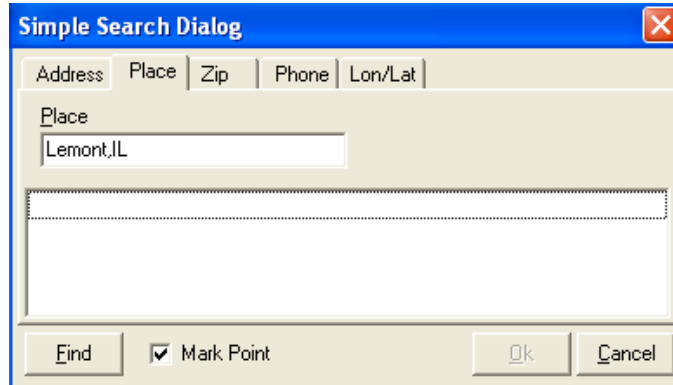
If the suffix is not specified, then all Streets, Avenues, Lanes, etc. meeting the criteria are returned (see Appendix "D" for suffix abbreviations)

Double-clicking on one of the addresses returned in the listbox, will center the viewport around that street segment's Lon/lat and will place the following information in the Result variable (separated by tabs, #9):

StreetName, Place, Block#, State, ZipCode, Lon, Lat

**Option=1**

Open the dialog with the Place Search tab selected.



The user may specify a Place, City, Town to search for, including the state (if desired). Wildcard characters are permitted in the search. The only condition is that the first character of either the Place name or the state CANNOT be a wildcard! For example,

(1) Specifying Lem\*,IL as the search string would return the following hits:

Lemmon,IL  
Lemont,IL

(2) Specifying Lee\*,IL as the search string would return the following hits:

Lee,IL  
Lee Center,IL  
Lee County,IL  
Leeds,IL  
Leesburg,IL  
Leesville,IL

(3) Specifying Le???a,T? as the search string would return the following hits:

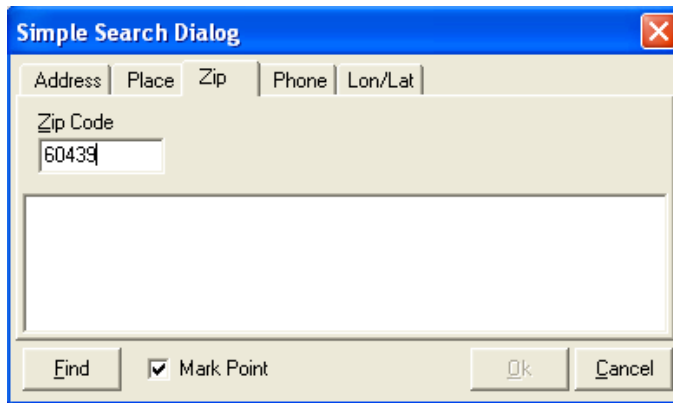
Leanna,TN  
Levita,TX

Double-clicking on one of the Place names returned in the listbox, will center the viewport around its Lon/lat and will place the following information in the Result variable (separated by tabs, #9):

Place, State, Lon, Lat

**Option=2**

Open the dialog with the ZipCode Search tab selected.



The user may enter a ZipCode for the search. If all five digits of the ZipCode are specified, a single hit is returned, if found in the ZipCode database. Wildcards may be used in the search as well.

For example, specifying `?2?14` as the search string would return a number of hits such as,

02814 Chepachet, RI  
 02914 East Providence, RI  
 12214 Albany, NY

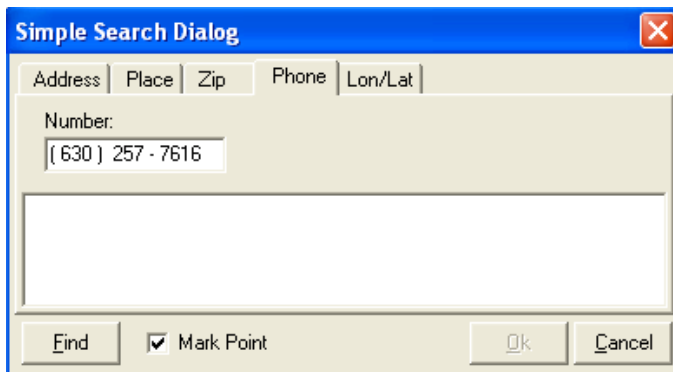
and so on....

Double-clicking on one of the Place names returned in the listbox, will center the viewport around its Lon/lat and will place the following information in the Result variable (separated by tabs, #9):

Place , State , AreaCode , ZipCode , Lon , Lat

### **Option=3**

Open the dialog with the Area Code Search tab selected.



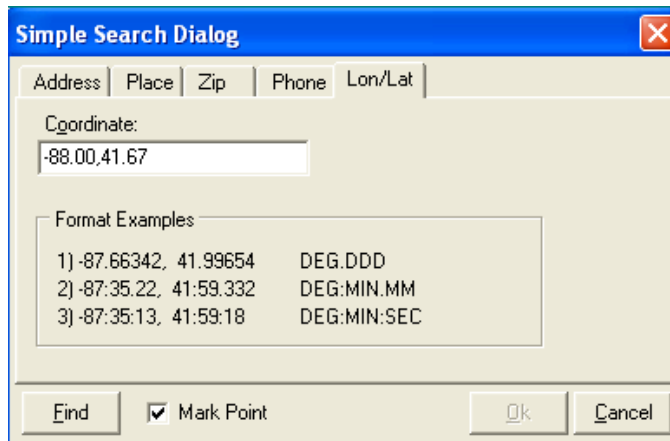
The user may enter an area code and a local exchange for a search. Area code, Exchange, Place Name, State and Zipcode information matching the criteria, are displayed in the listbox.

Double-clicking on one of the entries returned in the listbox, will center the viewport around its Lon/lat and will place the following information in the Result variable (separated by tabs, #9):

Place , State , ZipCode , AreaCode&Exchange , Lon , Lat

## Option=4

Open the dialog with the Lon/Lat Search tab selected.



The user may enter a Lon/Lat coordinate separated by comma, (see the Coords property for changing the input to Lat/Lon). Pressing ENTER or clicking Find centers the viewport around the specified point.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.ExecSearch "My Search Dialog",4  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button4Click(Sender: TObject);  
//-----  
// Search for a street  
//-----  
begin  
    MapProl.execsearch('Searching for a Street',0);  
end;  
  
Procedure TForm1.Button1Click(Sender: TObject);  
//-----  
// Search for a Place  
//-----  
begin  
    MapProl.execsearch('Searching for a Place',1);  
end;
```

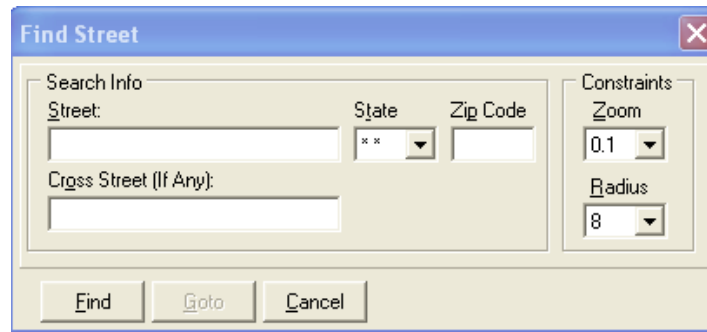
---

## **ExecStreet()**

**Procedure**

Presents user with a street search dialog (similar to that in Precision Mapping 4.0). Once a street is specified and the search is completed, the user is presented with a listbox containing the retrieved matches. Selecting one of the listbox choices presented, by double clicking, will center the viewport at the Lon/Lat of the selected street segment.

Note that a cross Street may also be specified in the search. Also, note that the user can specify the search radius (Search is faster for smaller search radii), and the State (default is \*\*, which signifies search ALL states within the specified radius).



**VB Example**

```
Private Sub Command39_Click()
    MapProl.ExecStreet
End Sub
```

**Delphi Example**

```
Procedure TForm1.Street1Click(Sender: TObject);
begin
    MapProl.ExecStreet;
end;
```

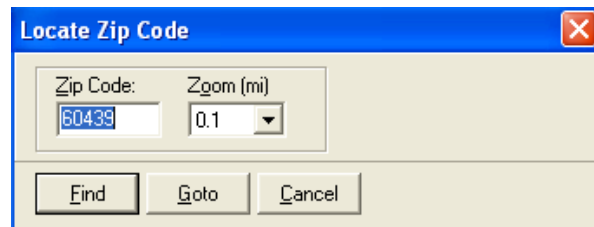
---

## ExecZipcode()

**Procedure**

---

Presents user with the standard Precision Mapping Streets zipcode search dialog. Once a ZipCode is specified and the search is completed, the user is presented with a listbox containing the retrieved matches. Selecting one of the listbox choices presented, by double clicking, will center the viewport at the Lon/Lat of the selected ZipCode centroid.



**VB Example**

```
Private Sub Command39_Click()
    MapProl.ExecZipcode
End Sub
```

**Delphi Example**

```
Procedure TForm1.Zipcode1Click(Sender: TObject);
begin
    MapProl.ExecZipcode;
end;
```



---

**FindAcEx(temp:String)****Procedure**

---

Searches the Area Code/Exchange data base ( FONE.BIN ) and returns the area code/exchange and other data closest to the query value in the 'Result' string. 'Result' is a variable length string formatted as follows;

```
Areacode #9 Exchange #9 City #9 State #9 Lon #9 Lat
```

The argument Temp can be 3 or 6 digits in length with the first 3 digits taken as the area code. If 4 or 5 digits are specified, then the only 3 are used and the first exchange in the specified area code is returned.

**Notes:** The location of the phone data is specified in the property 'path3'. It is up to the user to check the first 6 characters returned by the OCX to determine if the desired area code and/or exchange were found.

It should also be noted that no "OnFind" event is triggered by this procedure. The "Result" property should be checked immediately after the call to it. If 'AreaCode' in Result is the same as that specified by the user for the search, then the requested AreaCode was found, if the Areacode returned is different than that specified, then no exact match occurred, and the closed match (next higher AreaCode) was returned.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.FindAcEx Text1.text  
    Text2.text = MapProl.Result  
End Sub
```

**Delphi Example**

```
Procedure TForm2.Button6Click(Sender: TObject);  
begin  
    MapProl.findacex(edit5.text);  
    label7.caption:=MapProl.Result;  
end;
```

---

**FindCity(temp:String)****Procedure**

---

Searches the Place data base ( CITIES03.BIN ) and returns the place specified in temp, by generating an OnFindPlace event. The search focus is better if the desired place name is followed by a comma and the corresponding state abbreviation. This method will also accept wildcards both in the City/Place name and the two letter State abbreviation. The only condition is that the first character of both the Place name and the state abbreviation CANNOT be a wildcard.

For each place that is found matching the search specification an OnFindPlace event is triggered. The user must then query the 'Result' property in the OnFindPlace event handler, and store it or otherwise process its value, e.g., add it to a list box, parse it to its appropriate components. The string stored in "Result" contains the following information separated by a tab character (#9).

In addition to being able to search for Place names, this method also enables the user to search for counties (or parishes, in LA). Counties may be specifically searched for by appending the suffix "county", after them, or they can be searched as part of a wildcard place search, by simply specifying the name and an asterisk.

FindCity supports two different paradigms:

- If an explicit string is searched for, then the OnFindPlace is triggered and a single hit (if found) returns in the "Result" property of the control.
- If a wildcard search is specified, then an OnFind event is triggered and found hits are returned in the "Street" property.

Name: The place (City, Town, etc.) name from the places database

State: The two letter state abbreviation

Lon: Longitude (from the places database)

Lat: Latitude (from the places database)

Examples of using the wildcards with FindCity

(1) FindCity('Lem\*,IL') would return the following hits in the Result property

- Lemmon IL -89.794 39.531
- Lemont IL -88.002 41.674

(2) FindCity('Lee\*,IL') would return the following hits in the Result property

- Lee IL -88.941 41.795
- Lee Center IL -89.279 41.747
- Lee County IL -89.283 41.751
- Leeds IL -88.988 41.021
- Leesburg IL -90.317 40.247
- Leesville IL -87.625 41.025

(3) FindCity('Lem\*,I?') would return the following hits in the Result property

- Lemhi ID -113.619 44.852
- Lemhi County ID -114.017 44.967
- Lemhi Range ID -113.490 44.519
- Lemmon IL -89.794 39.531
- Lemont IL -88.002 41.674

(4) FindCity('Lemont\*') would return the following hits in the Result property

- Lemont IL -88.002 41.674
- Lemont PA -77.819 40.810
- Lemont Furnace PA -79.670 39.914
- Lemontree AZ -111.743 33.410
- Lemontree Condominium UT -111.876 40.901

(5) FindCity('Lemont') would return the following hits in the Result property

- Lemont IL -88.002 41.674

(only one exact match, since no wildcards were specified)

(6) FindCity('Le?n??t') would return the following hits in the Result property

- o Leinarts TN -84.190 36.108
- o Leoncito NM -105.138 34.672

(7) FindCity('Le????t,T?') would return the following hits in the Result property

- o Le Verte TX -93.927 30.529
- o Ledbetter TN -88.729 35.934
- o Ledbetter TX -96.791 30.151
- o Ledbetter Hills TX -96.926 32.692
- o Lee Estates TN -84.886 35.223
- o Lees Station TN -85.253 35.554
- o Leggett TX -94.870 30.818

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.FindCity Text1.text  
    Text2.text = MapProl.Result  
End Sub
```

**Example of how this works:**

```
** Explicit Search **  
    FindCity Search String: Lemont  
    Event Triggerred: OnFindPlace  
    Number of hits Returned: 1  
    Property Used for Hit(s): Result  
    Hit(s) Returned: LEMONT | IL | -88.002,41.674  
  
** WildCat Search **  
    FindCity Search String: Lemont,*  
    Event Triggerred: OnFind  
    Number of hits Returned: 3  
    Property Used for Hit(s): Result & Street  
    Hit(s) Returned: LEMONT | IL | -88.002,41.674  
                    LEMONT | IA | -94.469,41.333  
                    LEMONT | PA | -77.819,40.811
```

**VB Example**

```
Private Sub Command113_Click()  
    List1.Clear  
    ' This will return all Essex, e.g. Essex County, Essex Falls,  
    ' etc. in MA  
    List1.AddItem "Wildcard - Essex, in MA"  
    MapProl.FindCity "Essex*,MA"  
    ' This will return ONLY "Essex County" in ALL states  
    List1.AddItem "Essex County in ALL States"  
    MapProl.FindCity "Essex County,*"  
End Sub
```

**Delphi Example** Procedure TForm2.Button5Click(Sender: TObject);  
begin  
MapProl.findCity(edit4.text);  
label7.caption:=MapProl.Result;  
end;

---

### FindClosest(X,Y,Radius:OleVariant)

### Procedure

---

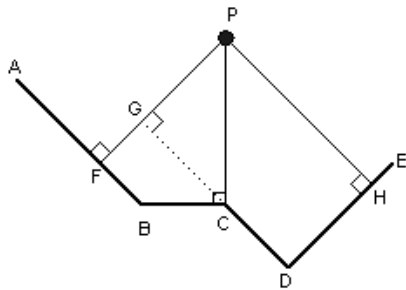
Searches the Streets data bases within the specified radius, and finds the street segment that is closest to the user specified point X,Y (Lon/Lat). The radius (miles) is useful in restricting the search operation which, if not bound, could take a considerable length of time. The procedure performs an exhaustive search, and calculates the distances to every street in the grids within "Radius", even if only portion of such a grid is within that radius.

The results of the search are returned in the property "Result", which a string that contains the following fields separated by character #9:

Street, City, Block#, State, Zip, Lon, Lat, Distance

The "Lon, Lat" in Result is the point on the street segment determined to be the closest to the user specified point. If the Search fails, a null string is returned as the Street name in Result. See SetOption with OpCode \$EEEE for selecting either the closest road segment end-point, or the closest interpolated point.

**Note:** It should be noted that the perpendicular distance from the specified point to each road segment is used in determining the closest one.



For example, if AD, BC, CD, DE are the road segments in question, and P is the point of interest, perpendicular distances PG, PF, PC and PH are calculated and compared to determine the shorter distance, i.e., the closest street segment.

**VB Example** Private Sub Command39\_Click()  
  
Dim Lon as Double  
Dim Lat as Double  
Dim Temp as String  
Dim Street as String  
Lon = (MapProl.LonLeft + MapProl.LonRight) / 2  
Lat = (MapProl.LatTop + MapProl.LatBottom) / 2  
MapProl.FindClosest Lon, Lat, 0.03)  
Temp = MapProl.Result  
Street = Mid(temp, 1, InStr(1, temp, Chr(9)) - 1)  
  
For X = 1 To 8

```

        Temp = Mid(Temp, InStr(1, Temp, Chr(9)) + 1)
        If X = 5 Then Lon = Mid(Temp,1,InStr(1,Temp, Chr(9)) - 1)
        end If
        If X = 6 Then Lat = Mid(Temp,1,InStr(1,Temp, Chr(9)) - 1)
        End If
    Next X
    MapProl.Miles = 0.2
    MapProl.drawbubble GetDC(MapProl.handle),Lon,Lat,Street
End Sub

```

### **Delphi Example**

```

Procedure TForm1.Button49Click(Sender: TObject);
{-----}
{ Find the closest street to the current viewport }
{ centroid. Search radius is set to 2 miles }
{-----}
var j,dc:integer;
    s:string;
    Lon,Lat:real;
begin
    {Calculate current viewport centroid}
    Lon:=(MapProl.LonLeft+MapProl.LonRight)/2;
    Lat:=(MapProl.LatTop+MapProl.LatBottom)/2;
    { Find the closest street }
    MapProl.Findclosest(lon,lat,2);
    Application.ProcessMessages;
    {get the lon/lat coordinates from the returned result}

    {and draw a bubble at that location}
    j:=pos(chr(9),MapProl.result);
    s:=copy(MapProl.result,1,j-1);
    MapProl.miles:=0.2;
    dc:=getdc(MapProl.handle);
    MapProl.drawbubble(dc,lon,lat,'Closest is: '+s);
end;

```

---

### **FindClosestPlace(X,Y,Rad,Pop,Opt):string**

### **Procedure**

---

Finds the closest named place from a point in the USA. The returned string contains the following information, separated by tab (#9) characters:

Place Name, FIPS Code, Population, Distance from specified point, Longitude & Latitude

- X,Y: Lon/Lat coordinates - search center point
- Rad: Search radius in miles
- Pop: Population criterion to be used for search
- Opt: Option specifying the type of search,
  - 1 Find closest place with population less than the one specified
  - +1 Find closest place with population higher than the one specified
  - 0 Find closest place regardless of population

### **VB Example**

```

Private Sub Command1_Click()
    'Find the closest named place from the center of the screen,
    'with population more than 30000 within 10 miles

```

```

xc = (MapProl.LonRight + MapProl.LonLeft) / 2
yc = (MapProl.LatTop + MapProl.LatBottom) / 2
city = MapProl.FindClosestPlace(xc, yc, 30000, 10, 1)
' Display the returned information in an edit box
' Info is: FIPS Code, Pop, Dist, Longitude, Latitude
' separated by tab characters
Text1.Text = city
End Sub

```

**Delphi Example**

```

procedure TForm1.Button2Click(Sender: TObject);
var xc,yc:real;
begin
  // Find the closest named place from the center of the screen,
  // with population less than that specified in the Edit2 box
  // within the radius specified in the Edit3 box.
  xc:=(pmap21.lonRight+pmap21.lonleft)/2;
  yc:=(pmap21.lattop+pmap21.latbottom)/2;
  City:=pmap21.FindClosestPlace(xc,yc,
    strtoint(edit2.text),strtoint(edit1.text),-1);
  // Display the returned information as a panel caption
  // Info is: FIPS Code, Pop, Dist, Longitude, Latitude
  panel2.caption:=city;
end;

```

---

## onFindDir

Event

---

Road segments found when the FindRoute method, or the ExecRoute dialog are executed, are combined into explicit directions. For each explicit direction placed in the ExecRoute listbox, the OnfindDir is fired, and a string is passed in it. The string contains the following information, separated by tabs (#9 character):

Road Name;X,Y coordinates;Instruction;Direction;Distance;Time

For an alternative way to access the detailed routing information, also see GetRouteFirst/Next.

**VB Example**

```

Private Sub MapProl_FindDir(ByVal s As String)
  List1.AddItem s
End Sub

```

**Delphi Example**

```

Procedure TForm1.MapProlFindDir(Sender:
TObject;s:string);
begin
  listbox2.items.add(s);
end;

```

---

## FindItem(X,Y:OleVariant)

Function

---

Returns the User Item ID#, if one is found within 8 pixels from X,Y (lon, Lat), or zero otherwise. It also triggers and OnFind and returns a Result string with ID,X,Y,ItemString separated by a tab character (#9) (Also see SetItem).

**Note:** This is a very powerful method that allows you to hot-link desired actions to user placed bitmaps. Although searching for the item ID can be a CPU intensive process, it has been tried with several thousand points on the screen without a significant time penalty.

**VB Example**

```
Private Sub Command39_Click()
    Dim Lon as Double
    Dim Lat as Double
    Dim ID as Integer
    Dim Temp as String
    Lon = (MapProl.LonLeft + MapProl.LonRight) / 2
    Lat = (MapProl.LatTop + MapProl.LatBottom) / 2
    MapProl.Finditem Lon, Lat
    Temp = MapProl.Result
    ID = Val(Left(Temp, 1))
    MapProl.DeleteItem (ID)
end Sub
```

**Delphi Example**

```
Procedure TForm1.MapProlMouseMove(Sender: TObject;
Shift:TShiftState; X,Y: Integer);
begin
    If MsMode=1 then
    begin
        MapProl.MapMode:=MdUser;
        MapProl.Cursor:=crArrow;
    end else
    begin
        if Imode=1 then
        begin
            MapProl.Mapmode:=MdUser;
        end else
        begin
            Imode:=0;
            fpt:=MapProl.Finditem(MapProl.xcord,MapProl.ycord);
            if fpt=0 then
            begin
                MapProl.Mapmode:=MdZoom;
            end else
            begin
                Imode:=2;
                MapProl.mapmode:=MdUser;
                MapProl.cursor:=crHelp;
            end;
            panel5.caption:='Pt #' +inttostr(fpt);
        end;
    end;
end;
```

---

**FindRoute(Lon1,Lat1,Lon2,Lat2:OleVariant;Opt: LongInt)**

---

**Procedure**

Performs a Routing calculation between the points identified by Lon1,Lat1 and Lon2,Lat2.

**Opt:** Long Integer that can accept either an integer value, or one of the enumerated constants described below (or any combination, i.e., sum, of the values of these options)

**Enumerated**

<u>Constant</u>	<u>Value</u>	<u>Action</u>
Rt_Clear	0	Clear the highlighted route
Rt_Spots	1	Mark the Begin and End point of the calculated route.
Rt_Hatch	2	Highlight the calculated route using the current user-selected hatch pattern. (the hatch pattern is selected using the RoadOptions)
Rt_Zoom	4	Zoom the map viewport out so that the route start and end points are visible.
Rt_Short	16	Calculate the Shortest route
Rt_Fast	32	Calculate the Fastest route
Rt_Direct	48	Calculate the most direct route (least # of turns. Note that this is a combination of Rt_Short and Rt_Fast).
Rt_Hours	64	Return the calculated time as a fraction of hr:min, not hr:min:sec.
Rt_km	128	Return the calculated distances in kilometers, not miles.
Rt_Total	512	Display total (cumulative) distance and time at the end of each road segment in the route.
Rt_PrtMap	1024	Print the point maps after the route is calculated
Rt_PrtDir	2048	Print the directions after the route is calculated
Rt_NoERR	4096	Suppresses error dialog from display if no route is found
Rt_NoDlg	8192	Calculate the route without displaying a dialog

For example, if the FindRoute method was called and Options had the value 42, then RT\_Hatch, Rt\_Combine and Rt\_Total would be the selected options. The 'Result' string returned on each OnFindRte event contains the following fields of information separated by a tab (#9) character.

Route Segment No.	- First one is #1
Road Classification	- A41, etc.
Reserved	- Contains % sign, used for other intermediate calculations
Road Name	- First one is always "Start"
Reserved	- Blank
Place name	- City, Town, etc. It should be noted that limited access Interstate highways have no place names assigned to them.
Time	- xx:xx:xx
Reserved	- Blank
Reserved	- Blank
Speed	- Speed for the road segment in mph or kph.
Direction	- E, NW, W, etc.
Position	- Lon/Lat coordinates of segment endpoint.



It should be noted the first string returned when the event is fired contains the literal 'Start' in the third field, while the last string returned, at the completion of the route calculation, contains the literal 'Finish' in the third field.

**Note:** For each road segment that is found to be part of the calculated route, an OnFindRoute Event is triggered. The user must then query the 'Result' property in the OnFindRoute event handler, and store it or otherwise process this value, e.g., add it to a list box. The user may also parse the returned string into its appropriate components.

Since segments of the same road are consolidated for generating the driving directions, an OnFindDir event is fired every time a consolidated segment is generated, and a tabbed string is passed with it containing the following information:

RoadName, Lon, Lat, Descriptor, Direction, Distance

```
VB Example Private Sub Command39_Click()
    Dim FRteOption as Integer
    Dim StartLon as Long
    Dim StartLat as Long
    Dim EndLon as Long
    Dim EndLat as Long
    MapProl.RoadOption(48,5)
    MapProl.RoadOption(49,0)

    'Set the desired value for the Options Flag
    FRteOption:=FRteOption+1    {mark the start/finish points}
    FRteOption:=FRteOption+2    {highlight the calculated route}
    FRteOption:=FRteOption+3    {Zoom so endpoints are visible}
    FRteOption:=FRteOption+32   {Return cumulative distances/times}
    FRteOption:=FRteOption+128  {return distances in km}
    'Calculate the Route
    MapProl.FindRoute StartLon,StartLat,EndLon,EndLat,FRteOption
    'Refresh the map control
    MapProl.Refresh
End Sub
```

```
Delphi Example (Calculating the Route)
Procedure TForm1.Button2Click(Sender: TObject);
{-----}
{ Set color and hatch options and calculate simple Route }
{ using the FIndRoute method (results handled by user) }
{-----}
const FRteOption:longint=0;
begin
    {Clear the list box, prepare for the new road segments}    68
    listbox1.Clear;
    {Set color and the hatch pattern for highlighting Route}
    MapProl.RoadOption(48,5);
    MapProl.RoadOption(49,0);
    {Set the desired value for the Options Flag}

    FRteOption:=FRteOption+1;    {mark the start/finish}
    FRteOption:=FRteOption+2;    {highlight the route}
    FRteOption:=FRteOption+3;    {Zoom to see route}
    FRteOption:=FRteOption+32;   {Cumulative distances/times}
    FRteOption:=FRteOption+128;  {return distances in km}
    { Calculate the Route }
```

```

    MapProl.FindRoute(defx1,defy1,defx2,defy2,FRteOption);
    { Refresh the map control }
    MapProl.Refresh;
end;

```

Example (Calculating the Route & Printing)

```

Procedure TForm1.Button2Click(Sender: TObject);
{-----}
{ Set options, Calculate and Print Route }
{-----}
const FRteOption:longint=0;
begin
    listbox1.Clear;
    MapProl.RoadOption(48,5);
    MapProl.RoadOption(49,0);
    FRteOption:=FRteOption+1+2+3;
    {Set flag to Print Calculated Route}
    FRteOption:=FRteOption+256;
    MapProl.FindRoute(defx1,defy1,defx2,defy2,FRteOption);
    MapProl.Refresh;
end;

```

Example (placing the results in a listbox)

```

Procedure TForm1.MapProlFindRte(Sender: TObject);
{-----}
{ Add the road segments to a simple list box }
{-----}
begin
    Listbox1.Items.add(MapProl.result);
end;

```

---

## **FindViaRoute(Opt: LongInt)**

## **Procedure**

---

Performs a Routing calculation between the Via points currently defined (note, this is different than FindRoute which calculates a route between the points identified by Lon1,Lat1 and Lon2,Lat2, as part of the call to the method). See AddViaPoints and related routines on how to add such points to the routing list prior to calling this function.

**Opt:** Long Integer that can accept either an integer value, or one of the enumerated constants described below (or any combination, i.e., sum, of the values of these options)

### **Enumerated**

<b>Constant</b>	<b>Value</b>	<b>Action</b>
-----------------	--------------	---------------

Rt_Clear	0	Clear the highlighted route
Rt_Spots	1	Mark the Begin and End point of the calculated route.
Rt_Hatch	2	Highlight the calculated route using the current user-selected hatch pattern. (the hatch pattern is selected using the RoadOptions)
Rt_Zoom	4	Zoom the map viewport out so that the route start and end points are visible.

Rt_Short	16	Calculate the Shortest route
Rt_Fast	32	Calculate the Fastest route
Rt_Direct	48	Calculate the most direct route (least # of turns. Note that this is a combination of Rt_Short and Rt_Fast).
Rt_Hours	64	Return the calculated time as a fraction of hr:min, not hr:min:sec.
Rt_km	128	Return the calculated distances in kilometers, not miles.
Rt_Total	512	Display total (cumulative) distance and time at the end of each road segment in the route.
Rt_PrtMap	1024	Print the point maps after the route is calculated
Rt_PrtDir	2048	Print the directions after the route is calculated
Rt_NoERR	4096	Suppresses error dialog from display if no route is found
Rt_NoDlg	8192	Calculate the route without displaying a dialog

For example, if the FindViaRoute method was called and Options had the value 42, then RT\_Hatch, Rt\_Combine and Rt\_Total would be the selected options. The 'Result' string returned on each **OnFindRte** event contains the following fields of information separated by a tab (#9) character.

Route Segment No.	- First one is #1
Road Classification	- A41, etc.
Reserved	- Contains % sign, used for other intermediate calculations
Road Name	- First one is always "Start"
Reserved	- Blank
Place name	- City, Town, etc. It should be noted that limited access Interstate highways have no place names assigned to them.
Time	- xx:xx:xx
Reserved	- Blank
Reserved	- Blank
Speed	- Speed for the road segment in mph or kph.
Direction	- E, NW, W, etc.
Position	- Lon/Lat coordinates of segment endpoint.

It should be noted the first string returned when the event is fired contains the literal 'Start' in the third field, while the last string returned, at the completion of the route calculation, contains the literal 'Finish' in the third field.

**Note:** For each road segment that is found to be part of the calculated route, an **OnFindRte** Event is triggered. The user must then query the 'Result' property in the OnFindRte event handler, and store it or otherwise process this value, e.g., add it to a list box. The user may also parse the returned string into its appropriate components.

Since segments of the same road are consolidated for generating the driving directions, an OnFindDir event is fired every time a consolidated segment is generated, and a tabbed string is passed with it containing the following information:

RoadName, Lon, Lat, Descriptor, Direction, Distance

```
VB Example Private Sub Command85_Click()  
    ' Add some Via points  
    MapProl.AddViaPoint -89.4, 43, "MyVia"  
    MapProl.AddViaPoint -112.4, 42.12, "MyVia2"  
    MapProl.AddViaPoint -118.23, 35.55, "MyVia3"  
    ' Calculate Route using defined points  
    MapProl.FindViaRoute 31  
End Sub
```

---

**FindStr(const t, t2: string;add: Integer;xctr, yctr, mradius: OleVariant;const ststr: string)**

---

Initiates a substring search for the specified street and optional cross street, optional address, center of search (lon/lat) and search radius (miles) and optional state specifier. (also see Street and onFind).

T	- specified street
T2	- optional cross street
Add	- optional address
xctr,yctr	- center of search ( lon/lat)
Mradius	- search radius (miles)
Ststr	- optional state specifier (if blank searches all states, otherwise uses two character state abbreviation, i.e. MA;

**Note:** For each street that is found an OnFind Event is triggered. The user must then query the 'Street' property in the OnFind event handler, and store it or otherwise process this value, e.g., add it to a list box. The user is also responsible for parsing the returned string into its appropriate components.

If a cross street search is requested, the user must handle every OnFind event (one is triggered for every street hit - not just the cross street), and determine whether a cross street was found. This determination can be made by examining the first character of the returned "Street" property. If a cross street was found, that character will be an asterisk. Furthermore, if a cross street was found, the Streetname field will contain a concatenation of the two streets, e.g., "First and Main", and the address block field will contain the string "N/A"

'Street' is a variable length string with each field separated by ASCII code 9 (Tab) and is formatted as follows;

```
StreetName #9 CityName #9 Address #9 State #9 ZipCode #9 Lon #9 Lat #9 Distance.
```

**VB Example** Example #1 Button routine invokes the search

```
Private Sub Command39_Click()  
    dim x,y,r as double  
    ' Set a sample lat, lon and search radius  
    x=-73.5  
    y=43.5  
    R=20.0  
  
    ' Search for 20 Main street using the sample coordinates  
    'specified above }
```

```

MapProl.Findstr("Main", "", 20, x, y, r, "MA")

' After the search is finished, set the magnification factor
'to 14 - double lined streets
MapProl.Magnitude=14

' Since Magnification 14 might involve loading a lot of data,
'yield to windows message processing, prior to issuing a
'command to relocate the viewport
application.ProcessMessages
MapProl.GotoPoint(x,y)
End Sub

```

Example #2 The OnFind Event is used to store and display the Street, block number, and City for each hit, in a listbox.

```

procedure TForm1.MapProlFind(Sender: TObject);
  dim i,l,ns,ne as integer
  dim a as string
  ns=1
  a=""
  l=length(MapProl.street)
  '{ Use simple loop to extract desired info }
  For i=1 to 3
  ne=pos(#9,copy(MapProl.street,ns,l-ns-1))
  a=a+copy(MapProl.street,ns,ne-1)+" * "
  ns=ns+ne
  a=a+copy(MapProl.street,ns,l-ns-1)
  ListBox1.AddItem(a)
End Sub

```

**Delphi Example** Example #1 Button routine invokes the search

```

Procedure TForm1.Button14Click(Sender: TObject);
var x,y,r:real;
begin
  { Set a sample lat, lon and search radius }
  x:=-73.5;
  y:=43.5;
  R:=20.0;
  { Search for 20 Main street using the sample coordinates
  specified above }
  MapProl.Findstr('Main','',20,x,y,r,'MA');
  { After the search is finished, set the magnification factor
  to 10 - double lined streets }
  MapProl.Magnitude:=14;
  { Since Magnification 14 might involve loading a lot of data,
  yield to windows message processing, prior to issuing a
  command to relocate the viewport }
  application.ProcessMessages;
  MapProl.GotoPoint(x,y);
end;

```

Example #2 The OnFind Event is used to store and display the street, block number, and City for each hit, in a listbox.

```

Procedure TForm1.MapProlFind(Sender: TObject);
var i,l,ns,ne:integer;
    a:string;
begin
    ns:=1;
    a:='';
    l:=length(MapProl.street);
    { Use simple loop to extract desired info }
    For i:=1 to 3 do
    begin
        ne:=pos(#9,copy(MapProl.street,ns,l-ns-1));
        a:=a+copy(MapProl.street,ns,ne-1)+' * ';
        ns:=ns+ne;
    end;
    a:=a+copy(MapProl.street,ns,l-ns-1);
    ListBox1.Items.Add(a);
end;

```

---

## **FindZip(z:LongInt)**

**Procedure**

---

Searches the zipcode database (ZIP.BIN) and returns data associated with the closest zipcode which matches the search query in the 'Result' property string.

'Result' is a variable length string with each field separated by ASCII code 9 and is formatted as follows:

Zipcode #9 city #9 State #9 areacode #9 lon #9 lat.

The specified Zip Code should be 5 digits long. If less than 5 digits are specified, then the entered value is padded on the left with zeroes, e.g., if 1234 is specified, then the routine searches for the Zip Code 01234.

**Note:** The location of Zipcode data is specified in the OCX property 'path3'. The areacode in the returned Result is the one associated with the centroid of the ZipCode.

Note that an "OnFind" event is not triggered by this procedure. The "Result" property should be checked immediately after the call to it. If 'ZipCode' in Result is the same as that specified by the user for the search, then the requested Zipcode was found, if the Zipcode returned is different than that specified, then no exact match occurred, and the closest match (next higher ZipCode) was returned.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.findzip val(Text1.text)
    list1.additem MapProl.Result
End Sub

```

**Delphi Example**

```

Procedure TForm2.Button4Click(Sender: TObject);
var z,code:longint;
begin
    val(edit3.text,z,code);
    MapProl.findzip(z);
    label7.caption:=MapProl.Result;
end;

```

---

**FirePmapEvent(EventID, Delay:Integer)****Method**

---

Fires a generic event added to the control, at the user's will and discretion. The Event is fired by calling the FirePmapEvent method, with the following parameters.

The Event can be fired for multiple operations, using a unique **EventID** specified and managed by the user, and the **Delay**, before the event is fired, is in milliseconds.

When the method is called, the event PmapEvent is fired, with the form:

```
Pmap61PmapEvent(Sender: TObject; EventID: Integer);
```

The user needs to manage this event themselves.

**Delphi Example**

```
Procedure TForm1.Button6Click(Sender: TObject);  
// Fire an event with a 500 msec delay and increment the  
eventide #  
begin  
    inc(eid);  
    Pmap61.FirePmapEvent(eid,500);  
end;  
  
procedure TForm1.Pmap61PmapEvent(Sender: TObject; EventID:  
Integer);  
// When the event is fired, it is trapped here an a string is  
added  
// to the listbox to let the user know  
begin  
    ListBox1.items.add('Fired Event #'+inttostr(Eventid));  
end;
```

---

**Font:String****Property**

---

Inherited Property. Sets the font (Font.Name) and height (font.Height) to be used for State names, Country names, Landmarks, Major water bodies, City names and Highway shields.

**Note:** If the specified font name is not found on the system, the last font used is assumed.

**VB Example**

```
Private Sub Command39_Click()  
    ' button to set a new font  
    Font.Name="Arial"  
    Font.Height=16
```

End Sub

**Delphi Example** Procedure TForm1.Button3Click(Sender: TObject);  
begin  
    { button to set a new font }  
    Font.Name:='Arial';  
    Font.Height:=16;  
end;

---

**GeoFind(s:String):Integer;****Function**

---

Returns the number of hits (if a StreetAddress Search is done), or -1 if a City Search is performed and there is NO unique match to the specified city/place. Each hit generated by the function triggers a Find (OnFind) event and the developer can examine the results for each hit by examining the Street property of the OCX, in the OnFind event. The following fields are returned in the Street property, separated by tab characters #9:

Street|City|Block Number|State|ZipCode|\*reserved|Longitude,Latitude

The \*Reserved field is blank for now.

It requires a variable string argument as follows, s = StreetAddress, City, State, ZipCode [|Radius]

Any of the four fields may be omitted. In particular, the last argument, separated from the rest of the string by a piping character, specifies the search radius (in miles), from the center search point (Zip, state, place coordinates). The search hierarchy is

- (1) ZipCode
- (2) City, State
- (3) StreetAddress

Here are some examples and brief explanations of the operation of the function. A few of them are explained in detail, while the rest are presented as the specified string and a simple listing of the results returned in the Street property.

*N = GeoFind('Lowell,MA')*

Returns the N = 1 (one hit) and examination of the Street property reveals the string:

|LOWELL|MA||-71.317000,42.633000

where | is used to denote the tab delimiter #9 character, used in the returned string.

The program recognizes that a City, State search is being requested and performs it accordingly.

*N = GeoFind('Market St,Lowell,MA')*

Returns the N = 16 (16 hits) and examination of the Street property, on each OnFind event, reveals the strings:

|MARKET ST|LOWELL|630 - 699|MA|01854||-71.318912,42.647360  
|MARKET ST|LOWELL|612 - 629|MA|01854||-71.318464,42.647168



|MARKET ST|LOWELL|578 - 611|MA|01854||-71.318144,42.647104  
 |MARKET ST|LOWELL|564 - 577|MA|01854||-71.317888,42.646912  
 |MARKET ST|LOWELL|544 - 563|MA|01854||-71.317696,42.646848  
 |MARKET ST|LOWELL|530 - 543|MA|01854||-71.317504,42.646720  
 |MARKET ST|LOWELL|512 - 529|MA|01854||-71.317312,42.646656  
 |MARKET ST|LOWELL|452 - 511|MA|01854||-71.316800,42.646464  
 |MARKET ST|LOWELL|380 - 451|MA|01854||-71.315776,42.645888  
 |MARKET ST|LOWELL|353 - 379|MA|01854||-71.315072,42.645632  
 |MARKET ST|LOWELL|320 - 352|MA|01852||-71.314752,42.645440  
 |MARKET ST|LOWELL|292 - 323|MA|01852||-71.314048,42.645120  
 |MARKET ST|LOWELL|248 - 290|MA|01852||-71.313536,42.644928  
 |MARKET ST|LOWELL|221 - 246|MA|01852||-71.313088,42.644800  
 |MARKET ST|LOWELL|116 - 219|MA|01852||-71.311872,42.644672  
 |MARKET ST|LOWELL|1 - 98|MA|01852||-71.309632,42.644544

The program recognizes that a street search (without a block number) is being requested and returns all street segments (blocks) that match the specified street within the city/state specified by the user. Identical results would be returned if the user specified 'Market,Lowell,MA' as well.

However, if the specified search was:

*N = GeoFind('207 Market Street,Lowell,MA');*

Then N=1 (single hit) would be returned and the property Street would contain the string:

MARKET ST|LOWELL|116 - 219|MA|01852||-71.312576,42.644736

*N = GeoFind('Andover')*

Returns the N = -1 and examination of the Street property, on each OnFind event, reveals the strings:

|ANDOVER||CA||-120.246080,39.310528  
 |ANDOVER||CA||-120.256384,39.301952  
 |ANDOVER||CT||-72.370816,41.737216  
 |ANDOVER||IL||-90.291968,41.293888  
 |ANDOVER||IA||-90.251648,41.979136  
 |ANDOVER||KS||-97.136128,37.713920  
 |ANDOVER||ME||-70.751680,44.635584  
 |ANDOVER||MA||-71.137472,42.658304  
 |ANDOVER||MN||-93.291136,45.233344  
 |ANDOVER||MO||-93.894976,40.564992  
 |ANDOVER||NH||-71.823872,43.436928  
 |ANDOVER||NJ||-74.742528,40.985856  
 |ANDOVER||NY||-77.795840,42.156416  
 |ANDOVER||OH||-80.572480,41.606656  
 |ANDOVER||PA||-78.084160,39.946368  
 |ANDOVER||SC||-82.205824,35.079168  
 |ANDOVER||SD||-97.902208,45.410304  
 |ANDOVER||VT||-72.697216,43.277248  
 |ANDOVER||VA||-82.796672,36.923584

|ANDOVER ESTATES||MD||-76.504704,38.168640  
|ANDOVER GOLF ESTATES||FL||-80.208640,25.963904  
|ANDOVER JUNCTION||NJ||-74.746112,40.996928  
|ANDOVER LAKESOUTH ESTATES||FL||-80.202240,25.965824  
|ANDOVER NORTH||GA||-84.302528,34.09446

The program recognizes that a search for a place (City, town, etc.) is being performed, but since there is no state or Zip code information, it does a sub-string search and returns all places found that contain the string 'Andover' in them.

*N = GeoFind('Andover,01810');*

Returns N = 1

|ANDOVER||MA|01810||-71.155800,42.648700

The ZipCode is used for the search.

*N = GeoFind('Andover,MA,02117');*

Returns N = 1

|BOSTON||MA|02117||-71.060300,42.358300

The ZipCode is used for the search. The correct coordinates (Boston) are returned, and the city/state specification is ignored.

*N = GeoFind('Main Street,Andover,MA');*

Returns N = 11

MAIN ST|ANDOVER|1 - 4|MA|01810||-71.140096,42.656896  
MAIN ST|ANDOVER|5 - 17|MA|01810||-71.139904,42.656512  
MAIN ST|ANDOVER|33 - 46|MA|01810||-71.139712,42.656128  
MAIN ST|ANDOVER|47 - 64|MA|01810||-71.139456,42.655680  
MAIN ST|ANDOVER|65 - 96|MA|01810||-71.138752,42.654720  
MAIN ST|ANDOVER|95 - 108|MA|01810||-71.138048,42.653696  
MAIN ST|ANDOVER|109 - 121|MA|01810||-71.137472,42.652864  
MAIN ST|ANDOVER|120 - 131|MA|01810||-71.136832,42.651840  
MAIN ST|ANDOVER|133 - 158|MA|01810||-71.135936,42.650752  
MAIN ST|ANDOVER|151 - 157|MA|01810||-71.135104,42.649600  
MAIN ST|ANDOVER|165 - 206|MA|01810||-71.134464,42.648320

All 'Main Street' segments are returned since there is no block number specified. The same results would have been returned if the specified search was:

*N = GeoFind('Main St,Andover,01810');*

*N = GeoFind('1000 Main,Andover,MA');*

Returns N = 1

|ANDOVER||MA||-71.137000,42.658000

*N = GeoFind('North Andover');*

Returns N = -1

|NORTH ANDOVER||MA||-71.135552,42.698624  
|NORTH ANDOVER||WI||-90.965824,42.815552  
|NORTH ANDOVER CENTER||MA||-71.112512,42.683328

*N = GeoFind('Main Street, North Andover');*

Returns N = -1

|NORTH ANDOVER||MA||-71.135552,42.698624  
|NORTH ANDOVER||WI||-90.965824,42.815552  
|NORTH ANDOVER CENTER||MA||-71.112512,42.683328

Since no unique North Andover was specified, no street search was performed, but a sub-string search on the place was done instead.

*N = GeoFind('North Andover,MA,01810');*

Returns N = 1

|ANDOVER||MA|01810||-71.155800,42.648700

Results based on ZipCode search.

*N = GeoFind('Andover,NH,1045');*

Returns N = 1

|ANDOVER||NH||-71.824000,43.437000

Invalid ZipCode so a City/State search was performed instead.

*N = GeoFind('N. andover,MA');*

Returns N = 1

|NORTH ANDOVER||MA||-71.136000,42.699000

*N = GeoFind('Lawrence,NH');*

Returns N = -1

|LAWRENCE CORNER||NH||-71.523904,42.847232

A substring search on the city, within the specified state, was performed.

```
N = GeoFind('Lawrence,MA,01845');
```

Returns N = 1

```
|NORTH ANDOVER||MA|01845||-71.117900,42.687600
```

Results based on ZipCode search

```
N = GeoFind('Lawrence,MA,02117');
```

Returns N = 1

```
|BOSTON||MA|02117||-71.060300,42.358300
```

### ***VB Example***

---

<b>GeoFindArray(S:string);</b>	<b>Method</b>
--------------------------------	---------------

---

It takes the same argument as the GeoFind routine. The results are returned through an interface StreetsArray, through a record structure, IStreetRec. This approach was incorporated to primarily accommodate developers not using visual environments, and therefore not being able to handle events fired by the OCX in order to examine the Street property for hits generated from GeoFind.

```
IStreetRec = record
    Name:string;
    Address:string;
    City:string;
    State:string;
    ZipCode:String;
    AreaCode:String;
    X:double;
    Y:double;
end;
```

The IStreetsArray Interface object has the following properties & methods.

IStreetsArray.Count	-	# of hits
IStreetsArray.Items[]	-	Indexed array of the unparsed strings that are usually returned by GeoFind
IStreetsArray.Streets[]	-	Indexed list of Parsed records of returned hits (Record Type IStreetRec)

**Delphi Example** Sample Code (Delphi)

```
procedure TForm1.GeoFindHitsClick(Sender: TObject);
//-----
// New Method GeoFindArray takes identical arguments to those
// used by GeoFind and returns an IStreetsArray.
```

```

//
//   IStreetsArray.Count      - # of hits
//
//   IStreetsArray.Items[] - Indexed array of the unparsed strings
//                           that are usually returned by GeoFind
//
//   IStreetsArray.Streets[]- ndexed list of Parsed records of
//                           returned hits (Record Type IStreetRec)
//
//   IstreetRec.Name         - Street Name
//   IstreetRec.Address      - Block #
//   SstreetRec.City         - City Name
//   IstreetRec.State        - State Name
//   IstreetRec.ZipCode      - ZipCode
//   IstreetRec.AreaCode     - Telephone Area Code (for Future use)
//   IstreetRec.X            - Latitude
//   IstreetRec.Y            - Longitude
//
//   or in terms of the indexed array...
//
//   Streets[n].Name        - Street Name
//   Streets[n].Address     - Block #
//   Streets[n].City        - City Name
//   Streets[n].State       - State Name
//   Streets[n].ZipCode     - ZipCode
//   Streets[n].AreaCode    - Telephone Area Code (for Future use)
//   Streets[n].X           - Latitude
//   Streets[n].Y           - Longitude
//-----
--

var SearchStr:string;
    i:integer;
    gHits:IstreetsArray;
begin
    SearchStr:=edit1.text;
    if length(SearchStr)<3 then
    begin
        SearchStr:='Market Street, Lowell, MA, 01852';
        edit1.text:=SearchStr;
    end;
    // Search for multiple hits by not specifying a block #
    gHits:=MapProl.GeoFindArray(SearchStr);
    ListBox1.clear;
    listBox1.Items.add('Found '+inttostr(gHits.count)+' Hits');
    // Note that AC was added to the record for completeness, and
possibly future
    // use. AC was never returned by the GeoFind method.
    listBox1.items.add('Listed below as: #, Street, City, State,
ZipCode, and AreaCode');
    // List all generated hits
    For i:=0 to gHits.count-1 do
    begin
        ListBox1.items.add(gHits.Streets[i].Address);
        ListBox1.items.add(gHits.Streets[i].Name);
        ListBox1.items.add(gHits.streets[i].City);
        ListBox1.items.add(gHits.streets[i].State);
        ListBox1.items.add(gHits.streets[i].ZipCode);
        ListBox1.items.add(gHits.streets[i].AreaCode+'(N/A)');
        ListBox1.items.add(floattostr(gHits.streets[i].x)

```

```

        +','+floattostr(gHits.streets[i].y));
    ListBox1.items.add('-----');
end;
// List the unparsed Strings
ListBox2.clear;
ListBox2.items.add('Unparsed strings for each hit');
for i:=0 to gHits.count-1 do
begin
    Listbox2.Items.Add(gHits.items[i]);
end;
Messagebeep(0);
end;

```

---

**GeoFindClose()**
**Procedure**


---

Clears the list object and returns all used memory to the pool. This should be called after GeoFindFirst/Next methods are used. (See GeoFindFirst for sample source code).

---

**GeoFindFirst(GeofindString:String):String**
**Procedure**


---

Searches for the specified criteria and creates a list object to hold the results and returns the first hit in the list. Returns an empty string if no further items exist in the list object. The returned result is a tab-delimited string with the following information:

Street #9 City #9 Block #9 State #9 ZipCode #9 Reserved #9 Lon,Lat

**VB Example**

```

Private Sub Command1_Click()
    If FirstTime = True Then
        s = MapProl.GeoFindFirst("Winter Street, Boston, MA")
        FirstTime = False
        nfd = 1
    Else
        nfd = nfd + 1
        s = MapProl.GeoFindNext
    End If
    If s <> Null Then
        Label4.Caption = "[" & Str(nfd) & "]" & s
    Else
        Label4.Caption = "No more Items Found"
        MapProl.GeoFindClose
    End If
    Label4.Visible = True
    Beep
End Sub

```

---

**GeoFindNext():String**
**Procedure**


---

Finds and returns the next item in the Geofind list object. Returns an empty string if no further items exist in the list.

**VB Example**

```

Private Sub Command1_Click()
    If FirstTime = True Then
        s = MapProl.GeoFindFirst("Winter Street, Boston, MA")
        FirstTime = False
        nfd = 1
    Else
        nfd = nfd + 1
        s = MapProl.GeoFindNext
    End If
    If s <> nil Then
        Label20.Caption = "[" & Str(nfd) & "]" " & s
    Else
        Label20.Caption = "No more Items Found"
    End If
End Sub

```

---

### GeoFindParse(Field, Result:String):String

### Procedure

Return the value of Field, from the result string generated by the GeoFindFirst or GeoFindNext methods.

**Field** The field whose value is to be returned. It can have one of these string values, STREET, CITY, ADDRESS, STATE, ZIPCODE, AREACODE, X, Y

**Result** The GeoFind result string being parsed.

**VB Example**

```

Private Sub Command21_Click()
    If FirstTime = True Then
        s = MapProl.GeoFindFirst(Text8.Text)
        FirstTime = False
        nfd = 1
    Else
        nfd = nfd + 1
        s = MapProl.GeoFindNext
    End If
    If s <> Null Then
        Label20.Caption = "[" & Str(nfd) & "]" " & s
    Else
        Label20.Caption = "No more Items Found"
    End If
    Label6.Caption = MapProl.GeoFindParse("ADDRESS", s)
    Label8.Caption = MapProl.GeoFindParse("STREET", s)
    Label10.Caption = MapProl.GeoFindParse("CITY", s)
    Label12.Caption = MapProl.GeoFindParse("STATE", s)
    Label14.Caption = MapProl.GeoFindParse("ZIPCODE", s)
    Label16.Caption = MapProl.GeoFindParse("AREACODE", s)
    Label18.Caption = MapProl.GeoFindParse("X", s) & ", " &
    MapProl.GeoFindParse("Y", s)
    Beep
End Sub

```

---

**GetProductCode:String**

---

**Property**

Returns the string that is needed to transmit to undertow in order to register a product. Normally this is not required as the OCX checks to determine if it is registered, and if not it initiates its own internal registration process and presents this information to the end user through its own dialogs. (Also see ExecRegister)

**VB Example**

```
Private Sub Command21_Click()  
    S = Mappro1.GetProductCode  
End Sub
```

---

**GetRouteFirst(x1,y1,x2,y2:double; Consolidate:boolean; Option:integer):String**

---

A List object added to the control to facilitate the calculation of routes in non-visual environments, that do not support event-driven operations. (Three methods were added to access this list object, GetRouteFirst, GetRouteNext, and GetRouteClose)

Where:

- x1,y1** - are the coordinates of the starting point,
- x2,y2** - are the coordinates of the endpoint
- Consolidate** - a flag that specifies whether to return each individual segment, or consolidate segments with the same name
- Option** - is an integer that specifies a variety of options to be used for the calculation (see FindRoute for a description of the same variable). It should be pointed out, however, that certain "Option" values that are available as part of the FindRoute method, have no effect when using the "GetRoute..." methods, as hown below:

Enumerated Constant	Value	Action
Rt_Clear	0	Clear Current Route
Rt_Spots	1	Mark the Start and End points
Rt_Hatch	2	Highlight the calculated route
Rt_Zoom	4	No Effect
Rt_Short	16	Calculate the Shortest route
Rt_Fast	32	Calculate the Fastest route
Rt_Direct	48	Calculate the most direct route (least # of turns. Note that this is a combination of Rt_Short and Rt_Fast).
Rt_Hours	64	Return the calculated time as a fraction of hr:min, not hr:min:sec.
Rt_km	128	Return the calculated distances in kilometers, not miles.
Rt_Total	512	Display total (cumulative) distance and time at the end of each road segment in the route.
Rt_PrtMap	1024	No Effect
Rt_PrtDir	2048	No Effect
Rt_NoERR	4096	Suppresses error dialog from display if no route is found
Rt_NoDlg	8192	No Effect
Rt_Degree	16384	Return the bearing as degrees, instead of literal.



This function returns the first entry in the routing calculation array, containing information about the first route segment, as a string made up of a number of fields, delimited by the tab character (#).

Here is the information (fields) returned.

Leg	- Integer identifying the # of this segment of the trip.
Type	- The CFCC Code for this road segment
Instructions	- Literal instructions for this Leg
Locale	- The local place & road name
Time	- The time required for this Leg, or the cumulative time, depending on the Option setting.
Dist	- The distance traveled for this Leg, or the cumulative distance, depending on the Option setting.
Speed	- Speed for this Leg (km/hr or mi/hr, based on Option)
Bearing	- Bearing for this Leg (Degrees or literal, based on Option)
Lon or X	- Longitude (or X-coordinate) of Leg start
Lat or Y	- Latitude (or Y-coordinate) of Leg start
Street	- The Street/Road name
Place	- The local place name

It should be noted the first string returned when the event is fired contains the literal 'Start' in the third field, while the last string returned, at the completion of the route calculation, contains the literal 'Finish' in the third field.

---

## GetRouteNext():String

## Procedure

---

Returns the next string of the List Object. If the end of the list has been reached, a blank string is returned.

**Delphi Example**

```
procedure TForm1.Button5Click(Sender: TObject);
// List Calculated Route segments
var s,t:string;
    i,j:integer;
begin
    i:=0;
    s:=pmap61.GetRouteFirst(-71.77,42.55, -71.81,42.70, true,
                           Rt_Spots +
                           Rt_Hatch +
                           Rt_Zoom +
                           Rt_Total+
                           8192);
    messagebeep(0);
    repeat
        listbox1.Items.add('* New Leg');
        inc(i);
        for j:=1 to 12 do
            begin
                t:=Pmap61.GetRouteParse(j,s);
                listbox1.Items.add(t);
            end;
        s:=pmap61.GetRouteNext;
```

```

until s='';
Pmap61.GetRouteClose;
end;

```

---

**GetRouteClose()**
**Procedure**


---

Destroys the Routing List Object and returns all resources to the system. Needs to be used once the developer is finished with the GetRouteFirst/Next methods.

---

**RouteParse(Fld:Variant, s:string):String**
**Procedure**


---

Parses the results returned by the GetRouteFirst, GetRouteNext, GetOptiFirst, GetOptiNext methods.

**Fld** - FieldName or Index #  
**s** – StringToBeParsed

Fld is one of the fields (or its equivalent fld #) from the list presented earlier, i.e.,

Here is the information (fields) returned.

No	Name	Explanation
1	Leg	Integer identifying the # of this segment of the trip.
2	Type	The CFCC Code for this road segment
3	Instructions	Literal instructions for this Leg
4	Locale	The local place & road name
5	Time	The time required for this Leg, or the cumulative time, depending on the Option setting.
6	Dist	The distance traveled for this Leg, or the cumulative distance, depending on the Option setting
7	Speed	Speed for this Leg (km/hr or mi/hr, based on Option)
8	Bearing	Bearing for this Leg (Degrees or literal, based on Option)
10	Lon or X	Longitude (or X-coordinate) of Leg start
11	Lat or Y	Latitude (or Y-coordinate) of Leg start
12	Street	The Street/Road name
13	Place	The local place name

For example, GetRouteParse(2,GetRouteNext)) or GetRouteParse(Type,GetRouteNext)) would return the CFCC road type of the current Route Leg.

**VB Example**

```

Private Function MyQFactor() As Integer
MyQFactor = 1
If MapPro1.GeoFindParse(3, MapPro1.Street) <> "" Then
MyQFactor = 5

```

```

Else
  If MapPro1.GeoFindParse(1, MapPro1.Street) <> "" Then
    MyQFactor = 4
  Else
    If MapPro1.GeoFindParse(2, MapPro1.Street) <> "" Then
      MyQFactor = 3
    Else
      If MapPro1.GeoFindParse(5, MapPro1.Street) <> "" Then
        MyQFactor = 2
      Else
        If MapPro1.GeoFindParse(4, MapPro1.Street) <> "" Then
          MyQFactor = 1
        End If
      End If
    End If
  End If
End If
End Function

```

---

<b>GetViaRouteFirst(Consolidate:Boolean; Options:Integer):String</b>	<b>Procedure</b>
--	------------------

---

Used to perform a routing calculation with Via points and return the results in a list object. Consolidate controls whether the similarly named road segments will be consolidated into a continuous segment, and Options is the same Options parameter used in the FindRoute method. This method creates a list object and populates it with the calculated routing instructions, and returns the first one. See GetViaRouteNext and GetViaRouteStop for information on how to get the remaining directions and close the list object.

The returned string is of the same format as the string returned in the GetRouteFirst/Next and can therefore be parsed using the GetRouteParse method.

**VB Example**

```

Private Sub Command104_Click()
  ' Clear the list object to get the results
  ' of the new routing calculation
  List1.Clear
  ' Get the first routing leg. This presumes that
  ' Some Via points have been defined.
  If Check1.Value = 1 Then
    s = MapPro1.GetViaRouteFirst(True, 31)
  Else
    s = MapPro1.GetViaRouteFirst(False, 31)
  End If
  ' Continue to get the rest of the routing segments
  While s <> ""
    List1.AddItem s
    s = MapPro1.GetViaRouteNext
  Wend
  ' Close the list object
  MapPro1.GetViaRouteClose
End Sub

```

---

<b>GetViaRouteNext():String</b>	<b>Procedure</b>
---------------------------------	------------------

---

Returns the next string of the List Object created when GetViaRouteFirst is called. If the end of the list has been reached, a blank string is returned.

---

**GetViaRouteClose():String****Procedure**

---

Closes the list object created when GetViaRouteFirst is called, and releases all resources used by the object back to the system.

---

**GotoPoint(x, y: OleVariant)****Procedure**

---

Centers the viewport around the specified lon/lat coordinate in decimal degrees. The screen is updated after this command. (Note that no change of the scale takes place).

**VB Example**

```
Private Sub Command1_Click()  
    Call MapProl.GotoPoint(-110,42)  
    Or  
    MapProl.GotoPoint -110,42  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button7Click(Sender: TObject);  
begin  
    MapProl.GotoPoint(-110,42);  
end;
```

---

**Grid:Boolean**

---

Makes visible the lon and lat grid lines on the map, with appropriate scale labeling. The labeling depends on the value of the property LLMode (which also controls the display format in the coordinate area of the toolbar). An alternative way to control the labeling of the Grid lines is through the use of the property of degFormat.

**Note:** It should be noted that when LLMode=3, the grid labels are in Deg.DecimalMinutes, as it would make no sense to label them with screen coordinates.

**VB Example**

```
Private Sub Command39_Click()  
    ' Button to display gridstatus  
    MapProl.Grid=1  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button8Click(Sender: TObject);  
begin  
    // Button to display gridstatus  
    MapProl.Grid:=1;  
end;
```

Windows Handle of the OCX container. Used by Windows API calls to manage the control.

**VB Example**

```
Private Sub Command39_Click()  
    dc=getdc(MapProl.handle)  
End Sub
```

**Delphi Example**

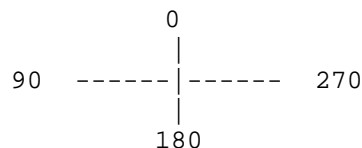
```
{-----}  
{ Draw a line using the control's DrawLine Method      }  
{-----}  
var dc,w,color,mode:longint;  
begin  
    {get the dc for the map object}  
    dc:=getdc(MapProl.handle);  
    {set the color to blue}  
    Color:=clblue;  
    {set the mode to raster operation to R2_MergePen}  
    Mode:=R2_MergePen;  
    {set the width to 10 pixels}  
    W:=10;  
    {Draw a line from Chicago to LA.  Note that if the screen}  
    {is updated, the line is not redrawn unless it's tied to}  
    {the OnPaintAfter event}  
    MapProl.DrawLine(dc,-87.65,41.84,-118.24,34.05,W,Color,Mode);  
    {finally, release the dc}  
    releasedc(handle,dc);  
end;
```

---

**HeadsUp(x1,y1,x2,y2:OleVariant):longint****Function**

---

Given the coordinates of two points (Lat/Lon), it returns the angle (degrees) that the map must be rotated by, in order for the "PointOne-to-PointTwo" direction to be UP. Note that the zero degree angle is due North, and the positive rotation is counterclockwise. Useful for developers that need to always display direction of movement, for example, always up.



**VB Example**

```
Private Sub Command39_Click()  
    'Use two points on horizontal line, which  
    'should rotate the map by 90 degrees  
    Dim x as Long  
    x = MapProl.Headsup -101.56,48.12,-101.43,48.12  
    MapProl.Rotate(x)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button1(Sender: TObject);  
var x:longint;  
begin
```

```

    { Use two points on horizontal line, which
      should rotate the map by 90 degrees }
    x:=MapProl.Headsup(-101.56,48.12,-101.43,48.12);
    MapProl.Rotate(x);
end;

```

---

## HelpPath:String

Property

---

Specifies the help file/path to be used by Winhelp when the question mark icon on the toolbar is clicked.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.helppath="d:\cmap40\help\pmap.hlp"
End Sub

```

**Delphi Example**

```

Procedure TForm1.FormCreate(Sender: TObject);
begin
    MapProl.helppath="d:\cmap40\help\pmap.hlp";
end;

```

---

## HideAllItems()

Procedure

---

Sets the attribute for all user-created item objects to invisible.

**VB Example**

```

Private Sub Command39_Click()
    MAPPRO1.HideAllItems
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button9Click(Sender: TObject);
begin
    MapProl.HideAllItems;
end;

```

---

## InitNonVis()

Procedure

---

It is recommended that this new method is called right after the object is created in a non-visual environment (i.e. ASP). It forces the build-in map (USA with coarse highway network) to be loaded and gets the application handle. Not using this method may result in non-visual applications not displaying any mapping info until after the first need to update the screen, due to a zoom operation, etc.

---

## Int2Lat(i:Integer):Double

Function

---

Returns a real value of the Latitude, given the Y coordinate in screen units.

**Note:** It only applies to non-rotated maps. An incorrect coordinate will be returned if the map has been rotated.

**VB Example**

```
Private Sub Command39_Click()  
    Dim x as Single  
    Dim p as Integer  
    p = 345  
    x = MAPPRO1.Int2Lat(p)  
    Text1 = Str(x)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button3Click(Sender: TObject);  
var Yd:string[12];  
    p:integer;  
begin  
    p:=345;  
    floatttstr(MapProl.Int2Lat(p));  
    panel2.caption:='Lat = '+Yd;  
end;
```

---

**Int2Lon(i:Integer):Double****Function**

---

Returns a real value of the Longitude, given the X coordinate in screen units.

**Note:** An incorrect coordinate will be returned if the map has been rotated.

**VB Example**

```
Private Sub Command39_Click()  
    Dim x as Single  
    Dim p as Integer  
    p = 345  
    x = MAPPRO1.Int2Lon(p)  
    Text1 = Str(x)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button6Click(Sender: TObject);  
var Yd:string[12];  
    p:integer;  
begin  
    p:=412;  
    floatttstr(MapProl.Int2Lon(p));  
    panel2.caption:='Lon = '+Yd;  
end;
```

---

**IsDrawing:Boolean****Property**

---

When true, it indicates that the control is in the process of drawing the map. The \*true\* state of the Boolean initiates when the Windows OS message to Paint is issued, and is terminated when all painting of the control is completed.

**VB Example**

```
Private Sub Command39_Click()  
    If Mappro1.IsDrawing = False Then
```

```

    MapProl.ZoomAll
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button8Click(Sender: TObject);
begin
    with MapProl do
    begin
        If Not(IsDrawing) then ZoomPan(2);
    end;
end;

```

---

### **ItemFontSize:Integer**

**Property**

Sets the size of the font to be used for the user items placed on the map control by the SetItem method.

**VB Example**

```

Private Sub Command105_Click()
' Set font size for labeling user items
MapProl.ItemFontSize = 20
' Set a user item
MapProl.SetItem 1, -70, 40
MapProl.SetItemString 1, "Sample"
' Refresh the screen to show the label
MapProl.Refresh
End Sub

```

---

### **Kms Property:Double**

This property sets the scale of the map control. The value of Kms is the number of Kilometers per logical inch of the control. This results in much more accurate zooming than that using the Magnitude property.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.Kms=27
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button1Click(Sender: TObject);
begin
    { Set Scale to 20 Kms to the inch}
    MapProl.Kms=27;
end;

```

---

### **Lat2Int(x:OLEVariant):Integer**

**Function**

Returns an integer giving the Latitude equivalent in device coordinates. Truncates to the nearest pixel.



**Note:** An incorrect value will be returned if the map has been rotated. See the LL2INT function for getting the equivalent information, even with rotated maps.

**VB Example**

```
Private Sub Command39_Click()  
    Dim x as Integer  
    x = MapProl.Lat2Int(MapProl.ycord)  
    Text1 = Str(x)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button3Click(Sender: TObject);  
var Yd:string[12];  
begin  
    inttstr(Lat2Int(MapProl.ycord),Yd);  
    panel2.caption:='Lon Equivalent: '+Yd;  
end;
```

---

## LatBottom:Double

Property

---

Indicates the Latitude of the lower edge of the map view window.

**VB Example**

```
Private Sub Command39_Click()  
    Dim x as Double  
    x = MapProl.LatBottom  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button11Click(Sender: TObject);  
var xt:double;  
begin  
    xt:=MapProl.Latbottom;  
end;
```

---

## LatCenter:Double

Property

---

Indicates the Latitude of the center point of the map view window.

**VB Example**

```
Private Sub Command105_Click()  
    Dim x As Double, y As Double, xd As Double, yd As Double  
    Dim deltaX As Double, deltaY As Double  
  
    ' Obtain center coordinates  
    x = MapProl.LonCenter  
    y = MapProl.LatCenter  
    'Calculate center coordinates using alternate method  
    yd = (MapProl.LatTop + MapProl.LatBottom) / 2  
    xd = (MapProl.LonLeft + MapProl.LonRight) / 2  
    ' Deltas should be zero  
    deltaX = x - xd  
    deltaY = y - yd  
End Sub
```

---

**LatTop:Double**

---

**Property**

Indicates the Latitude of the upper edge of the map view window.

**VB Example**

```
Private Sub Command39_Click()  
    Dim x as Double  
    x = MapProl.LatTop  
End Sub
```

**Delphi Example**

```
Procedure TForm1.Button15Click(Sender: TObject);  
var x:double;  
begin  
    x:=MapProl.LatTop;  
end;
```

---

**LL2INT(x,y:OLEVariant):LongInt**

---

**Function**

Take the lon (x) and lat (y) coordinates and return a packed long integer containing the rotated screen coordinates, lon (x) in the 'high' word and lat (y) in the 'low' word.

**Note:** The user does not have to perform the calculation transformation. For example, if the user was drawing a line from unrotated coordinates x1,y1 to x2,y2, then in Delphi,

```
xy1:=MapPro1.LL2INT(x1,y2);  
xx1:=loword(xy1);  
yy1:=hiword(xy1);  
xy2:=MapPro1.LL2INT(x2,y2);  
xx2:=loword(xy2);  
yy2:=hiword(xy2);
```

xx1,yy1 and xx2,yy2 would be the rotated screen coordinates corresponding to x1,y1 and x2,y2.

**VB Example**

```
Private Sub Command39_Click()  
    Dim x as Integer  
    x = MapProl.LL2Int(MapProl.ycord)  
    Text1 = Str(x)  
End Sub
```

**Delphi Example**

```
Procedure TForm1.MapProlpaintAfter(Sender: TObject; dc: Integer);  
var testing1,testing2,i,j,ix1,iy1,ix2,iy2:longint;  
    hp:hpen;  
    DInteger:integer;  
begin  
    i := MapProl.LL2int(MapProl.LonLeft, MapProl.LatTop);  
    j := MapProl.LL2int(MapProl.LonRight, MapProl.LatBottom);  
    ix1 := i div 65536;  
    iy1 := i Mod 65536;  
    ix2 := j div 65536;  
    iy2 := j Mod 65536;  
    val(edit2.text,MyBlue,code);  
    hp:=createpen(ps_solid,5,RGB(MyRed,MyGreen,MyBlue));
```

```

hp:=selectobject(dc, hp);
MoveToEx(dc, iX1, iY1, nil);
LineTo(dc, iX2, iY2);
deleteobject(selectobject(dc, hp));
end;

```

---

## LLMode:Integer

## Property

---

Sets the format to be used when displaying the coordinates in the toolbar area. Also sets the format for the Grid line labels.

LLMode can take the following values:

- 0 - LLDMS (Display format DD MM' SS")
- 1 - LLDEG (Display format DD.xxxxxx)
- 2 - LLInternal (Display internal coordinate, LongInt)
- 3 - LLScreen (Display screen coordinates)

**Note:** The user may also cycle through these different display formats by clicking in the coordinate display area when the toolbar is visible.

**Delphi Example**

```

Procedure TForm1.Button15Click(Sender: TObject);
var x:double;
begin
    x:=MapProl.LLMode:=1;
end;

```

---

## Load\_Air:Boolean

## Property

---

When true enables loading of the airport data layer. The layer remains visible all the way down to the detailed Tiger data level (<2 mi).

**VB Example**

```

Private Sub Command39_Click()
    MapProl.Load_Air = Not MapProl.Load_Air
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button15Click(Sender: TObject);
begin
    MapProl.Load_Air:=not(MapProl.Load_Air);
end;

```

---

## Load\_City:Boolean

## Property

---

When true enables loading of the city, place and county names data layer. It remains visible all the way down to the detailed Tiger data level (<2 mi).

**VB Example**    Private Sub Command39\_Click()  
                   MapProl.Load\_city = Not MapProl.Load\_city  
 End Sub

**Delphi Example** Procedure TForm1.Button15Click(Sender: TObject);  
 begin  
     MapProl.Load\_City:=not(MapProl.Load\_City);  
 end;

---

### **Load\_County: Boolean**

**Property**

---

When true enables loading of county area information so that it may be shaded. Visibility of this layer is turned off at the Tiger data level (<2 mi).

**VB Example**    Private Sub Command39\_Click()  
                   MapProl.Load\_county = Not MapProl.Load\_county  
 End Sub

**Delphi Example** Procedure TForm1.Button5Click(Sender: TObject);  
 begin  
     MapProl.Load\_county:=not(MapProl.Load\_county);  
 end;

---

### **Load\_Highway: Boolean**

**Property**

---

When true, it enables loading of the National Highway Network data layer. Visibility of this layer is turned off at the Tiger data level (<2 mi).

**VB Example**    Private Sub Command39\_Click()  
                   MapProl.Load\_highway = Not MapProl.Load\_highway  
 End Sub

**Delphi**            Procedure TForm1.Button9Click(Sender: TObject);  
 begin  
     MapProl.Load\_highway:=not(MapProl.Load\_highway);  
 end;

---

### **Load\_Hydro: Boolean**

**Property**

---

When true, it enables loading of the USGS major water bodies and rivers layer. Visibility of this layer is turned off at the Tiger data level (<2 mi).

**VB Example**    Private Sub Command39\_Click()  
                   MapProl.Load\_hydro = Not MapProl.Load\_hydro  
 End Sub

---

**Load\_Landmark:Boolean**

---

**Property**

When true, it enables loading of the landmark data layer. Visibility of this layer is enabled only below the Tiger data threshold (<2 mi).

**Note:** Depending on the map scale, landmarks are displayed as,

- (a) 2x2 bit color coded marker, at about 2 mi scale
- (b) 12x12 bit color coded rectangle with a landmark number, at about 0.5 mi scale (see Precision Mapping Help for landmark identification numbers)
- (c) 12x12 bit color icon and the actual landmark name (where available) at less than 1000 ft scale (see Precision Mapping Help for landmark identification icons and numbers)

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Load_landmark = Not MapProl.Load_landmark  
End Sub
```

**Delphi**

```
Procedure TForm1.Button7Click(Sender: TObject);  
begin  
    MapProl.Load_landmark:=not(MapProl.Load_landmark);  
end;
```

---

**Load\_State:Boolean**

---

**Property**

When true enables loading of the state and county political border data.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Load_state = Not MapProl.Load_state  
End Sub
```

**Delphi**

```
Procedure TForm1.Button5Click(Sender: TObject);  
begin  
    MapProl.Load_state:=not(MapProl.Load_state);  
end;
```

---

**LoadConfig(path:String)**

---

**Procedure**

Loads the configuration file specified by the full path specification, 'Path'. Note that the default configuration file name, used by AutoConfig is **MapPro71.cfg**

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Loadconfig (App.Path & "\MapPro.cfg")  
End Sub
```

**Delphi**

```
Procedure TForm1.Button1Click(Sender: TObject);  
begin  
    // Load the file MAPPRO.OCX from the directory d:\MyData  
    MapProl.LoadConfig('d:\MyData\MAPPRO.CFG');
```

end;

---

**Loaded:Boolean****Method**

---

This is used when running the OCX in a non-visual environment. This forces the OCX to load all of the necessary data files and configurations that are normally done in a visual environment automatically.

**VB Example**

```
Private Sub Form_Load()  
  
    'Create the object  
    Set MapProl = CreateObject("MapPro50.Pmap")  
  
    'Load in all of the little things that are in the  
    'Config file - if you want to change your paths  
    'do it after the Loaded statement  
    MapProl.AutoConfig = True  
    MapProl.Loaded  
  
    'Set your map size  
    MapProl.ResizeCtl 300, 300  
  
    'Echo your paths so you know it loaded the config  
    'file. Sometimes you don't know which MapPro50.cfg  
    'file it is loading in.  
    MsgBox MapProl.Path_states0  
  
End Sub  
  
Private Sub Command1_Click()  
    MapProl.Miles = 1  
    MapProl.GotoPoint -85, 41  
    MapProl.SetItem 1, -85, 41  
    MapProl.SetItemString 1, "MapOCX"  
    MapProl.SaveToGif "C:\Test.gif"  
    Picture1.Picture = LoadPicture("C:\Test.gif")  
    Picture1.Refresh  
End Sub
```

---

**LoadExclusion(filename:String)****Procedure**

---

Loads the list of bounding box coordinates from the specified file. The exclusion bounding polygons read from the file replace any such polygons currently in the memory-based exclusion list. The bounding boxes are used to exclude areas in route.

**Delphi**

```
Procedure TForm1.Button35Click(Sender: TObject);  
begin  
    // Load exclusions file - assumed extension: .exl  
    Pmap61.LoadExclusion('MyRtExcFile');  
end;
```

---

**LoadStreets(s:String)**

---

**Procedure**

Loads a User Street file specified by a file name. It replaces any user streets currently in memory.

**VB Example**

```
Private Sub Command2_Click()  
    MapProl.LoadStreets ("C:\Steets.Str")  
End Sub
```

---

**LoadViaFile(s:String)**

---

**Procedure**

Loads a file containing Via points to be used for routing.

**VB Example**

```
Private Sub Command2_Click()  
    MapProl.LoadStreets ("C:\Steets.via")  
End Sub
```

---

**Lon2Int(x:OLEVariant):Integer**

---

**Function**

Returns an integer giving the Longitude equivalent in device coordinates. Truncates to the nearest pixel.

**Note:** An incorrect value will be returned if the map has been rotated. See the LL2INT function for getting the equivalent information, even with rotated maps.

**VB Example**

```
Private Sub Command39_Click()  
    Dim x as Integer  
    x = MapProl.Lon2Int(MapProl.xcord)  
    Text1 = Str(x)  
End Sub
```

**Delphi**

```
Procedure TForm1.Button4Click(Sender: TObject);  
var Xd:string[12];  
begin
```

---

**LonCenter:Double**

---

**Property**

Indicates the Longitude of the center point of the map view window. (Also see LatCenter)

---

**LonLatStr(x,y:OLEVariant):String**

---

**Function**

Returns a formatted string for the specified Lon/Lat coordinates. X and Y are decimal coordinates, and the returned string contains the coordinates in Deg.Min.Sec format.

**VB Example** Private Sub Command39\_Click()  
 Text1.text = MapProl.lonlatstr(-120,32)  
 End Sub

**Delphi** Procedure TForm1.Button7Click(Sender: TObject);  
 begin  
 panel2.caption:=MapProl.lonlatstr(-120,32);  
 end;

---

## LonLeft:Double

**Property**

---

Indicates the Longitude of the left edge of the map view window.

**VB Example** Private Sub Command39\_Click()  
 Dim x as Double  
 x = MapProl.LonLeft  
 End Sub

**Delphi** Procedure TForm1.Button5Click(Sender: TObject);  
 var xl:double;  
 begin  
 xl:=MapProl.LonLeft;  
 end;

---

## LonRight

**Property**

---

Indicates the Longitude of the right edge of the map view window.

**VB Example** Private Sub Command39\_Click()  
 Dim x as Double  
 x = MapProl.LonRight  
 End Sub

**Delphi** Procedure TForm1.Button18Click(Sender: TObject);  
 {Calculate screen center coordinates }  
 var Centerx,CenterY:double;  
 begin  
 CenterX:=(MapProl.lonleft+MapProl.lonright)/2;  
 CenterY:=(MapProl.lattop+MapProl.Latbottom)/2;  
 end;

---

## Magnitude:Integer

**Property**

---

This property controls the scale of the map in the viewport. When the magnitude property is set, the value of the internal "Scale" property changes as well.



Magnitude is an enumerated variable that can take the following values (Note that the scale of Magnitude is approximate. See the Miles property for more accurate scaling):

```

0 : M500_0  500 mi to the inch
1 : M300_0  300 mi to the inch
2 : M200_0  200 mi to the inch
3 : M100_0  100 mi to the inch
4 : M050_0   50 mi to the inch
5 : M030_0   30 mi to the inch
6 : M020_0   20 mi to the inch
7 : M010_0   10 mi to the inch
8 : M005_0    5 mi to the inch
9 : M003_0    3 mi to the inch
10 : M002_0   2 mi to the inch
11 : M001_0   1 mi to the inch
12 : M000_5   0.5 mi to the inch
13 : M000_3   0.3 mi to the inch
14 : M000_2   0.2 mi to the inch
15 : M000_1   0.1 mi to the inch

```

**Note:** Although the largest enumerated magnitude (15) corresponds to approximately 0.1 mi/inch, internally, the maximum scale limit is 0.025 mi/inch. So, setting a magnitude of 15 would zoom in, however, further zooming might be possible using the mouse. Also, setting the Scale property to a value greater than 10, would result in maximum magnification.

**VB Example** `Private Sub Command39_Click()  
MapProl.Magnitude = 3  
End Sub`

**Delphi** `Procedure TForm1.Button2Click(Sender: TObject);  
begin  
{ Set Magnitude scale to 50 mi/in }  
MapProl.Magnitude:=4;  
end;`

---

## MainLay:Boolean

**Property**

---

When true enables loading of the Main Tiger Data Set.

**VB Example** `Private Sub Command39_Click()  
MapProl.MainLay = False  
End Sub`

**Delphi** `Procedure TForm1.Button3Click(Sender: TObject);  
begin  
MapProl.MainLay:=False;  
end;`

---

## MapCount:LongInt

**Property**

---

This read-only property returns the number of map generations or map redraw actions. This is used when licensing for internet server or per transaction licensing.

This property controls the built in behavior of zooming. Autozooming is enabled when mapmode is set to a value of 0 (MdZoom) and is evidenced by the Zoom circle cursor. A value of 1 (MdUser) permits users to set their own cursor type, and it disables the default zoom/window mode. Note that while in this latter mode, the user still has access to the Xcord, Ycord properties which, for example, may be used with the SetItem procedures to place user-created objects, using an OnMouse... event. A value of 2 permits users to add/delete or edit user-defined street segments. See APPENDIX L for Mode 2 (Adding Streets).

**Note:** When MapMode=2 is invoked, the cursor changes to a plain cross-hair that can be used to locate vertices of a new street segment. As the cursor moves around, a circle of "snap" or "attach" influence can be seen tracking the cursor movement always being on an existing road segment. If the cursor is inside this influence circle, when the left mouse button is clicked, then the current vertice will attach (snap) to the existing road point in the circle.

The user may continue to press the left mouse button and define new vertices (belonging to the same street polyline) at will. When the desired number of vertices have been defined, the user may press the right mouse button to signify completion of the current street polyline definition. It should be noted that when the Street editing mode is invoked, all user-defined road segments become cyan for better/quicker identification.

When the right mouse button is pressed, a dialog appears that permits the user to specify the name for the created segment, as well as to assign the desired road attribute. The options available in this dialog are:

**(File) New** Clears all currently defined segments from memory (make certain you have saved any road segments you want, prior to selecting this command ).

**(File) Open** Load a user specified external roads file, (see further down for file structure). Note that this operation will erase ALL user-defined segments currently in memory before loading the specified roads file (also see File, Merge.)

**(File) Save** The user may save the currently defined street segments to a file (the extension .STR is automatically appended)

**(File) Merge** Load a user specified external roads file, (see further down for file structure). Note that this operation will does NOT erase-user defined segments currently in memory but merges them with the ones loaded from the specified file.

**(File) Exit** Close the street editing dialog (note that this does NOT cancel the street editing mode, which can only be done by setting the appropriate MapMode value.)

**(Options) ZoomAll** Zooms the view port to the extents of all User Defined streets currently in memory.

**(Options) Attach** Toggles the display and operation of the "attach" circle on or off.

**(Options) Ortho** When toggled on, only horizontal and vertical street orientations are permitted.

**Name** This is the name assigned to the current road segment by the user. It's used to label the road segment, search for it, etc. (Note: When searching for streets, these road segments are identified as "User Defined" in the listbox that appears in the search dialog.)

**Road Type** Five Road types are allowed. The descriptions of these types in the dialog are self-explanatory.

**Add [Button]** Adds a newly defined road segment to the list of road segments already in memory. Note that these segments are NOT saved unless the File, Save command (from this dialog) is executed.

**Modify [Button]** Replaces the attributes of the currently selected road segment with new ones specified in the dialog.

**Delete [Button]** Deletes the currently selected road segment from the list of segments in memory (but not from a file such segments have been saved in, unless the File, Save command is executed subsequent to the deletion)

**Cancel [Button]** Close the street editing dialog (note that this does NOT cancel the street editing mode, which can only be done by setting the appropriate MapMode value.)

- a) A defined road segment is selected for editing, or deletion, by placing the cursor on the segment and pressing the left mouse button while holding down the Shift key. The selected road segment will assume flashing highlight attribute to clearly show the used that it is being modified
- b) The user-created road segments are NOT visible at scales above the Tiger Street level scale, i.e. about 2 miles. Also, the editing mode should not be activated if the current scale is not at the Tiger street level scale or lower.
- c) The number of road segments that can be loaded at any given time is 50,000.
- d) User defined road segments may be "searched for" using the standard searching techniques of MAPPRO, by specifying the assigned street name.
- e) While in the street editing mode, road segment vertices may be moved by placing the mouse cursor on them, and holding down the control key and the left mouse button. This action engages the vertex which may them be dynamically moved to a new location. When the mouse button is released, the new location of the vertex become permanent.

### **User-Created Street file format (plain text)**

```
Street File:Chicago Map Corporation
STR "RoadName/SecondaryFileName" Class N
x1 y1
x2 y2
...
...
xN yN
```

where: *First Line is an identifying header line*

*STR* - Keyword used internally

*RoadName* - Name specified for the road by the user. Used for display and search purposes. Note that a secondary name may also be specified using the slash character as a separator.

*Class* - 50: Interstate  
59: Primary Highway  
68: Major Road  
77: Minor Road  
93: Ramp

*N* - Number of points for this Road segment

*x1, y1* - The longitude and latitude (x and y) coordinates for each of the segments defining this road (in decimal degree units). It should be noted that streets files created with earlier releases of MAPPRO40.OCX, i.e., without the header line and using internal coordinates, may still be read by the OCX transparently.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.mapmode = MdUser  
    MapProl.cursor = 17  
End Sub
```

**Delphi**

```
Procedure TForm1.SpeedButton10Click(Sender: TObject);  
begin  
    { set default mode }  
    MapProl.Mapmode:=mdZoom;  
end;  
  
Procedure TForm1.Button4Click(Sender: TObject);  
begin  
    { Set User mode and North/South cursor }  
    MapProl.mapmode:=MdUser;  
    MapProl.cursor:=crsizens;  
end;
```

---

## MapUnits:Integer

## Property

---

This property controls the units used in the mapping application of the OCX control. If equal to 0, or 'Mumi', then the units are miles. If equal to 1, or 'Mukm' the units are kilometers.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.mapmode = MdUser  
End Sub
```

**Delphi**

```
Procedure TForm1.Button4Click(Sender: TObject);  
begin  
    { Set Units to miles }  
    MapProl.mapmode:=MdUser;  
end;
```

---

**Miles:Double**

---

**Property**

---

This property sets the scale of the map control. The value of Miles is the number of miles per logical inch of the control. This results in much more accurate zooming than that using the Magnitude property.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Miles = 27  
End Sub
```

**Delphi**

```
Procedure TForm1.Button1Click(Sender: TObject);  
begin  
    { Set Scale to 27 miles to the inch}  
    MapProl.Miles=27;  
end;
```

---

**OnClick**

---

**Event**

---

Issued when a mouse clicks on the control surface.

**VB Example**

```
Private Sub MapProl_Click()  
    Dim x As Integer  
    x = MapProl.Lat2Int(MapProl.Ycord)  
    Text1 = Str(x)  
End Sub
```

**Delphi**

```
Procedure TForm1.MapProlClick(Sender: TObject);  
{-----}  
{ In Click mode.  Select current location }  
{-----}  
var dc:integer;  
begin  
    defx1:=MapProl.xcord;  
    defy1:=MapProl.Ycord;  
    str(defx1:10:6,xc1);  
    str(defy1:10:6,yc1);  
    Panel2.Caption:='Selected: Point #1 = '+ xc1 + ', ' + yc1);  
end;
```

---

**OnDblClick**

---

**Event**

---

Issued when a mouse double clicks on the control surface.

**VB Example**

```
Private Sub MapProl_DblClick()  
    Dim x As Integer  
    x = MapProl.Lat2Int(MapProl.Ycord)  
    Text1 = Str(x)  
End Sub
```

**Delphi**

```

Procedure TForm1.ListBox1DblClick(Sender: TObject);
var temp:string;
    dc,j,i,code:integer;
    x,x1,y1,x2,y2:real;
begin
    Temp:=listbox1.items[listbox1.itemindex];
    j:=pos(chr(9),temp);
    temp:=copy(temp,j+1,length(temp)-j);
    j:=pos(chr(9),temp);
    val(copy(temp,1,j-1),x1,code);
    temp:=copy(temp,j+1,length(temp)-j);
    j:=pos(chr(9),temp);
    val(copy(temp,1,j-1),y1,code);
    temp:=copy(temp,j+1,length(temp)-j);
    MapProl.gotopoint(x1,y1);
end;

```

---

## OnDirect

## Event

Issued when DirectDraw has finished processing the Map, the Overlay and the User layer, but prior to setting the scale factor used by DirectDraw to map the OCX control surface to the user specified DC.

**VB Example**

```

Private Sub MapProl_Direct(ByVal dc As Long)
    Call MapProl.DrawScalebar(Printer.hdc, 3, 3)
End Sub

```

**Delphi**

```

Procedure TForm1.MapProlDirect(Sender: TObject; dc: Integer);
{-----}
{ Processes to be done following a DirectDraw }
{-----}
var hp:hpen;
begin
    hp:=createpen(ps_solid,4,RGB(0,0,255));
    hp:=selectobject(dc,hp);
    {Paint Blue line}
    MoveToEx(dc, 10,10, nil);
    Lineto(dc,60,60);
    deleteobject(selectobject(dc,hp));
end;

```

---

## OnDirectBefore

## Event

Performs the specified Operations immediately before re-painting the map by DirectDraw on the user specified surface. The painting on the control surface is completed in this order:

- The OnDirectBefore Event is triggered
- The map is painted
- The overlay is painted
- The OnDirect event is triggered
- The user layer is painted

**VB Example** Private Sub MapProl\_PaintBefore(ByVal dc As Long)  
 Call MapProl.DrawScalebar(Printer.hdc, 3, 3)  
 End Sub

**Delphi** Procedure TForm1.MapProldirectBefore(Sender: TObject;dc: Integer);  
 {-----}  
 { Draw a blue line at the specified Lat/Lon coordinates }  
 { prior to the map being drawn to the dc. }  
 { Note that in order for the line draw here to be visible, }  
 { shading has to be turned off }  
 {-----}  
 begin  
 {Use DrawLine so that the line can be clipped to the  
 viewing window if necessary }  
 MapProl.Drawline(dc,-101.34056,34.55798,  
 -99.32330,30.676885,4,clblue,R2\_CopyPen);  
 end;

---

## OneWayColor:Integer

**Property**

Color to be used for highlighting One-way street segments above the double-line-road zoom levels, and the arrows when at double-line level. A negative value indicates no highlighting will be done. Note that because of the need to retain the data structure in older versions of MapPro, only colors primary 0 - 16 may be assigned to this property.

**Delphi** Procedure TForm1.Button29Click(Sender: TObject);  
 // Cycle through the 16 colors to highlight one way roads  
 begin  
 Pmap61.OneWayColor:=Pmap61.OneWayColor+1;  
 // Make sure it's limited to 16  
 if pmap61.Onewaycolor>16 then pmap61.onewaycolor:=0;  
 pmap61.redraw;  
 end;

---

## OneWayShow

**Property**

Enables the automatic drawing of arrows for road segments that are one way, when the view port is zoomed to the double-line road level, or the different color lines when zoomed out.

**Delphi** Procedure TForm1.Button30Click(Sender: TObject);  
 // Toggle the onewayshow flag  
 begin  
 with pmap61 do  
 begin  
 pmap61.OneWayShow:=not(OneWayShow);  
 if Onewayshow=true then button30.caption:='s:T'  
 else button30.caption:='s:F';

```

        Pmap61.Redraw;
    end;
end;

```

---

## OneWayUse

## Property

Enables the use of the one-way information when calculating a route. The default is true. Note that is also disables the old logic (used with TIGER data), where the angle of attack was used to determine the appropriateness of using a limited access highway ramp (that was the only way On/Off ramps could be discerned in the past. This was introduced with the use of GDT data.

### Delphi

```

procedure TForm1.Button33Click(Sender: TObject);
// Toggle the onewayuse flag
begin
    with pmap61 do
    begin
        OneWayUse:=not(OneWayUse);
        if OneWayUse=true then button33.caption:='u:T'
            else button33.caption:='u:F'
        end;
    end;
end;

```

---

## onCADChange(Current:Long)

## Event

This event is fired each time the ObjectType is changed, and it returns the current ObjectType. The valid ObjectTypes, corresponding to valid CAD objects, are shown below. If ObjectType=-1, then the control is in object selection mode. If ObjectType=0, then the control is in NUL mode, i.e., the mapMode may be set to mbZoom.

#	Object Type
1	Line
2	Rectangle
3	Ellipse
4	Polyline
5	Polygon
6	Marker
7	Text
8	Circle
9	Regular Polygon
10	Free Hand (*)
11	Arrow
12	Bezier
13	Symbol
14	Text Bubble
15	Grouped Object
13	MetaObj



**VB Example**

```
Private Sub MapProl_CadChange(ByVal Current As Long)
' Check to see if Current (ObjectType) is -1 and change MapMode
  If Current = -1 Then MapProl.MapMode = MdZoom
  Beep
End Sub
```

---

<b>OnFind</b>	<b>Event</b>
---------------	--------------

---

This event is triggered by the FindStreet method when a street matching the search specification has been found. The user should then query the Street property and parse the information of interest from the resulting string.

**VB Example**

```
Private Sub MapProl_Find()
  Text1 = MapProl.Street
End Sub
```

**Delphi**

```
Procedure TForm1.MapProlFind(Sender: TObject);
begin
  If ProcMode=4 then listbox1.items.add(MapProl.street);
  {Display number of streets found}
  panel4.caption:=' Found: '+inttostr(listbox1.items.count);
  Application.ProcessMessages;
end;
```

---

<b>OnFindDir</b>	<b>Event</b>
------------------	--------------

---

Road segments found when the FindRoute method, or the ExecRoute dialog are executed, are combined into explicit directions. For each explicit direction placed in the ExecRoute listbox, the OnfindDir is fired, and a string is passed in it. The string contains the following information, separated by tabs (#9 character):

```
Road Name;X,Y coordinates;Instruction;Direction;Distance;Time
```

**VB Example**

```
Private Sub MapProl_FindDir(ByVal s As String)
  List1.AddItem s
End Sub
```

**Delphi**

```
Procedure TForm1.MapProlFindDir(Sender: TObject;s:string);
begin
  listbox2.items.add(s);
end;
```

---

<b>OnFindPlace</b>	<b>Event</b>
--------------------	--------------

---

For each place that is found, when the user calls FindCity, an OnFindPlace event is triggered. The user must then query the 'Result' string property in the OnFindPlace event handler, and store it or otherwise process the string, e.g., add it to a list box, parse it to its appropriate components. The string stored in "Result" contains the following information separated by a tab character (#9).

Name - The place (City, Town, etc.) name from the places database  
 State - The two letter state abbreviation  
 Lon - Longitude (from the places database)  
 Lat - Latitude (from the places database)

FindCity supports two different paradigms:

(a) If an explicit string is searched for, then the OnFindPlace is triggered and a single hit (if found) returns in the "Result" property of the control.

(b) If a wildcard search is specified, then an OnFind event is triggered and found hits are returned in the "Street" property.

**VB Example** Private Sub MapProl\_FindPlace()  
 List1.AddItem MapProl.Result  
 End Sub

Example of how this works:

```
** Explicit Search **
  FindCity Search String: Lemont
  Event Triggerred: OnFindPlace
  Number of hits Returned: 1
```

**Delphi Example** Procedure TForm1.MapProlFindPlace(Sender: TObject);  
 begin  
 listbox1.items.add(MapProl.result);  
 {Increase the count and add item to array}  
 inc(m);  
 res[m]:=MapProl.result;  
 {Display the # of places found}  
 panel4.caption:=' Found: '+inttostr(listbox1.items.count);  
 Application.ProcessMessages;  
 end;

---

## OnFindRte

Event

---

For each road segment found when the FindRoute method is used, an OnFindRte event is triggered. The user must then query the 'Result' property in the OnFindRte event handler, and store it or otherwise process its value, e.g., add it to a list box, parse

**Note:** For details on what the 'Result' string contains, see the documentation for the FindRoute method.

**VB Example** Private Sub MapProl\_FindPlace()  
 List1.AddItem MapProl.Result  
 End Sub

**Delphi** Procedure TForm1.MapProlFindRte(Sender: TObject);  
begin  
  listbox2.items.add(MapProl.result);  
end;

---

## OnMouseDown

**Event**

---

Issued when the mouse button is held down on the control surface.

**VB Example** Private Sub MapProl\_MouseDown(button As Long, shift As Long, x As Long, y As Long)  
  Dim dc%  
  Dim di%  
  dc = GetDC(MapProl.Handle)  
  MapProl.DrawObject dc, MapProl.Xcord, MapProl.Ycord, 3, vbRed  
  di = ReleaseDC(MapProl.Handle, dc)  
End Sub

---

## OnMouseMove

**Event**

---

Issued when the mouse moves over the control surface.

**VB Example** Private Sub MapProl\_MouseMove(button As Long, shift As Long, x As Long, y As Long)  
  Form1.Caption = "lat: " & MAPPRO1.Ycord & " Lon:" &  
  MAPPRO1.Xcord  
End Sub

**Delphi** Procedure TForm1.MapProlMouseMove(Sender: TObject;  
  Shift: TShiftState; X, Y: Integer);  
var xtemp,ytemp,x2,y2:string[12];  
begin  
  with MapProl do  
  begin  
    str(xcord:10:6,xtemp);  
    str(ycord:10:6,ytemp);  
  
    { Now, let's get the coordinates in Deg.Min.Sec form as  
      well, and then place both types on panel2 }  
    panel2.caption:='W:'+xtemp+' N:'+ ytemp  
      +'('+DMS(xcord)+', '+DMS(ycord)+')';  
  end;  
end;

---

## OnMouseUp

**Event**

---

Issued when the mouse button is released.

```

VB Example Private Sub MapProl_MouseUp(button As Long, shift As Long, x As
Long, y As Long)
    If MapProl.Mapmode = MdUser And button = 1 Then
        MapProl.SetItem 1, MapProl.Xcord, MapProl.Ycord
        Call OlePmMap.SetItemlocalbitmap(1, App.Path & "\" & "car.bmp")
        MapProl.SetItemString 1, "My car"
        MapProl.Redraw
    End If
End Sub

```

```

Delphi Procedure TForm1.MapProlMouseUp(Sender: TObject; Button:
TMouseButton; Shift: TShiftState; X, Y: Integer);
{-----}
{ Simply displays a message indicating the mouse button }
{ has been Released. Better illustrated if the right }
{ mouse button is pressed and released }
{-----}
begin
    Panel2.caption:='Mouse Button is Up (Released)';
    { annunciate the buttonup event}
    messagebeep(0);
    Application.ProcessMessages;
end;

```

---

<b>OnOptiRouterMsg</b>	<b>Event</b>
------------------------	--------------

---

This event is fired at various points during the Optimized Route calculation, following an OptiRouter.Calculate call, or the selection the option to perform the calculations from the OptiRouter dialog. Code is reserved, and not used at this time. MsgStr contains one of the following strings identified what part of the calculation the OptiRouter is in.

- **Loading NetWork** – The OptiRouter has started the process of loading the Road Node Network which will be used for the routing calculations.
- **A series of data grid ID's** specifying which grids are currently loaded.
- **Network Loaded** – The OptiRouter has successfully loaded the Road Nodes Network
- **Finished Opti Route xxx mi** – The OptiRouter has finished its calculations, the total travel distance in miles is also displayed.

```

VB Example Private Sub MapProl_OptiRouteMsg(ByVal Code As Long,
ByVal MsgStr As String)
    ' Display the Status message returned each time the
    ' event is fired, in a list box
    List1.AddItem "Event fired: " & MsgStr
End Sub

```

---

<b>OnPaintAfter</b>	<b>Event</b>
---------------------	--------------

---

Performs the specified operations immediately after re-painting the map on the surface of the OCX control. This takes place immediately after the map is re-painted, but prior to the user layer being painted on the control surface. The painting on the control surface is completed in this order:

- The underlay is painted
- The map is painted
- The overlay is painted
- The OnPaintAfter event is triggered
- The user layer is painted

**VB Example**

```
Private Sub MapProl_PaintAfter(ByVal dc As Long)
    Call MapProl.DrawScalebar(dc, 5, 8)
End Sub
```

**Delphi**

```
Procedure TForm1.MapProlpaintAfter(Sender: TObject; dc: Integer);
begin
    {Draws a scale bar and a text bubble on top of the map surface}
    MapProl.drawscalebar(dc,5,5);
    MapProl.Drawbubble(dc,-125,45,'Sample');
end;

procedure TForm1.MapProlpaintAfter(Sender: TObject; dc: Integer);
var hp:hpen;
begin
    With MapProl do
    begin
        {Get Device Context and select Pen}
        hp:=createpen(0,1,RGB(0,0,$ff));
        hp:=selectobject(dc,hp);
        {Draw A line from Denver to Oklahoma City}
        movetoex(dc,Lon2Int(-104.83),Lat2Int(39.64),nil);
        lineto(dc,Lon2Int(-97.35),Lat2Int(35.42));
        {Deselect Pen and release device context}
        deleteobject(selectobject(dc,hp));
    end;
end;
```

---

## OnPmapEvent

**Event**

---

This event is fired as needed by the user. See FirePMapEvent.

**Delphi Example**

```
Procedure TForm1.Button6Click(Sender: TObject);
// Fire an event with a 500 msec delay and increment the eventide
#
begin
    inc(eid);
    Pmap61.FirePmapEvent(eid,500);
end;

procedure TForm1.Pmap61PmapEvent(Sender: TObject; EventID:
Integer);
// When the event is fired, it is trapped here an a string is
added
```

```

// to the listbox to let the user know
begin
  ListBox1.items.add('Fired Event #' + inttostr(Eventid));
end;

```

---

## OnPaintBefore

**Event**

---

Performs the specified operations prior to re-painting the map on the surface of the OCX control.

**VB Example**

```

Private Sub MapProl_PaintBefore(ByVal dc As Long)
  MapProl.DrawLine dc, -89.76, 41.12, -88.99, 42.43, 4, vbGreen,
13
End Sub

```

**Delphi**

```

Procedure TForm1.MapProlPaintBefore(Sender: TObject; dc:
  Integer);
{-----}
{ Draw Thick Red line before drawing the map }
{ It's visible ONLY outside the USA boundary }
{ Unless shading is turned OFF }
{-----}
begin
  MapProl.DrawLine(dc, -115.34056, 28.55798,
    -90.32330, 49.676885, 8,
    clRed, R2_CopyPen);
end;

```

---

## OnResize

**Event**

---

This event is triggered when the height or width of the control is changed.

**VB Example**

```

Private Sub MapProl_Resize()
  Dim dc%
  Dim di%
  dc = GetDC(MapProl.Handle)
  MapProl.DrawScalebar dc, 5, 8
  di = ReleaseDC(MapProl.Handle, dc)
End Sub

```

**Delphi**

```

Procedure TForm1.MapProlResize(Sender: TObject);
var dc: integer;
begin
  dc := getdc(MapProl.handle);
  DrawObject(dc, MapProl.xcord, MapProl.ycord, 2, clRed);
  releasedc(handle, dc);
end;

```

---

**OnStatus****Event**

---

This event is triggered during drawing operations and contains a value from 0 to 100 representing the progress of drawing operations. This can be used to show a dynamic bar or some other indicator during lengthy drawing operations.

**VB Example**

```
Private Sub MAPPRO1_Status(ByVal s As Long)
    ProgressBar1.Visible = True
    ProgressBar1.Value = s
    ProgressBar1.Visible = False
End Sub
```

---

**OpenOverlay(s:String)****Procedure**

---

Loads the specified overlay. Overlay files may be created by the user's application (see Appendixes A and K for format description), or created by Precision Mapping Streets V4.0, and can NOT contain any Metafile Objects. The filetype is determined by the specified filename extension (.ovr or .cmx). By specifying a null name, or a non-existent overlay filename, the control now erases the currently loaded overlay data from memory. For a description of the Overlay file structure, see Appendix "A". The argument needs to be a full file specification, i.e., with drive, path, etc.

**VB Example**

```
Private Sub Command39_Click()
    '-----}
    'Display an overlay file created with Precision }
    'Mapping 4.0 (S. Dakota area) }
    '-----}
    MapProl.OpenOverlay("c:\pmap40\sdak01.ovr")
    ' Zoom to the Overlay area}
    MapProl.ZoomOverlay
End Sub
```

**Delphi**

```
Procedure TForm1.Button32Click(Sender: TObject);
{-----}
{Display an overlay file created with Precision }
{Mapping 4.0 (S. Dakota area) }
{-----}
begin
    MapProl.OpenOverlay('c:\pmap40\sdak01.ovr');
    {Zoom to the Overlay area}
    MapProl.ZoomOverlay;
end;
```

---

**OptiRouter:Interface****Interface**

---

Allows the user to access the OptiRouter Interface (See sections later in this document)

---

**OptiRouterBtn:Boolean**

---

**Property**

This property controls the visibility of the OptiRouter dialog button in the stock toolbar.

---

**Overlay:Boolean**

---

**Property**

Controls visibility of the overlay file, if present. True state sets the overlay to visible.

**VB Example**

```
Private Sub Form_Load()  
    MapProl.Overlay = True  
End Sub
```

**Delphi**

```
Procedure TForm1.FormCreate(Sender: TObject);  
begin  
    MapProl.OverLay:=True;  
end;
```

---

**Path\_Data1**

---

**Property**

Identifies the location of the Precision Mapping Streets coarse data.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Path_data1="d:\pmap40\data1"  
End Sub
```

**Delphi**

```
Procedure TForm1.FormCreate(Sender: TObject);  
begin  
    MapProl.Path_data1:='d:\pmap40\data1';  
end;
```

---

**Path\_Data2**

---

**Property**

Identifies the location of the Precision Mapping Streets landmark data.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Path_data2="d:\pmap40\data2"  
End Sub
```

**Delphi**

```
Procedure TForm1.FormCreate(Sender: TObject);  
begin  
    MapProl.Path_data2:='d:\pmap40\data2';  
end;
```



---

**Path\_Data3**

---

**Property**

Identifies the location of the Precision Mapping Streets City, ZipCode and Phone database files.

**VB Example**   Private Sub Command39\_Click()  
                  MapProl.Path\_data3="d:\pmap40\data3"  
                  End Sub

**Delphi**        Procedure TForm1.FormCreate(Sender: TObject);  
                  begin  
                    MapProl.Path\_data3:='d:\pmap40\data3';  
                  end;

---

**Path\_Library**

---

**Property**

Identifies the location of the metafile symbols that are accessed through the CAD toolbar.

**VB Example**   Private Sub Command39\_Click()  
                  MapProl.Path\_library="d:\pmap\pmap.lib"  
                  End Sub

---

**Path\_States0:String**

---

**Property**

Identifies the location of States Street data files. The Path\_States0 is checked first, then the Path\_States1 data directory is checked. If the system finds the data file in the States0 directory it uses that file. If it doesn't find it in the States0, it moves on to the States1. This allows the user to have some data on the hard drive and some on CD. It is also useful when updates are made to certain state files.

Also note that in version 6.0 and above a "XXXX.SIG" file must be present in the States data directory based upon the use of either Tiger or GDT data.

**VB Example**   Private Sub Command39\_Click()  
                  MapProl.Path\_States0="d:\pmap40\states"  
                  End Sub

**Delphi**        Procedure TForm1.FormCreate(Sender: TObject);  
                  begin  
                    MapProl.Path\_states:='d:\pmap40\states';  
                  end;

---

**Path\_States1:String**

---

**Property**

Identifies the location of States Street data files. The Path\_States0 is checked first, then the Path\_States1 data directory is checked. If the system finds the data file in the States0 directory it uses that file. If it doesn't find it in the States0, it moves on to look in the States1 path. This allows the user to have some data on the hard drive and some on CD. It is also useful when updates are made to certain state files.

Also note that in version 6.0 and above a "XXXX.SIG" file must be present in the States data directory based upon the use of either Tiger or GDT data.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Path_States1="d:\pmap40\states"  
End Sub
```

**Delphi**

```
Procedure TForm1.FormCreate(Sender: TObject);  
begin  
    MapProl.Path_States1:='d:\pmap40\states';  
end;
```

---

**PhoneRegInfo**

---

**Property**

This will allow you to modify the text in the Register Over the Phone dialog. This is usefull when you would like a different phone number so users can call your company direct. If this property is set to "" or Null, it will disable the Register Over the Phone button in the registration dialog.

**Note:** This property may not be visible in the properties inspector, you can only set this via code in your application, usually the form load event.

**VB Example**

```
Private Sub Command103_Click()  
    'Sets the registration phone number to your selected number  
    MapProl.PhoneRegInfo = "Call us at 800-123-4567"  
End Sub
```

---

**PmPalette:Integer**

---

**Property**

PmPalette is the handle of the OCX Palette. Note that this is a read-only property that can be used to synchronize the palette of the user canvas to that of the OCX. Also see the SetOption method section for controlling the PmPallette.

**VB Example**

```
Private Sub Form_Load()  
    MyPalette = MapProl.PmPalette  
    ' Set user bitmap palette to that of OCX  
    Picture1.Picture.hPal = MyPalette  
End Sub
```

**Delphi** Procedure TForm1.button5click(Sender:Tobject)  
MyPalette := MapProl.PmPalette;  
End

---

**PmParent:Integer****Property**

---

PmParent is used to assign the parent form handle to the OCX.

**VB Example** Private Sub Command114\_Click()  
' Get the dc to the PmParent  
h = GetDC(MapProl.PmParent)  
' Use Windows API MoveToEX  
MoveToEx h, 1, 1, 0  
' Draw Line using Windows APIs from previous point to 100,100  
LineTo h, 100, 100  
' Release the dc  
ReleaseDC MapProl.PmParent, h  
End Sub

**Delphi** Procedure TForm1.Button3click(Sender:Tobject);  
MapProl.PmParent := Form1.hwnd;  
End

---

**PmScale:Double****Property**

---

This property is the same as Scale internal scaling factor and was implemented to avoid conflicts in Visual Basic which already uses a 'Scale' property.

**Note:** The maximum value that can be set for this property is 10, which results in maximum magnification.

**VB Example** Private Sub Form\_Load()  
MapProl.PmScale = 10  
End Sub

---

**PopUpRoute:Boolean****Property**

---

Permits the user to pop up a routing selection menu by pressing the left or right mouse button while holding down the shift

**VB Example** Private Sub Form\_Load()  
' Disable the popup menu for routing.  
MapProl.PopUpRoute = False  
End Sub

**Delphi**

```

Procedure TForm1.FormCreate(Sender: TObject);
begin
    // Disable the popup menu for routing.
    MapProl.PopUpRoute:=false;
end;

```

---

## PostUnderlay:Integer

## Property

Defines when the Underlay will be painted in the map drawing sequence. The default mode, PostUnderlay=0, operates as in early versions of MapPro, i.e., the Underlay is painted, the water polygons are painted and then all the other data is oainted. When PostUnderlay=1, the order is: the water polygons are painted, then the underlay is painted and then all the other data is painted. When PostUnderlay=2, then the all the map data is painted and the Underlay is painted last (before the OnPaintAfter even is fired).

**VB Example**

```

Private Sub Command71_Click()
    'Open stock dialog to open underlay file
    CommonDialog2.ShowOpen
    s = CommonDialog2.FileName
    ' Set underlay file
    MapProl.UnderlayFile = s
    ' Set the Underlay transparency mode
    MapProl.UnderlayTransparent = True
    ' Set the Underlay Transparent color
    MapProl.UnderlayTransparentColor = RGB(255, 255, 255)
    'Redraw the Map
    MapProl.Redraw
End Sub

Private Sub Command70_Click()
    ' Set the underlay visibility to True
    MapProl.Underlay = True
    ' Set the Underlay painting Sequence
    MapProl.PostUnderlay = 2
    MapProl.Redraw
End Sub

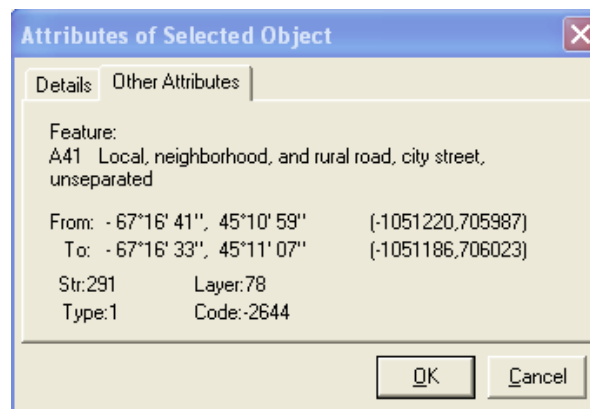
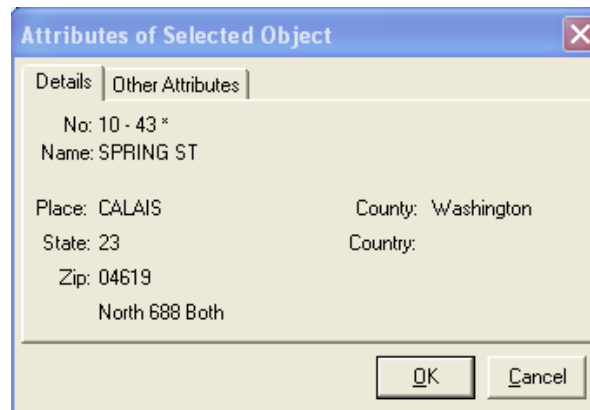
```

---

**QueryObj(x,y:Double)****Property**

---

Searches the current viewport, and if it finds an object within 8 pixels of the specified x.y (Lo,Lat) coordinate, it pops up a dialog with attributes about that object. No action is taken if no object is found within the 8-pixel tolerance.



---

**Redirty****Procedure**

---

Updates the dirty rectangles and the new/changed objects without repainting the complete map surface. Usually called after a user-drawn bitmap is moved. Can provide significant time savings if used following user item movements, rather than using Redraw – which would regenerate the map, or even Refresh, which would repaint all the used item bitmaps.

**VB Example** Private Sub Timer2\_timer()  
'-----}

```

' Timer used to show animated car trail          }
'-----}
dim temp1,temp2 as double
inc(locnum)
'Check to see if all cars have been drawn}
if locnum>MaxCarLoc then
'Disable the timer to stop the loop}
timer2.enabled=false
'Turn AutoQuery back ON}
  MapProl.AutoQuery=true
end if
'Set the bitmap to a new location}
MapProl.SetItem(1,carloc[locnum,1],carloc[locnum,2])
'erase the old bitmap and refresh the one at the new location}
MapProl.ReDirty
'annunciate every other movement}
  if (locnum mod 2) =0 then Messagebeep(0)
End Sub

```

### **Delphi**

```

Procedure TForm1.Timer2Timer(Sender: TObject);
{-----}
{ Timer used to show animated car trail      }
{-----}
var temp1,temp2:real;
begin

  inc(locnum);
  {Check to see if all cars have been drawn}
  if locnum>MaxCarLoc then
  begin
    {Disable the timer to stop the loop}
    timer2.enabled:=false;
    {Turn AutoQuery back ON}
    MapProl.AutoQuery:=true;
  end else
  begin
    {Set the bitmap to a new location}
    MapProl.SetItem(1,carloc[locnum,1],carloc[locnum,2]);
    {erase the old bitmap and refresh the one at the new
location}

    MapProl.ReDirty;
  end;
  {annunciate every other movement}
  if (locnum mod 2) =0 then Messagebeep(0);
end;

```

---

## **Redraw**

## **Procedure**

---

Causes the map to load any required map data and draw all elements to the specified control. If the map has not changed and only other items, painted on the map, have been modified, using Refresh instead or Redraw would be much faster.

**Note:** If the users have their own paint handler, then it's better to use the Refresh method, if background drawing is enabled.

**VB Example** Private Sub Command39\_Click()  
    MapProl.Redraw  
End Sub

**Delphi** Procedure TForm1.Update1Click(Sender: TObject);  
begin  
    MapProl.redraw;  
end;

---

**Refresh****Procedure**

---

Causes the map to update its surface with the background bitmap which is saved when background drawing is enabled.

**Note:** This is different from ReDraw as the screen refresh is done with an image that's already created and doesn't involve the loading of any data.

**VB Example** Private Sub Command39\_Click()  
    MapProl.Refresh  
End Sub

**Delphi** Procedure TForm1.SpeedButton6Click(Sender: TObject);  
begin  
    MapProl.Refresh;  
end;

---

**ResizeCtl(dx,dy:Integer)****Procedure**

---

Modifies the internal scale factor and viewing window coordinates to account for changes in the size of the control. Dx and Dy represent the new size that the control adopts after a windows resize operation.

**Note:** The OCX control may be set to automatically resize to the client window size, in which case the ResizeCtl call might not be required. It is recommended that a call to this procedure occur in response to a Wm\_size message which is issued every time a window, control, form, etc. changes size. In a visual development environment, like Delphi, Visual Basic, etc., this message is handled by, or replaced with, an OnResize event.

**VB Example** Private Sub Command39\_Click()  
    MapProl.ResizeCtl(MapProl.width,MapProl.height)  
End Sub

**Delphi** Procedure TForm1.PmMap1Resize(Sender: TObject);  
begin  
    MapProl.ResizeCtl(PmMap1.width,PmMap1.height);  
end;

---

**Result****Property**

---

This string is used as a general purpose way to return the result of city, areacode and zipcode searches.

**Note:** A different variable, "Street" is used for Street searches, as they are based on totally different models, i.e., Street searches return multiple hits. Refer to the documentation for each of the search operations to see the prospective contents of "Result".

**VB Example**

```
Private Sub Command39_Click()
    ' Display the Result from a ZipCode search, in a panel}
    MapProl.findzip val(text1.text)
    label7.caption=OlPmMap1.Result
End Sub
```

**Delphi**

```
Procedure TForm2.Button4Click(Sender: TObject);
{ Display the Result from a ZipCode search, in a panel}
var z,code:longint;
begin
    val(edit3.text,z,code);
    MapProl.findzip(z);
    label7.caption:=MapProl.Result;
end;
```

---

### RoadOption(Option, Atrib:LongInt)

### Procedure

---

Permits the user to set options to be used for the routing calculation without using the dialog described in the ExecRoadOption method.

The parameters Option and Atrib are described below.

(a) When Option = 1..6, then the value of Atrib sets the travel speed (mph) for the road type identified in Option.

Option    Travel Speed for Type of Road

- |       |  |
|-------|--|
| ----- | -----  |
| 1     | Limited Access Highways (Tiger types A10..A18) |
| 2     | US and State Highways (Tiger types A20..A28)   |
| 3     | Secondary Highways (Tiger types A30..A38)      |
| 4     | Residential Roads (Tiger types A40..A48)       |
| 5     | Trails (Tiger types A50..A53)                  |
| 6     | Other (Tiger types A60..A65)                   |

(b) When Option = 17..22, then the value of Atrib sets the priority (0 to 5), of the road type identified in Option,

Option    Priority for Type of Road

- |       |  |
|-------|--|
| ----- | -----  |
| 17    | Limited Access Highways (Tiger types A10..A18) |
| 18    | US and State Highways (Tiger types A20..A28)   |
| 19    | Secondary Highways (Tiger types A30..A38)      |
| 20    | Residential Roads (Tiger types A40..A48)       |
| 21    | Trails (Tiger types A50..A53)                  |
| 22    | Other (Tiger types A60..A65)                   |



(c) When Option = 33..38, then the value of *Attrib* sets the gas mileage of the road type identified in option,

Option	Type of Road
33	Limited Access Highways (Tiger types A10..A18)
34	US and State Highways (Tiger types A20..A28)
35	Secondary Highways (Tiger types A30..A38)
36	Residential Roads (Tiger types A40..A48)
37	Trails (Tiger types A50..A53)
38	Other (Tiger types A60..A65)

(d) When Option = 48, then the value of *Attrib* sets the color to be used for highlighting the calculated route on the map.

(e) When Option = 49, then the value of *Attrib* sets the type of hatching to be used for highlighting the calculated route on the map:

- 0 = Dot (10%)
- 1 = Dot (20%)
- 2 = Dot (50%)
- 3 = Cross
- 4 = Hatch
- 5 = Grid

**Note:** The user should be cautioned that the likelihood of routing failure will increase when road types are totally excluded, i.e., when travel preference priority is set to "0" for one or more road types.

**VB Example**

```
Private Sub Command39_Click()
    '-----}
    ' Change Some Routing options }
    '-----}
    'change the color of the Routing highlight}
    Hcolor=Hcolor+16
    MapProl.RoadOption(48,Hcolor)
    'Set faster driving options}
    MapProl.RoadOption(1,80)
    MapProl.RoadOption(2,75)
    MapProl.RoadOption(3,65)
    'Set Road priorities to avoid Limited Access Highways}
    'and preferably use secondary roads}
```

**Delphi**

```
Procedure TForm1.Button8Click(Sender: TObject);
{-----}
{ Change Some Routing options }
{-----}
begin
    {change the color of the Routing highlight}
    Hcolor:=Hcolor+16;MapProl.RoadOption(48,Hcolor);
    {Set faster driving options}
```

```

MapProl.RoadOption(1,80);
MapProl.RoadOption(2,75);
MapProl.RoadOption(3,65);
{Set Road priorities to avoid Limited Access Highways}
{and preferably use secondary roads}
MapProl.RoadOption(17,1);
MapProl.RoadOption(18,2);
MapProl.RoadOption(19,2);
MapProl.RoadOption(20,5);
end;
MapProl.RoadOption(17,1)
MapProl.RoadOption(18,2)
MapProl.RoadOption(19,2)
MapProl.RoadOption(20,5)
End Sub

```

---

## Rotate(x:Double)

---

## Procedure

Rotates the map X degrees about the centerpoint of the view port. Place and Landmarks text remains horizontal. Street label text is automatically rotated so that it aligns itself with the rotated street/road segment. The orientation (from-to) of the string depends on the setting of the Synch boolean property. If Synch is set to false (default), then the text orientation is always restricted in the East quadrants. If Synch is set to true, then the text is rotated through the same angle as the street segment, retaining the original relative orientation to the street. (Also see Synch)

**Note:** Positive direction is counterclockwise, and zero degrees is due North.

**VB Example**

```

Private Sub Command39_Click()
    ' Rotate the screen counter clockwise by 20.5 degrees}
    MapProl.Rotate(20.5)
End Sub

```

**Delphi**

```

Procedure TForm1.PmMap1Rotate(Sender: TObject);
begin
    { Rotate the screen counter clockwise by 20.5 degrees}
    MapProl.Rotate(20.5);
end;

```

---

## SaveConfig

---

## Procedure

Saves the current parameters in the configuration file specified in 'Path'.

**VB Example**

```

Private Sub Command39_Click()
    ' Save config file to d:\MyData
    MapProl.SaveConfig("d:\MyData\mappro.ocx")
End Sub

```

**Delphi**

```

Procedure TForm1.SaveBitmap1Click(Sender: TObject);
begin

```

```

// Save config file to d:\MyData
MapProl.SaveConfig('d:\MyData\mappro.ocx');
end;

```

---

### SaveExclusion(s:String)

### Procedure

Saves the current list of bounding box coordinates to the specified file. This is a flat ASCII file with one entry line per exclusion polygon of the form:

X1, Y1, X2, Y2, Identifying String

The identifying string specified by the user is automatically enclosed in double quotes.

#### Sample File

```

-71.068928,42.349952,-71.067840,42.348864,"Route Exclusion-1"
-71.070928,42.351952,-71.069840,42.350864,"Route Exclusion-2"

```

**Delphi**

```

Procedure TForm1.Button36Click(Sender: TObject);
// Save currently defined exclusions to file
// Assumed extension: .exl
begin
    Pmap61.SaveExclusion('MyRtExcFile');
end;

```

---

### SaveStreets(s:String)

### Procedure

Saves the current user defined streets in memory to the specified file.

**VB Example**

```

Private Sub Command2_Click()
    MapProl.SaveStreets ("C:\Streets.Str")
End Sub

```

---

### SavetoBitmap(s:String)

### Procedure

Saves the current background bitmap (the map bitmap) to a BMP file specified by the user.

**Note:** No extension is added, so the user would have to supply the ".BMP" file extension.

**VB Example**

```

Private Sub Command39_Click()
    Clipboard.Clear
    MapProl.SaveToBitmap (App.Path & "\ClipboardSave.bmp")
End Sub

```

**Delphi**

```

Procedure TForm1.SaveBitmap1Click(Sender: TObject);

```

```

begin
  with opendialog1 do
  begin
    filter:='Bitmap Files|*.bmp';
    if execute then
    begin
      MapProl.SaveToBitmap(filename);
    end;
  end;
end;

```

---

## SavetoGif(s:String)

**Procedure**

---

Saves the current background bitmap (the map bitmap) to a GIF file specified by the user.

**Note:** No extension is added, so the user would have to supply the ".GIF" file extension.

**VB Example**

```

Private Sub Command39_Click()
  MapProl.SavetoGif (App.Path & "\Test.Gif")
End Sub

```

**Delphi**

```

Procedure TForm1.SaveBitmap1Click(Sender: TObject);
begin
  with opendialog1 do
  begin
    filter:='Gif Files|*.Gif';
    if execute then
    begin
      MapProl.SavetoGif(filename);
    end;
  end;
end;

```

---

## SaveViaFile(s:String)

**Property**

---

Save the currently defined Via points to a file for later use.

**VB Example**

```

Private Sub Form_Load()
  MapProl.SaveViaFile "c:\mydata\sample.via"
End Sub

```

---

## SaveView:Boolean

**Property**

---

Upon starting the application, if true, this property restores the view of the map that was visible when the application was last executed (the coordinates are taken from the .CFG file).

**VB Example**     Private Sub Form\_Load()  
                  MapProl.SaveView = True  
                  End Sub

**Delphi Example** Procedure TForm1.FormCreate(Sender: TObject);  
                  begin  
                    MapProl.SaveView:=True;  
                  end;

---

## ScaleProperty:Double

---

This property is an internal scaling factor and ONLY makes sense when used in a "relative scale" manner. Its value changes when the Magnitude or Miles properties are set. When the scale value is set, the control determines the closest enumerated value of Magnitude. A redraw is issued when the value of this internal scale factor changes.

**Note:** Note that the maximum value that can be set for this property is 10, which results in maximum magnification. Cannot Use in Visual Basic - Use PMScale.

**VB Example**     Cannot Use in Visual Basic - Use PMScale

**Delphi Example** Procedure TForm1.Button8Click(Sender: TObject);  
                  begin  
                    // echo current value, and reduce scale by 50%  
                    label1.caption:=floattostr(mapprol.scale);  
                    mapprol.scale:=mapprol.scale\*0.5;  
                    Mapprol.Redraw;  
                    // echo new scale value  
                    label2.caption:=floattostr(mapprol.scale);  
                  end;

---

## ScaleBar:Integer

---

Property

An easier way to display the scale bar without the need to use the DC and a specific offset location. The available enumerated values for this option are:

- 0 = sbNone
- 1 = sbTopLeft
- 2 = sbTopRight
- 3 = sbBottomLeft
- 4 = sbBottomRight

---

**Screen\_Aspect:Double****Property**

---

Defines the aspect ratio used when drawing to the OCX control. This is the ratio of Width to Height.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Screen_Aspect=2  
End Sub
```

**Delphi**

```
Procedure TForm1.Button1Click(Sender: TObject);  
begin  
    MapProl.Screen_Aspect:=2;  
end;
```

---

**SetDirtyRect(LeftX,TopY,RightX,BottomY)****Procedure**

---

Permits users to add their own rectangle to the dirty rectange list which can then be updated with the ReDirty method.

**VB Example**

```
Private Sub Command6_Click()  
    ' Set a small rectangle of current screen to be preserved  
    MapProl.SetDirtyRect 2, 2, 100, 100  
    ' Get the dc and paint the main screen  
    dc = GetDC(MapProl.Handle)  
    hp = SelectObject(dc, GetStockObject(0))  
    Rectangle dc, 1, 1, 700, 500  
    SelectObject dc, hp  
    ' Issue the redirty command. The added rectangle should  
    ' be retained, while the rest of the screen is white  
    MapProl.Redirty  
End Sub
```

**Delphi**

```
procedure TForm1.Button6Click(Sender: TObject);  
var hp:hbrush;  
    dc:integer;  
begin  
    // Set a small rectangle of current screen to be preserved  
    pmap21.SetDirtyRect(2,2,100,100);  
    // Get the dc and paint the main screen black  
    dc:=getdc(Pmap21.handle);  
    hp:=selectobject(dc,getstockobject(black_brush));  
    windows.rectangle(dc,1,1,700,500);  
    selectobject(dc,hp);  
    // Issue the redirty command. The added rectangle should  
    // be retained, while the rest of the screen is black.  
    pmap21.Redirty;  
end;
```

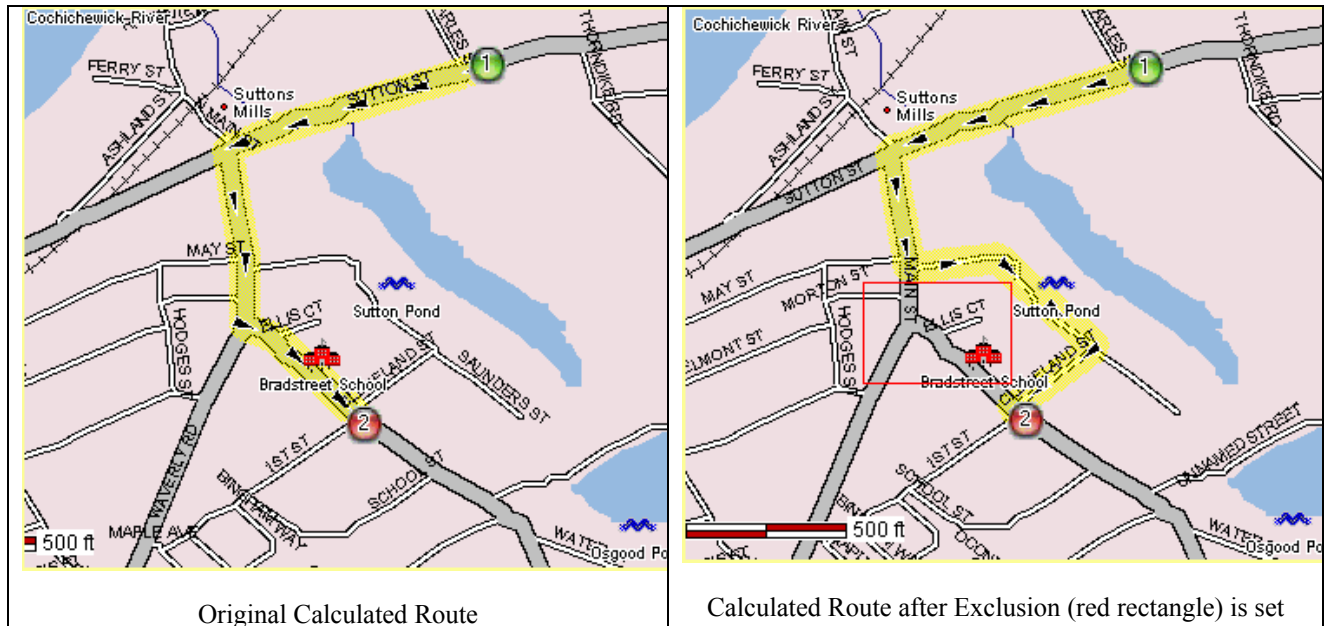
---

**SetExclusion(IDString:string; x1,y1,x2,y2:double)****Procedure**

---

Adds the bounding box defined by the user-specified string and the two corners (x1,y1 and x2,y2) to the memory-based routing exclusion list. (units are in degrees). Note that any such exclusions are lost when the application is terminated, unless they have been previously saved to a file using the SaveExclusion method.

The X1,Y1 and X2,Y2 coordinate pairs specify a bounding polygon for the exclusion. Road segments with both end-nodes within the exclusion polygon, are excluded from the routing nodes list.



```
Delphi Example procedure TForm1.Button32Click(Sender: TObject);
// Add two exclusion polygons to the current exclusions list
var id:string;
begin
  ExcludeRt:=true;
  exx1:=strtofloat(edit6.text);
  eyy1:=strtofloat(edit7.text);
  exx2:=strtofloat(edit13.text);
  eyy2:=strtofloat(edit14.text);
  id:=edit15.text;
  Pmap61.SetExclusion(id+'-1', exx1, eyy1, exx2, eyy2);
  // Set another exclusion slightly offset from first one
  Pmap61.SetExclusion(id+'-2', exx1-0.002, eyy1+0.002,
    exx2-0.002, eyy2+0.002);
  pmap61.ZoomWindow(exx1-0.002,eyy1+0.002,exx2-0.002,eyy2+0.002);
  panel6.visible:=false;
end;
```

---

**SetItem(id: Integer; x, y: OleVariant)**

**Procedure**

Creates an overlay object with the specified ID at the lon/lat coordinates. If an item of the same ID already exists, the item is repositioned to the new coordinates. These “items”, sometimes also referred to

as “user items”, can be used in a variety of application, e.g., displaying movement of an automobile on a map, as shown in the VB example below.

**Note:** The SetItem procedure needs to be executed PRIOR to using the SetItemLocalBitmap procedures. The maximum number of elements is 32,000, but the maximum value of 'id' has to be less than a word.

```
VB Example Private Sub Command110_Click()  
    'Cycle through the various mapmodes, when mapmode is 1, then  
    ' click on the map to record positions to temporary array  
    MapProl.MapMode = MapProl.MapMode + 1  
    If MapProl.MapMode > 4 Then MapProl.MapMode = 0  
    Command110.Caption = "Mode=" & MapProl.MapMode  
End Sub  
  
Private Sub MapProl_Click()  
    ' If the mapmodes is MdUser, then add the coordinates  
    ' of the point that is clicked on, to a temporary  
    ' two-dimentional array (needs to have been predefined)  
    If MapProl.MapMode = MdUser Then  
        ipos = ipos + 1  
        pos(ipos, 1) = MapProl.Xcord  
        pos(ipos, 2) = MapProl.Ycord  
    Else  
        End If  
End Sub  
  
Private Sub Command111_Click()  
    ' Set the starting index  
    Iposstart = 0  
    ' Set the timer interval  
    Timer1.Interval = 200  
    ' enable the timer  
    Timer1.Enabled = True  
End Sub  
  
Private Sub Timer1_Timer()  
    ' Check to see if all the points have been plotted  
    If Iposstart > ipos Then  
        Timer1.Enabled = False  
    Else  
        'If Not, set the item to the next set of coordinates  
        Iposstart = Iposstart + 1  
        MapProl.SetItem 101, pos(Iposstart, 1), pos(Iposstart, 2)  
        MapProl.SetItemLocalBitmap 101, "d:\test\mappro71\CarIcon.bmp"  
        MapProl.SetItemString 101, Iposstart  
        MapProl.Refresh  
    End If  
End Sub
```

```
Delphi Procedure TForm1.Button7Click(Sender: TObject);  
begin  
    MapProl.SetItem(1,-120,32);  
    MapProl.SetItemLocalBitmap(1,'BMP1.BMP');  
end;
```



---

**SetItem2Back(id:Integer)**

---

**Procedure**

Sets the user-created object with "Id" to be painted on the screen first when a screen update takes place.

**VB Example** Private Sub Command39\_Click()  
    MapProl.SetItem2Back(12)  
End Sub

**Delphi** Procedure TForm1.Button4Click(Sender: TObject);  
begin  
    MapProl.SetItem2Back(12);  
end;

---

**SetItem2Front(id:Integer)**

---

**Procedure**

Sets the user-created object with "Id" to be painted on the screen last (on top) when a screen update takes place.

**VB Example** Private Sub Command39\_Click()  
    MapProl.SetItem2Front(12)  
End Sub

**Delphi** Procedure TForm1.Button4Click(Sender: TObject);  
begin  
    MapProl.SetItem2Front(12);  
end;

---

**SetItemAngle(id:integer;x:Double)**

---

**Procedure**

Allows the user to rotate (clockwise) a user bitmap placed on the screen using SetItem.

**Note:** The color of the lower left pixel of the bitmap becomes transparent when rotated. It should be further noted that any bitmap that is not masked (early MAPOCX implementations required it to be masked for transparency), sets the color of the lower left pixel to transparent when placed on the screen using SetItem.

**VB Example** Private Sub Command1\_Click()  
    xc = (MapProl.LonRight + MapProl.LonLeft) / 2  
    yc = (MapProl.LatTop + MapProl.LatBottom) / 2  
    ' Set the item bitmap  
    MapProl.SetItem 1,xc,yc  
    MapProl.SetItemLocalBitmap 1,"images\sample.bmp"  
    ' Rotate the bitmap 45 degrees  
    MapProl.SetItemAngle 1,45  
    ' Use Redirty instead of having to repaint the whole screen  
    MapProl.Redirty  
End Sub

---

**SetItemBitmap(id:integer; handle:integer)****Procedure**

---

Attaches a user bitmap by assigning the handle (id#) of the bitmap (h) to the object. A mask concept is used for bitmaps. If SetItemBitmap or SetItemLocalBitmap are passed a "negative" id #, they do NOT mask the bitmap, they simply paint the square bitmap on the screen. All the user has to do is to simply negate the item #. If the ID is positive, it will mask the color that is used in the first pixel (top left). This allows for a transparent background.

**Note:** The SetItem procedure needs to be executed prior to using the SetItemBitmap procedures. The user is responsible for allocating and deallocating the bitmap resource. It should also be noted that on systems with 256 colors or less, 16 color bitmaps should be used (see Appendix "B"), otherwise the bitmap palette might interact with the background or the OCX control palette.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.SetItem 1,-100,32  
    'Set bitmap from existing handle  
    MapProl.Setitembitmap(1,Image1.Picture.handle)  
End Sub
```

**Delphi**

```
Procedure TForm1.Button7Click(Sender: TObject);  
begin  
    MapProl.SetItem(1,-100,32);  
    {Set bitmap from existing handle}  
    MapProl.Setitembitmap(1,Image1.Picture.Bitmap.handle);  
    {Draw on the bitmap surface}  
    with Image1.Picture.bitmap.canvas do  
    begin  
        pen.color:=clred;  
        Moveto(0,0);  
        Lineto(20,20);  
    end;  
end;
```

---

**SetItemLocalBitmap(id:integer; s:String)****Procedure**

---

Causes the specified bitmap file (s) to be loaded into memory and attaches the bitmap handle to the overlay object. A mask concept is used for bitmaps. If SetItemBitmap or SetItemLocalBitmap are passed a "negative" id #, they do NOT mask the bitmap, they simply paint the square bitmap on the screen. All the user has to do is to simply negate the item #. If the ID is positive, it will mask the color that is used in the first pixel (top left). This allows for a transparent background.

**Note:** The SetItem procedure needs to be used to set an item ID before this procedure is called to assign the bitmap to it. The number of unique local bitmaps that may be set is 100.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Gotopoint -120,32  
    MapProl.SetItem 1,-120,32  
    call MapProl.SetitemLocalbitmap (1,"bmp1.bmp")  
End Sub
```

**Delphi**

```
Procedure TForm1.Button7Click(Sender: TObject);  
begin  
    MapProl.Gotopoint(-120,32);  
    MapProl.SetItem(1,-120,32);
```

```

MapProl.SetitemLocalbitmap(1, 'bmp1.bmp');
end;

```

---

## **SetItemString(id:integer; s:String)**

**Procedure**

---

Attaches a descriptive string to the overlay object created by the user. Using a CR will act as a line break. If no bitmap is selected, rather than getting a black frame, only the text assigned to the item is displayed, centered, and enclosed in a black

**VB Example**

```

Private Sub Command39_Click()
    Call MapProl.SetItem (1,-120,32)
    Call MapProl.SetItemString(count,"Item:" + str(count) & chr(13)
& "Break")
End Sub

```

**Delphi**

```

Procedure TForm1.Button7Click(Sender: TObject);
begin
    MapProl.SetItem(1,-120,32);
    MapProl.SetItemString(count,'Item:'+inttostr(count));
end;

```

---

## **SetItemVis**

**Procedure**

---

Sets the attribute for the specified user-created object to visible (when flag is true) or invisible (when flag is false).

**VB Example**

```

Private Sub Command39_Click()
    '-----}
    'Set the Visibility of the yellow cars to True }
    '-----}

    dim locnum as integer
    for LocNum = 9 to MaxCarLoc

        If caronscreen = true then
            if (Locnum mod 2)=0 then
                MapProl.SetitemVis(LocNum,true)
            else
                MapProl.SetitemVis(LocNum,false)
            end if
        else
            'If the cars have not been drawn, display a message}
            Call MsgBox("No cars drawn on the map", vbCritical, "No Cars"
            MapProl.refresh
        End Sub

```

---

**SetOption(OpCode, Option:LongInt):LongInt**

---

**Function**

Allows the user to change a number of OCX properties as identified by the OpCode and Option values given below (in hex notation). It returns a Long Integer which contains useful information depending on the OpCode.

***Helpful Hint (for VB Users)***

Users have reported problems with setting these OpCodes in VB. For example, when specifying an OpCode of EEEE, the **&HEEEE** Vb representation, by basic positional values math, is supposed to be

$$(14 \times 16^3) + (14 \times 16^2) + (14 \times 16^1) + (14 \times 16^0) = 61166$$

However, in VB, this evaluates to -4270, because, for some reason, VB Does not appear to use Unsigned values for Hex operations. Users may implement their own workarounds, but here is a VB function that can help.

```
Public Function ConvertSigned2Unsigned(N As Long) As Double
    If N < 0 Then
        If (N < &H8FFF) Then
            ConvertSigned2Unsigned = (2 ^ 32) + N
        Else
            ConvertSigned2Unsigned = (2 ^ 16) + N
        End If
    Else
        ConvertSigned2Unsigned = N
    End If
End Function
```

If you call *SetOption(ConvertSigned2Unsigned(&HEEEE),1)* you should get the desired results. Note that you can use this function for any SetOption and any other situation where VB gets confused in trying to handle unsigned values. Conversely, you can calculate the hex values out and call the SetOption routines with decimal values in VB, e.g., SetOption 61166,2

### **OpCode = 00 (Special Color Options)**

Special Opcode use to reset or query attributes according to the "Option" values shown below. (Note that only some of the OpCodes are shown here, but specifying OpCode 00, the user can query the value of \*any\* OpCode described in this section, by setting the appropriate Option value).

*Option = -1*

Reset the palette to the built-in default. The function returns zero if the operation was successful.

*Option = 00*

Regenerate the palette handle. Required since the palette is not automatically generated every time a color is added. The function returns zero if the operation was successful.

*Option = 01*

Returns the value of the background color. For example, BkCol=.Setoption(\$00,01) would return an integer representing the RGB color of the background.

*Option = 02*

Returns the value of the water color.

*Option = 03*

Returns the value of the parks color.

*Option = 10..1F*

Returns the color value of the shade color specified (used for shading states and counties).

*Option = 20..6F*

Returns the color of the specified state, (see below for State ID number). Note that either a color or a color index will be returned. If a 3-byte value is returned, then it is an RGB color. If a 4-byte value is returned with the highest byte equal to \$08, then the number is an index to the built-in shading color definition.

*Option = 80..84*

Returns the value of the corresponding street labeling option (see OpCodes 80..84 below for a detailed description).

*Option = \$89*

Returns the value corresponding to the current visibility state of the PMAP built-in coarse layer (see OpCode \$89 below for description).

*Option = \$100+N*

Returns the value corresponding to the current visibility state of layer N (see OpCode \$100+N below for layer description).

*Option = \$EEE2*

Returns an integer indicating the current graphics bitmap mode (see the description for OpCode \$EEE2 later in this section for a description).

**OpCode = 01 (Background Color)**

Change the background color (Canada, Mexico, etc.), to that specified by Option. (The default is yellow), e.g., .SetOption(\$01,\$00FF00) would set the color to green.

**OpCode = 02 (Water Color)**

Change the color of the water (ocean) to that specified by Option (The default is blue) , e.g., .SetOption(\$01,\$00FF00) would set the color to green.

**OpCode = 03 (Parks Color)**

Change the color of the park areas to that specified by Option (The default is green) , e.g., .SetOption(\$01,\$00FF00) would set the color to green.

**OpCode = 10...1F (Build-in Color Shades)**

Set the identified color, used for shading states and county, areas to that specified by Option. Up to 16 dithered colors are used for the shading. For example, .SetOption(\$10,\$00FF00) would set the first color in the shading array to green. Use SetOption(0,1) if you need to reset the default palette.

**OpCode = 20...5F (State Colors)**

Set the color for the state specified by the OpCode (see table below), to that specified by Option. Option can be an RGB color or it can be an index to the shading colors, if a 4-byte value is specified and the highest byte is \$08. For example, using .SetOption(\$20,\$FF0000) (in Delphi) would set the color of Alabama to blue, whereas .SetOption(\$46,\$08000005) would set the color of Ohio to the 5-th value in the color shading array (see opcodes \$10 - \$1F above).

<b>State/#</b>	<b>State/#</b>	<b>State/#</b>	<b>State/#</b>	<b>Province/#</b>
AL 20	KS 33	OH 46	OH 46	AB 5B
AK 21	KY 34	OK 47	OK 47	BC 5C
RSV 22	LA 35	OR 48	OR 48	MB 48
AZ 23	ME 36	PA 49	PA 49	NB 5E
AR 24	MD 37	RSV 4A	RSV 4A	NF 5F
CA 25	MA 38	RI 4B	RI 4B	NS 60
RSV* 26	MI 39	SC 4C	SC 4C	ON 61
CO 27	MN 3A	SD 4D	SD 4D	PE 62
CT 28	MS 3B	TN 4E	TN 4E	QC 63
DE 29	MO 3C	TX 4F	TX 4F	YT 64
DC 2A	MT 3D	UT 50	UT 50	NT 65
FL 2B	NE 3E	VT 51	VT 51	SK 66
GA 2C	NV 3F	VA 52	VA 52	
RSV 2D	NH 40	RSV 53	RSV 53	
RSV 2E	NJ 41	WA 54	WA 54	
ID 2F	NM 42	WV 55	WV 55	
IL 30	NY 43	WI 56	WI 56	
IN 31	NC 44	WY 57	WY 57	
IA 32	ND 45			

\* RSV Denotes slot is reserved for later use

**OpCode = \$80 (Major Street Labeling)**

Set the labeling of major streets (secondary roads and above) to start when the scale reaches the value specified by Option (in tenths of miles). For example, SetOption(\$80,5) would set the major street labeling to start when the scale is 5/10=0.5 miles. Of course, such roads are labeled only if they are visible at the specified scale.

**OpCode = \$81 (Minor Street Labeling)**

Set the labeling of minor (neighborhood) street to start when the scale reaches the value specified by Option (in tenths of miles). For example, SetOption(\$81,2) would set the minor street labeling to start when the scale was 2/10=0.2 miles.

**OpCode = \$82 (Global Street Labeling)**

Set the labeling of roads (major and minor) ON, when the specified Option value is 1, or OFF, when the specified Option value is 0. For example, SetOption(\$82,0) would set street labeling OFF.

**OpCode = \$83 (Street Label Interference)**

Set the simple, built-in label interference detection for street labeling of roads (major and minor) ON, when the specified Option value is 1, or OFF, when the specified Option value is 0. For example, SetOption(\$83,1) would set street labeling interference detection ON.

**OpCode = \$84 (Hide Suffix)**

Hide Suffix for street labeling of roads (major and minor) is ON, when the specified Option value is 1, or OFF, when the specified Option value is 0. For example, SetOption(\$84,0) would set street labeling Hide Suffix OFF. With this option set ON, a road segment normally labeled as “Melton Ave” would now be labeled simply “Melton”.

**OpCode = \$85 (Street Text Size)**

Scale Factor for the street labeling text. These values are (mod 5) so a value of 10 increases the size of the font used for labeling streets by a factor of 2.0.

**OpCode = \$86 (User Item Visibility)**

Turns the visibility of all user items, created by the SetItem methods, Off (Option=0), or On (Option=1).

**OpCode = \$88 (Display Highway Shields)**

Controls the display of Highway Shields. Shield display is ON, when the specified Option value is 1, or OFF, when the specified Option value is 0.

**OpCode = \$89 (Display Coarse Layer)**

Turn the complete PMAP built-in coarse layer ON/OFF. SetOption(\$89,1) - Sets PMAP coarse layer visible. SetOption(\$89,0) - Sets PMAP coarse layer invisible

**OpCode = \$8F (Display Bounding Polygons)**

Display the simple bounding polygons that are used for placing text on the map and performing a simple collision detection. Primarily used for debugging purposes. The bounding polygon is displayed when the specified Option value is 1, or OFF, when the specified Option value is 0.

**OpCode = \$90 (State Text Size)**

Sets the size of the font used to label the 2-letter State name abbreviations and the major cities in each state. The default size is 11.

**OpCode = \$91 (Place Name Text Size)**

Sets the size of the font used to label place names. The default size is 10.

**OpCode = \$92 (Landmark Text size)**

Sets the size of the font used to label Landmarks when zoomed below 2 miles. The default size is 9.

**OpCode = \$93**

Reserved.

**OpCode = \$94 (Highway Shield Text Size)**

Sets the size of the font used to label Highway Shields. The default size is 12. The shield is resized to accommodate the new specified text size.

**OpCode = \$95 (Street Name Text Size)**

Sets the text size for the Street names. The default value is 9.

**OpCode = \$98 (Street Data Threshold)**

Sets the scale value (miles) at which the coarse data layers become invisible and the Street level data layers phase in. The default values is 2.0 miles. The maximum value that this is internally limited to, is 4 miles.

**OpCode = \$99 (City Label Spacing)**

Sets the spacing between City labels (in points). The larger this value is, the more space will be reserved between city name labels during the simple collision detection algorithm of the control.

**OpCode = \$100+N (Layer Visibility)**

Set the visibility of specific layers ON/OFF. All layer values have an offset of \$100, and are listed as the increment above \$100. The form is `SetOption($100+N,State)` where "N" is one of the values below, and "State" is the visibility of the layer, 0 (false), or 1 (true).

For example, the Delphi call: `MapPro1.SetOption($100+33,byte(false))` will set the display of highway shields OFF.



N = 1 State Boundaries	N = 21 Reserved
N = 2 State Interiors (shading)	N = 22 Reserved
N = 3 Reserved	N = 23 Permanent Hydro Features
N = 4 Reserved	N = 24 Intermitent Hydro Features
N = 5 County Boundaries	N = 25 Reserved
N = 6 MCD Boundaries	N = 26 Reserved
N = 7 Place Boundaries	N = 27 Reserved
N = 8 MCD Shading	N = 28 Reserved
N = 9 Interstate Highways	N = 29 Reserved
N = 10 US Principal Highways	N = 30 Reserved
N = 11 Secondary (County) Highways	N = 31 Reserved
N = 12 Secondary (State) Highways	N = 32 Reserved
N = 13 Other Main Roads	N = 33 Shields (Highways, State/County)
N = 14 Streets	N = 34 Coarse Secondary Highways
N = 15 Landmarks	N = 35 Reserved
N = 16 Reserved	N = 36 Reserved
N = 17 Railroads	N = 37 Reserved
N = 18 Power Lines	N = 38 Reserved
N = 19 Parks	N = 39 Reserved
N = 20 Reserved	N = 40 Reserved

SetOption(\$100+N), where N=41 and above, controls individual layers from the Tiger Data Set, as follows (see Appendix for Census Feature Class Code [CFCC]descriptions):

N/CFCC	N/CFCC	N/CFCC	N/CFCC	N/CFCC	N/CFCC	N/CFCC	N/CFCC
41 A00	65 A26	89 A53	113 B31	137 D30	161 D65	185 F20	209 H13
42 A01	66 A27	90 A60	114 B32	138 D31	162 D66	186 F21	210 H20
43 A02	67 A28	91 A61	115 B33	139 D32	163 D70	187 F22	211 H21
44 A03	68 A30	92 A62	116 B40	140 D33	164 D71	188 F23	212 H22
45 A04	69 A31	93 A63	117 B50	141 D34	165 D80	189 F24	213 H30
46 A05	70 A32	94 A64	118 B51	142 D35	166 D81	190 F25	214 H31
47 A06	71 A33	95 A65	119 B52	143 D36	167 D82	191 F30	215 H32
48 A07	72 A34	96 A70	120 C00	144 D37	168 D83	192 F40	216 H40
49 A08	73 A35	97 A71	121 C10	145 D40	169 D84	193 F50	217 H41
50 A10	74 A36	98 A72	122 C20	146 D41	170 D85	194 F60	218 H42
51 A11	75 A37	99 A73	123 C30	147 D42	171 D90	195 F70	219 H50
52 A12	76 A38	100 B00	124 C31	148 D43	172 D91	196 F71	220 H51
53 A13	77 A40	101 B01	125 D00	149 D44	173 E00	197 F72	221 H53
54 A14	78 A41	102 B02	126 D10	150 D50	174 E10	198 F73	222 H60
55 A15	79 A42	103 B03	127 D20	151 D51	175 E20	199 F74	223 H70
56 A16	80 A43	104 B10	128 D21	152 D52	176 E21	200 F80	224 H71
57 A17	81 A44	105 B11	129 D22	153 D53	177 E22	201 F81	225 H72
58 A18	82 A45	106 B12	130 D23	154 D54	178 F00	202 F82	226 H73
59 A20	83 A46	107 B13	131 D24	155 D55	179 F10	203 H00	227 H74
60 A21	84 A47	108 B20	132 D25	156 D60	180 F11	204 H01	228 H75
61 A22	85 A48	109 B21	133 D26	157 D61	181 F12	205 H02	229 H80
62 A23	86 A50	110 B22	134 D27	158 D62	182 F13	206 H10	230 H81
63 A24	87 A51	111 B23	135 D28	159 D63	183 F14	207 H11	231 X00
64 A25	88 A52	112 B30	136 D29	160 D64	184 F15	208 H12	

**OpCode = \$200 (State Polygon Shading)**

Shade State/Province Polygons. Shading is performed using the currently defined color shades (See Appendix for information on the shading array stored in the configuration file)

**OpCode = \$201 (County Polygon Shading)**

Shade County Polygons. Shading is performed using the currently defined color shades (See Appendix for information on the shading array stored in the configuration file)

**OpCode = \$202 (MCD Polygon Shading)**

Shade MCD Polygons. Shading is performed using the currently defined color shades (See Appendix for information on the shading array stored in the configuration file)

**OpCode = \$203 (Place Polygon Shading)**

Shade Place Polygons. Shading is performed using the currently defined color shades (See Appendix for information on the shading array stored in the configuration file)

**OpCode = \$C001 (Debug Mode)**

It controls the OCX debug mode. If Option=1 the debug mode is turned ON, and if Option=0, it is turned OFF. When the debug mode is ON, a file named **mpdebug.txt** is created in the default directory of the C: drive, containing useful information for Undertow Software's development department, when trying to resolve complex tech support problems. This file can get fairly large. Use this option only when directed to do so by Undertow Software, and follow whatever other instructions are given to you at the time.

**OpCode = \$C002 (Render Time)**

Time (Sec) to generate the last display, including the time to load the data.

**OpCode = \$C003 (Load Data Time)**

Time (sec) to load the data (included in value returned by OpCode \$C002).

**OpCode = \$C004 (World Extents)**

Setting it to tru, permits the control to accommodate coordinates outside North America.

**OpCode = \$D001 (Memory Usage)**

Maximum Number of EMS (the internal memory management module) Pages Allocated for any operation this far (ReadOnly, can be queried with OpCode 00).

**OpCode = \$D002 (Memory Page Size)**

Size of EMS page in bytes (ReadOnly, can be queried with OpCode 00). Note that the page size and the maximum allowable pages is optimized in each release of MapPro, in order to support the widest group of hardware and also perform efficiently.

**OpCode = \$D003 (Free Memory)**

Free EMS, in bytes (ReadOnly, can be queried with OpCode 00).

**OpCode = \$D004 (Max Memory)**

Maximum EMS, bytes, allocated (ReadOnly, can be queried with OpCode 00).

**OpCode = \$D005 (One Way Arrow Collision)**

This controls the one way street indicator collision bounding rectangle size. This can limit the number of arrows and overlap. You can do so using SetOption(\$D005,N) where N adds the specified number of pixels to the rectangle bounding box.

**OpCode = \$D007 (Min Zoom Scale)**

Sets the minimum zoom scale value (in feet). There is also a built-in limit of 100 feet.

**OpCode = \$D008 (Grid File Memory Usage)**

Returns the memory (bytes) used by the currently loaded grid files.

**OpCode = \$EEE2 (Internal Bitmap Mode)**

Set the mode to be used by the map drawing module, in terms of the Windows PixelFormats. This allows the user to select the type of internal bitmap to be generated by the map drawing routine. If the developer wants to use 16- or 24-bit bitmaps generated, instead of the default 8-bit 256-color bitmaps, they need only set the appropriate mode.

Option can be used to set one of the following modes:

- Option = 1, pf1bit - Mono
- Option = 2, pf4bit - 16 color
- Option = 3, pf8bit - 256 color
- Option = 4, pf15bit - 15 bit color
- Option = 5, pf16bit - 16 bit color
- Option = 6, pf24bit - RGB True color
- Option = 7, pf32bit - 32 bit color

**OpCode = \$EEE4 (User Item Paint Order)**

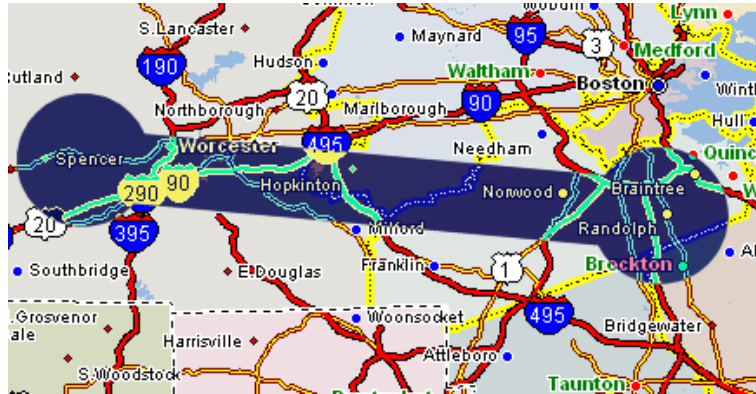
Sets the order in which the OCX paints the user items on screen. Option = 0 - Instructs the OCX to paint the items in the OnPaintAfter event "prior" to painting the user bitmaps placed by the SetItem methods. Option = 1 instructs the OCX to paint the user bitmaps first. The values are in Hex.

**OpCode = \$EEE9 (Double Lined Roads)**

Set the single-line street mode when zoomed very close. The default is Option=0, i.e., double line streets are used. If Option is set to 1, then single line streets are used when zoomed in.

**OpCode = \$EEEA (Routing Local Radius)**

Sets the local radius (through the Option value, in miles) to be used at the start/end points or a specified routing calculation, for connecting to the local road network. The larger the Radius, the higher the likelihood that the Interstate Network will find a node to connect to the local road network. Experienced user, familiar with the routing capabilities of the program can use this option to optimize their routing calculations, or eliminate problems where the default radius is too small and a national to local transition node is not found. The default value is 10 mi.



When doing routing calculations, a straight line is drawn between the **From** and **To** points. If applicable, an highway route is calculated between the points and then a transition from a highway to a local street node is sought for within the radius set with this OpCode around the **From** and **To** points.

**OpCode = \$EEEB (Routing Band Width)**

Sets the width of the bitmap used to determine the grids to load for en-route routing. The larger the width, the higher the likelihood that a route calculation will complete, at the expense of consuming significantly higher resources. The default value is set to 100 mi. This is the width of the straight line drawn between the **From** and **To** points, and it defines how many grids need to be loaded in creating the node network for calculating the route (See graphic for OpCode \$EEEA).

**OpCode = \$EEEC (Routing Highlight Resolution)**

If Option=1, then ALL the nodes are used for highlighting the route, and if Option=0, then only the first and last points of each chain are used, as it used to work in earlier versions of the OCX. The default value is set to 0.

**OpCode = \$EEEE (FindClosest Options)**

It affects the behavior when using the FindClosest Method. If Option=0, then it operates as before, i.e., it returns the coordinate of the segment endpoint. If Option=1, then it returns the coordinates of the interpolated address (Note that since not all segments are divided the same way in real life, the interpolated coordinates may, or may not be correct).

Some simple code examples using the SetOption method.

```

VB Example Private Sub Command39_Click()
    '-----}
    ' Change the background (Canada/Mexico) color
    '-----}

    dim flag as long
    'Set the color using the RGB function}
    flag=MapProl.setoption(1,RGB(33,23,45))
    'repaint the map surface to reflect the new color}
    MapProl.redraw
End Sub

```

```

'-----}
' Set Some options using SetOption
'-----}

dim flag as Integer
dim cl,StNum as Long
'Set the State number for MA }
StNum=38
'Set the color to solid Red}
cl=RGB(255,0,0)
'Use SetOption to Set the color of MA to Red}
flag=MapProl.SetOption(StNum,cl)
'Set the Palette}
MapProl.SetOption(0,0)
'Check to see if the operation was successful and echo
appropriate message as a caption to panel 5}
if flag<>0 then Panel5.caption="Palette Setting Failed!"
else Panel5.caption="Palette Setting Successful!"
'If the operation was successful, redraw the map
'to reflect the new color}
if flag=0 then MapProl.redraw
End Sub

'-----}
' Example using SetOption to query the map control
'-----}

Dim val,QResult,opt as long
'Convert the input entered by user in Textbox #3 to a value}
Opt = val(Text3.text)
'Use SetOptions to query the property specified by the user}
QResult=MapProl.SetOption(0,Opt)
'Echo the returned result as the panel5 caption}
panel5.caption=str(opt)+" ":" "+str(QResult)
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button14Click(Sender: TObject);
{-----}
{ Change the background (Canada/Mexico) color
}
{-----}
var flag:longint;
begin
  {Set the color using the RGB function}
  flag:=MapProl.setoption(1,RGB($33,$23,$45));
  {repaint the map surface to reflect the new color}
  MapProl.redraw;
end;

procedure TForm1.Button15Click(Sender: TObject);
{-----}
{ Set Some options using SetOption
}
{-----}
var flag:integer;
    cl,StNum:LongInt;
begin
  {Set the State number for MA }
  StNum:=$38;
  {Set the color to solid Red}
  cl:=RGB($ff,0,0);
  {Use SetOption to Set the color of MA to Red}
  flag:=MapProl.SetOption(StNum,cl);

```

```

    {Set the Palette}
    MapProl.SetOption(0,0);
    {Check to see if the operation was successful and echo
     appropriate message as a caption to panel 5}
    if flag<>0 then Panel5.caption:='Palette Setting Failed!'
      else Panel5.caption:='Palette Setting Successful!';
    {If the operation was successful, redraw the map
     to reflect the new color}
    if flag=0 then MapProl.redraw;
end;

procedure TForm1.Button17Click(Sender: TObject);
{-----}
{ Example using SetOption to query the map control }
{-----}
var QResult,opt:longint;
begin
  {Convert the input entered by user in editbox #3 to a value}
  val(edit3.text,Opt,code);
  {Use SetOptions to query the property specified by the user}
  QResult:=MapProl.SetOption(0,Opt);
  {Echo the returned result as the panel5 caption}
  panel5.caption:=inttostr(opt)+' ':''+inttostr(QResult);
end;

```

---

## Shade\_Cnty:Boolean

## Property

---

If set to True, the polygons defined by the County outlines are shaded. If set to false, they are not shaded, but instead assume the generic background color.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.Shade_Cnty=false
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button11Click(Sender: TObject);
begin
    MapProl.Shade_Cnty:=true;
end;

```

---

## Shade\_MCD:Boolean

## Property

---

If set to True, the polygons defined by the MCD outlines are shaded. If set to false, they are not shaded, but instead assume the generic background color.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.Shade_MCD=false
End Sub

```

**Delphi Example**

```

Procedure TForm1.Button10Click(Sender: TObject);
begin

```

```
MapProl.Shade_MCD:=true;  
end;
```

---

**Shade\_Plc: Boolean****Property**

---

If set to True, the polygons defined by the Place outlines are shaded. If set to false, they are not shaded, but instead assume the generic background color.

**VB Example** Private Sub Command39\_Click()  
MapProl.Shade\_Plc=false  
End Sub

**Delphi** Procedure TForm1.Button9Click(Sender: TObject);  
begin  
MapProl.Shade\_Plc:=false;  
end;

---

**Shade\_State: Boolean****Property**

---

If set to True, the polygons defined by the State outlines are shaded. If set to false, they are not shaded, but instead assume the generic background color.

**VB Example** Private Sub Command39\_Click()  
MapProl.Shade\_State=false  
End Sub

**Delphi** Procedure TForm1.Button5Click(Sender: TObject);  
begin  
MapProl.Shade\_State:=false;  
end;

---

**ShowAllItems()****Procedure**

---

















Sets the attribute for all user-created objects to visible.

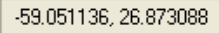
**VB Example** Private Sub Command39\_Click()  
MapProl.ShowAllItems  
End Sub

**Delphi** Procedure TForm1.Button9Click(Sender: TObject);  
begin  
MapProl.ShowAllItems;  
end;

Displays a floating toolbar with predefined icons to automatically execute a number of the build in methods.



-  Zooms the Viewport IN by a factor of 2.
-  Zooms the Viewport OUT by a factor of 2.
-  Reverts the Viewport to the immediately previous view.
-  Zoom out so that USA extents are shown.
-  Zoom out so that the world extent s are shown.
-  Toggle the display of the Lon/Lat grid On/Off
-  Open up the stock print dialog.
-  Open up the standard routing dialog.
-  Open up the Optirouter dialog (this button appears in the tool bar only if the OpriRouterBtn property is set to True).
-  Open up the stock search dialog and have the *Search for an Address* Tab selected.
-  Open up the stock search dialog and have the *Search for a Place* Tab selected.
-  Open up the stock search dialog and have the *Search for an Area Code* Tab selected .
-  Open up the stock search dialog and have the *Search for a Zip Code/Postal Code* Tab selected.
-  Open up the stock search dialog and have the *Goto a Lon,Lat* Tab selected.
-  Invoked Windows help and opens up the file at the location specified by the developer. (Note that this is to accommodate the developer in providing help facilities for end-users of their applications, not to invoke help facilities for the OCX).
-  Sets one of the predefined Zoom scales.

 -59.051136, 26.873088 This area echoes the coordinates of the current cursor position. Clicking in this area cycles the different Lon/Lat display formats available in the control.

**Note:** The toolbar can be cancelled by clicking on the "x" icon on the far right. When the toolbar is



floating, double-clicking in the caption area anchors it (similar to setting `ToolBarMode` to 1). Also, left-clicking on the toolbar gives the user the option to anchor, un-anchor or close the toolbar. While the toolbar is displayed, the rightmost portion of it displays the current mouse coordinates. Clicking in the coordinate echo area cycles through the various coordinate formats.

**VB Example**

```
Private Sub Command39_Click()
    MapProl.Parent = Form1.hdc
    MapProl.ShowToolBar
End Sub
```

**Delphi**

```
Procedure TForm1.Button2Click(Sender: TObject);
begin
    MapProl.ShowToolBar;
end;
```

---

### StartView(s:String)

### Property

A new property was added that can be set at design time. A string of the form `x1,y1,x2,x2`, (Upper Left, Lower Right Lat/Lon Values of Map) sets the viewport extents when the application starts up, and it takes precedence over `LastView` or any other viewport settings in the `.CFG` file.

---

### Street:string

### Property

This string holds the data returned by the `FindStreet` method when an `ONFIND` event is triggered. Data in the string consists of 8 fields delimited by ASCII character `#9` and is in the order shown below. (See `FindStr` for more information).

```
Streetname,Cityname,Address,State,Zipcode,Lon,Lat,Distance
```

When searching for a Cross Street, the field "Streetname" contains the concatenation of both cross street names, preceded by an asterisk, and the Address fields contains "N/A".

**Note:** It should be emphasized that this is used only for the Street search. "Result" is used to return information from the other available search operations.

**VB Example**

```
Private Function MyQFactor() As Integer
    MyQFactor = 1
    If MapProl.GeoFindParse(3, MapProl.Street) <> "" Then
        MyQFactor = 5
    Else
        If MapProl.GeoFindParse(1, MapProl.Street) <> "" Then
            MyQFactor = 4
        Else
            If MapProl.GeoFindParse(2, MapProl.Street) <> "" Then
                MyQFactor = 3
            Else
                If MapProl.GeoFindParse(5, MapProl.Street) <> "" Then
                    MyQFactor = 2
                Else
                    If MapProl.GeoFindParse(4, MapProl.Street) <> "" Then
                        MyQFactor = 1
                    End If
                End If
            End If
        End If
    End If
```

```

        End If
    End If
End If
End Function

```

---

**Synch: Boolean**
**Property**


---

Determines the rotation of street labeling when the Rotate procedure is called. If Synch is false (default), then the street label rotation is restricted in the eastern quadrants. If Synch is true, then the rotation of the street labels stays synchronized with the street segment (retains original relative orientation), around 360 degrees.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.Synch=true
End Sub

```

**Delphi**

```

Procedure TForm1.Synch(Sender: TObject);
begin
    MapProl.Synch:=true;
end;

```

---

**Texture: Boolean**
**Property**


---

Displays areas that do not contain map data with a gray textured surface.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.Texture = True
End Sub

```

---

**TitlePrint(s:String)**
**Property**


---

Sets the title to be printed at the top of the page of the driving directions and the driving map(s) in MapPro.. Sets the footer text displayed at the bottom of maps printed with ExecPrint.

**VB Example**

```

Private Sub Command39_Click()
    MapProl.TitlePrint("My Printed Directions")
End Sub

```

**Delphi**

```

Procedure TForm1.Button2Click(Sender: TObject);
begin
    MapProl.TitlePrint('My Printed Directions');
end;

```

---

**TitleUser(s:String)**

---

**Property**

Sets the string to be printed as part of the footer of the driving directions pages and the driving map(s).  
Sets the footer text displayed at the bottom right of maps printed with ExecPrint.

**VB Example**   Private Sub Command39\_Click()  
                  MapProl.TitleUser("Copyright 1999 XYZ Company")  
                  End Sub

**Delphi**        Procedure TForm1.Button2Click(Sender: TObject);  
                  begin  
                    MapProl.TitleUser('Copyright 1999 XYZ Company');  
                  end;

---

**ToolBarMode:Integer**

---

**Property**

Sets the mode for the built-in toolbar.

It can take one of three values (also enumerated, depending on the development environment).

- 0 or TbHide = Hides (closes) the toolbar
- 1 or TbFix = Displays the toolbar fixed in the upper left corner of the form.
- 2 or TbFloat = Displays the toolbar floating in the general form area.

**Note:** Note that when the toolbar is floating, double-clicking in the caption area anchors it (similar to setting ToolBarMode to 1). Also, left-clicking on the toolbar gives the user the option to anchor, un-anchor or close the toolbar.

**VB Example**   Private Sub Command39\_Click()  
                  MapProl.toolbarmode=1  
                  End Sub

**Delphi**        Procedure TForm1.Button2Click(Sender: TObject);  
                  // -----  
                  // Display a fixed (anchored) toolbar  
                  // -----  
                  begin  
                    MapProl.toolbarmode:=1;  
                  end;

---

**Underlay:Boolean**

---

**Property**

Controls visibility of the bitmap underlay file, if present. True state sets the underlay to visible.

**Note:** Underlays do NOT print.

**VB Example**   Private Sub Command39\_Click()

```

    MapProl.Underlayfile="C:\pmap40\contour\pmap.pcc"
    MapProl.underlay=true
End Sub

```

### Delphi

```

Procedure TForm1.UnderlayCN1Click(Sender: TObject);
begin
    MapProl.Underlayfile:='C:\pmap40\contour\pmap.pcc';
    MapProl.underlay:=true;
end;

```

---

## UnderlayFile(s:String)

## Property

---

Specifies the name of the underlay bitmap file. You can use a wildcards "\*" for the software to dynamically check all similar files and load the appropriate image if it is located in the view port. Version 7.0 of MapPro will load files of .BMP, .GIF or .JPG format. (Also see the PostUnderlay property that determines the sequence in which the underlay is drawn).

**Note:** A full file name specification (including path) is required, e.g., drive:\Folder\FileName.BMP. It should be emphasized that the OCX will also look in the specified directory for a file 'FileName.SAT'. This file contains the top left and bottom right Lon/Lat coordinates separated by comma. Using the OCX method ZoomUnderlay, after loading the file, will relocate the viewport to the location described by the .SAT file.

The SAT file layout is as follows: UpperLON, UpperLAT, LowerLON, LowerLAT:double

### VB Example

```

Private Sub Command39_Click()
    ' Use the sample Underlay file on the Precision Mapping
    ' Streets 4.0 CD-ROM disk, assuming that the CD-ROM drive
    ' letter is D: Note that the OCX looks for a file
    ' 'st_louis.sat' in the same directory as the
    ' 'st_louis.BMP' file. The contents of the .SAT file, in
    ' this case, are:
    '
    '     -90.979339, 39.013707,-90.031627, 38.182347
    '
    ' which are the upper right and bottom left coordinates
    ' of the area covered by the st_louis.bmp image file}
    MapProl.UnderlayFile="D:\pmap40\contour\st_louis.bmp"
End Sub

```

### Delphi

```

Procedure TForm1.UnderlaySL1Click(Sender: TObject);
begin
    { Use the sample Underlay file on the Precision Mapping
    Streets 4.0 CD-ROM disk, assuming that the CD-ROM drive
    letter is D: Note that the OCX looks for a file
    'st_louis.sat' in the same directory as the
    'st_louis.BMP' file. The contents of the .SAT file, in
    this case, are:

        -90.979339, 39.013707,-90.031627, 38.182347

    which are the upper right and bottom left coordinates
    of the area covered by the st_louis.bmp image file}

```

```
MapProl.UnderlayFile:='D:\pmap40\contour\st_louis.bmp';  
end;
```

---

**UnderlayTransparent: Boolean****Property**

---

Declares whether the loaded overlay will have a transparent color (see OverlayTransparentColor property), or not.

**VB Example**

```
Private Sub Command71_Click()  
    'Open stock dialog to open underlay file  
    CommonDialog2.ShowOpen  
    s = CommonDialog2.FileName  
    ' Set underlay file  
    MapProl.UnderlayFile = s  
    ' Set the Underlay transparency mode  
    MapProl.UnderlayTransparent = True  
    ' Set the Underlay Transparent color (white)  
    MapProl.UnderlayTransparentColor = RGB(255, 255, 255)  
    'Redraw the Map  
    MapProl.Redraw  
End Sub
```

---

**UnderlayTransparentColor: Integer****Property**

---

Defines what the transparent color in an underlay is (RGB color). This has an effect only when UnderlayTransparent = True.

**VB Example**

```
Private Sub Command71_Click()  
    'Open stock dialog to open underlay file  
    CommonDialog2.ShowOpen  
    s = CommonDialog2.FileName  
    ' Set underlay file  
    MapProl.UnderlayFile = s  
    ' Set the Underlay transparency mode  
    MapProl.UnderlayTransparent = True  
    ' Set the Underlay Transparent color (white)  
    MapProl.UnderlayTransparentColor = RGB(255, 255, 255)  
    'Redraw the Map  
    MapProl.Redraw  
End Sub
```

---

**ViaCount: Integer****Property**

---

Total number of via points currently defined.

---

**ViewCmd(s:String)**

---

**Property**

This forces the system to open a map to a specific location upon startup. "S" is a composite string made up of that can have two different forms, depending on its first character.

If the first character is 'P', then it denotes that the viewport is to be set by a center point and a scale value, so S is of the form: Px,y,Scale.

If the first character is 'W', it denotes that a viewport windows will be set, so it is of the form: Wx1,y1,x2,y2. This format is also the same as the ZoomSp property.

**VB Example**

```
Private Sub Form_Load()  
    MapProl.ToolbarMode = TbFix  
    ' Set the viewport using the Window method  
    ' This was implemented to address the start-up issues  
    MapProl.ViewCmd = "w-80,45,-92,38"  
End Sub
```

---

**Visible:Boolean**

---

**Property**

Sets the visibility of the Map object.

**VB Example**

```
Private Sub Command39_Click()  
    'Turn visibility off, zoom the map and turn it ON  
    MapProl.Visible=false  
    MapProl.ZoomPan(2)  
    MapProl.Zoomin  
    MapProl.Visible=true  
End Sub
```

**Delphi**

```
Procedure TForm2.Button4Click(Sender: TObject);  
{Turn visibility off, zoom the map and turn it ON}  
begin  
    MapProl.Visible:=false;  
    MapProl.ZoomPan(2);  
    MapProl.Zoomin;  
    OlePmMalp.Visible:=true;  
end;
```

---

**Xcord:Double**

---

**Property**

Returns the Longitude of the current cursor position in decimal degrees.

**VB Example**

```
Private Sub Command39_Click()  
    Text1.text =str(MapProl.xcord)+ ", " + str(MapProl.ycord)  
End Sub
```

**Delphi**

```

Procedure TForm1.MapProlMouseMove(Sender: TObject;
                               Shift: TShiftState; X, Y: Integer);
var xtemp,ytemp:string[12];
begin
  with MapProl do
  begin
    str(MapProl.xcord:10:6,xtemp);
    str(MapProl.ycord:10:6,ytemp);
    panel2.caption:='W:'+xtemp+' N:'+ ytemp;
  end;
end;

```

---

**Ycord:Double**

**Property**

---

Returns the Latitude of the current cursor position in decimal degrees.

**VB Example**

```

Private Sub Command39_Click()
  Text1.text =str(MapProl.xcord)+ ", " + str(MapProl.ycord)
End Sub

```

**Delphi**

```

Procedure TForm1.MapProlMouseMove(Sender: TObject;
                               Shift: TShiftState; X, Y: Integer);
var xtemp,ytemp:string[12];
begin
  with MapProl do
  begin
    str(MapProl.xcord:10:6,xtemp);
    str(MapProl.ycord:10:6,ytemp);
    panel2.caption:='W:'+xtemp+' N:'+ ytemp;
  end;
end;

```

---

**ZoomAll()**

**Procedure**

---

Resizes map to show continental USA within the view window. The map is redrawn.

**VB Example**

```

Private Sub Command39_Click()
  MapProl.ZoomAll
End Sub

```

**Delphi**

```

Procedure TForm1.SpeedButton3Click(Sender: TObject);
begin
  MapProl.ZoomAll;
end;

```

---

**ZoomCan()**

**Procedure**

---

Resizes map to show Canada within the view window. The map is redrawn.

**VB Example** Private Sub Command39\_Click()  
    MapProl.ZoomCan  
    or  
    MapProl.ZoomAll  
End Sub

**Delphi** Procedure TForm1.SpeedButton3Click(Sender: TObject);  
begin  
    MapProl.ZoomCan;  
    or  
    MapProl.ZoomAll;  
end;

---

**ZoomIn()****Procedure**

---

Resizes map by a factor of 2. All data required to display the map at the new size is automatically loaded (provided the path properties have been correctly defined). The map is redrawn at its new size.

**VB Example** Private Sub Command39\_Click()  
    MapProl.ZoomIn  
End Sub

**Delphi** Procedure TForm1.SpeedButton1Click(Sender: TObject);  
begin  
    MapProl.ZoomIn;  
end;

---

**ZoomIWindow(x1, y1, x2, y2: Integer)****Procedure**

---

Resizes map so that rectangle specified by screen coordinates is totally visible. Largest dimension, height or width dominates.

**VB Example** Private Sub Command39\_Click()  
    MapProl.ZoomIWindow(10,10,60,50)  
End Sub

**Delphi** Procedure TForm1.Button1Click(Sender: Object);  
begin  
    MapProl.ZoomIWindow(10,10,60,50)  
end;

---

**ZoomLast()****Procedure**

---

Restores the previous view resulting from any view operation.

**VB Example** Private Sub Command39\_Click()



```
MapProl.ZoomLast  
End Sub
```

**Delphi**

```
Procedure TForm1.SpeedButton4Click(Sender: TObject);  
begin  
    MapProl.ZoomLast;  
end;
```

---

**ZoomOut()****Procedure**

---

Resizes map downwards by a factor of 1/2. All data required to display the map is automatically loaded.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.ZoomOut  
End Sub
```

**Delphi**

```
Procedure TForm1.SpeedButton2Click(Sender: TObject);  
begin  
    MapProl.ZoomOut;  
end;
```

---

**ZoomOverlay()****Procedure**

---

Calculates the extents based on the elements in the currently loaded overlay and repositions and resizes viewport so that they are ALL visible. Note that this only applies to the older overlays of the type of .CMX and .OVR, which have been loaded using the OpenOverlay method. It does \*not\* apply to the newer CAD overlays which have their own Zoom method through the CAD interface.

**Notes** There is no effect if there is no Overlay file loaded.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Openoverlay("D:\PMAP40\OVERLAYS\myfile.ovr")  
    MapProl.ZoomOverlay  
End Sub
```

**Delphi**

```
Procedure TForm1.SpeedButton2Click(Sender: TObject);  
begin  
    MapProl.Openoverlay('D:\PMAP40\OVERLAYS\myfile.ovr');  
    MapProl.ZoomOverlay;  
end;
```

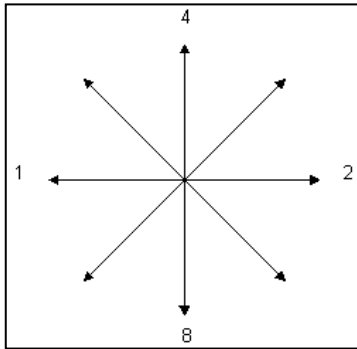
---

**ZoomPan(i:Integer)****Procedure**

---

Specified number causes viewport to move by a fixed amount in each of 8 principal directions. The directions are defined as shown below:

Direction	S	N	E	W
Bit	8	4	2	1



To move north, specify a ZoomPan integer factor of "4". To move west, specify 1. To move NorthEast use 6 (2+4), to move SouthWest use 9, with SouthEast use 10, etc.

**VB Example**

```
Private Sub Command39_Click()
    'Pan the viewport NorthWest
    MapProl.ZoomPan(5)
End Sub
```

**Delphi**

```
Procedure TForm1.Button2Click(Sender: TObject);
begin
    {Pan the viewport NorthWest}
    MapProl.ZoomPan(5);
end;
```

---

## ZoomSP(s:String)

## Procedure

This Zooms the system to open a map to a specific location. "S" is a composite string made up of that can have two different forms, depending on its first character.

If the first character is 'P', then it denotes that the viewport is to be set by a center point and a scale value, so S is of the form: Px,y,Scale.

If the first character is 'W', it denotes that a viewport windows will be set, so it is of the form: Wx1,y1,x2,y2. This format is also the same as the ViewCmd property.

**VB Example**

```
Private Sub Form_Load()
    MapProl.ToolbarMode = TbFix
    ' Set the viewport using the Window method
    ' This was implemented to address the start-up issues
    MapProl.ZoomSp("w-80,45,-92,38")
End Sub

Private Sub Command1_Click()
    ' Set the viewport using the Point method
    MapProl.ZoomSP "P-82.1234,41.4321,15"
End Sub
```

---

**ZoomUnderlay()****Procedure**

---

Repositions and resizes viewport so that the area defined by the 'top left' and 'bottom right' coordinated in the '.SAT' file associated with the currently loaded Underlay file, is visible.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.UnderlayFile="D:\pmap40\contour\st_louis.bmp"  
    MapProl.ZoomUnderlay  
End Sub
```

**Delphi**

```
Procedure TForm1.SpeedButton2Click(Sender: TObject);  
begin  
    MapProl.UnderlayFile:='D:\pmap40\contour\st_louis.bmp';  
    MapProl.ZoomUnderlay;  
end;
```

---

**ZoomWindow(x1, y1, x2, y2: OleVariant)****Procedure**

---

Resizes map so that rectangle specified by LON/LAT coordinates (decimal degrees) is totally visible. Largest dimension, height or width dominates. Resizes map so that rectangle specified (in decimal degrees) is visible. All data required to display map is automatically loaded. The order of the points (top-left, bottom-right, etc. is not important as they are ordered by the OCX.

**Note:** It should be noted that the actual extents of the viewport will not necessarily be those specified by the user, as such extents depend on the current viewport size. The largest dimension (height/width) dominates. However, the centroid of the requested windows will be located in the center of the view port.

**VB Example**

```
Private Sub Command39_Click()  
    MapProl.Zoomwindow(-120,30,-100,40)  
End Sub
```

**Delphi**

```
Procedure TForm1.Button11Click(Sender: TObject);  
begin  
    MapProl.Zoomwindow(-120,30,-100,40);  
end;
```

## **.CAD Interface**

An interface that enables the user to annotate a map surface by drawing desired objects on a “user” layer, superimposed on the map. These objects and their attributes can be set and edited either programmatically, or through the built-in toolbars, off the .CAD interface, as described later in this section. Objects are stored in an indexed array and can be randomly accessed and modified through that array. The map control needs to be refreshed, following the creation of these objects, for them to be rendered on the map surface.

User drawn objects can be saved to an external binary file (with the default extension *.CAD*), and can then be loaded from such a file either replacing any currently defined objects or being appended to them.

All objects defined in the CAD interface, have the following properties/methods.

- .CAD.Object.Brush**
- .CAD.Object.Caption**
- .CAD.Object.Font**
- .CAD.Object.GreatCircle**
- .CAD.Object.MoveAbs**
- .CAD.Object.MoveRel**
- .CAD.Object.Objecttype**
- .CAD.Object.Pen**
- .CAD.Object.Selected**
- .CAD.Object.Tag**
- .CAD.Object.Visible**

Details of these properties methods are included at the end of the CAD interface definition. New mdCAD mode.

CAD objects can be created in a number of ways.

- (a) Programatically, by directly calling a *CAD.Object* method, and specifying all the appropriate parameters.
- (b) By setting the appropriate mapMode value (mapMode=mdCAD), and the desired CAD.ObjectType, and then interactively drawing the object specified by ObjectType, or
- (c) By opening the CAD toolbar and clicking the appropriate button to draw the desired object.

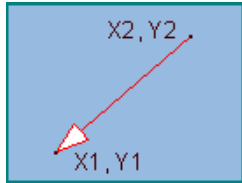
---

**.CAD.Arrow(x1,y1,x2,y2:Double):CadObj**

---

**Method**

Creates an Arrow object. X1,X2 are the Lon/Lat coordinates of the arrowhead, and X2,Y2 the coordinates of the arrow tail endpoint.



The arrow object may be re-sized, moved, etc, once it has been created, by invoking the CAD Edit mode from the CAD toolbar, or setting ObjectType=0 and then setting mapMode to mdCAD.

**VB Example**

```
Private Sub Command51_Click()  
Dim Arr As CadObj  
    ' Draw the arrow - second point is tip location  
Set Arr = MapProl.Cad.Arrow(-100, 30, -110, 40)  
    ' Set some brush attributes  
Arr.Brush.Color = vbBlue  
Arr.Brush.BackColor = vbGreen  
Arr.Brush.Style = 4  
Arr.Brush.Mode = 2 ' 1 would be transparent  
    ' Set some pen attributes  
Arr.Pen.Width = 4  
Arr.Pen.Color = vbRed  
    ' Set some Caption Attributes  
Arr.Caption = "Sample Arrow Object"  
Arr.Font.Height = 14  
Arr.Font.Style = 1 'bold  
MapProl.Refresh  
End Sub
```

---

**.CAD.Bezier(X1,Y1,X2,Y2,X3,Y3:Double):CadObj**

---

**Method**

Creates a bezier line object, using the coordinates of the three specified points, as shown in the graphics below.



**VB Example**

```
Private Sub Command52_Click()  
Dim Bz As CadObj, Pt1 As CadObj, Pt2 As CadObj, Pt3 As CadObj
```

```

Dim Ln1 As CadObj, Ln2 As CadObj
MapProl.Cad.Clear
' Set the coordinates for the three points
Pt1X = -100
Pt1Y = 30
Pt2X = -105
Pt2Y = 34
Pt3X = -107
Pt3Y = 30
Set Bz = MapProl.Cad.Bezier(Pt1X, Pt1Y, Pt2X, Pt2Y, Pt3X, Pt3Y)
' Show the Bezier control lines
Set Ln1 = MapProl.Cad.mLine(Pt1X, Pt1Y, Pt3X, Pt3Y)
Set Ln2 = MapProl.Cad.mLine(Pt2X, Pt2Y, Pt3X, Pt3Y)
Ln1.Pen.Style = 3
Ln1.Pen.Color = vbBlue
Ln2.Pen.Style = 3
Ln2.Pen.Color = vbBlue
' The commented alternative would mark the 3 points
' by getting and then using the handles to the built-in markers.
' s1 = MapProl.Cad.GetMarker(2)
' s2 = MapProl.Cad.GetMarker(2)
' s2 = MapProl.Cad.GetMarker(7)
' We'll use external bitmaps, instead
Set Image1.Picture = LoadPicture("d:\test\mappro71\One.gif")
Set Image2.Picture = LoadPicture("d:\test\mappro71\Two.gif")
Set Image3.Picture = LoadPicture("d:\test\mappro71\Three.gif")
Set Pt1 = MapProl.Cad.Marker(Pt1X, Pt1Y, Image1.Picture.Handle)
Set Pt2 = MapProl.Cad.Marker(Pt2X, Pt2Y, Image2.Picture.Handle)
Set Pt3 = MapProl.Cad.Marker(Pt3X, Pt3Y, Image3.Picture.Handle)
' Set some attributes
Bz.Pen.Width = 4
Bz.Pen.Color = vbGreen
MapProl.Refresh
End Sub

```

---

## **.CAD.BringToFront**

## **Method**

Brings the currently selected CAD objects to the front, i.e., draws them after (on top of) all other CAD Objects. See the SelectRange and SelectRect methods for selecting CAD objects to operate on.

**VB Example**

```

Private Sub Command58_Click()
Dim Bz As CadObj, Pt1 As CadObj, Pt2 As CadObj, Pt3 As CadObj
Dim Ln1 As CadObj, Ln2 As CadObj, rc1 As CadObj, rc2 As CadObj, rc3
As CadObj
MapProl.Cad.Clear
' Set the coordinates for the three points
Pt1X = -100
Pt1Y = 30
Pt2X = -105
Pt2Y = 34
Pt3X = -102
Pt3Y = 36
s1 = MapProl.Cad.GetMarker(2)
s2 = MapProl.Cad.GetMarker(4)
s3 = MapProl.Cad.GetMarker(7)

```

```

Set Pt1 = MapProl.Cad.Marker(Pt1X, Pt1Y, s1)
Set Pt2 = MapProl.Cad.Marker(Pt2X, Pt2Y, s2)
Set Pt3 = MapProl.Cad.Marker(Pt3X, Pt3Y, s3)
Pt1.Caption = "point[1]"
Pt1.Font.Align = 1
Pt2.Caption = "point[2]"
Pt2.Font.Align = 2
Pt3.Caption = "point[3]"
' create a circle and an ellipse
Set rc1 = MapProl.Cad.mCircle(-100, 30, -80, 38, 1)
rc1.Caption = "Circle[4]"
rc1.Brush.Style = 4
rc1.Brush.Mode = 2
Set rc2 = MapProl.Cad.Ellipse(-99, 28, -92, 40)
rc2.Caption = "Ellipse[5]"
rc2.Brush.Color = vbBlue
'Also draw enclosing polygon
Set rc3 = MapProl.Cad.Rectangle(-99, 28, -92, 40)
rc3.Brush.Style = 1
' Bring the first object Tofront, i.e. above the other objects
With MapProl.Cad
    .Objects(0).Selected = True
    .BringToFront
End With
MapProl.Refresh
End Sub

```

---

## **.CAD.Brush**

## **Property**

Sets the default brush properties for all CAD objects. When an object is created it inherits these brush properties, unless specific brush properties are set for the object, either prior to, or after its creation. (See *object.brush*, later on, for a detailed description of the brush properties)

### **VB Example**

```

Private Sub Command41_Click()
Dim RegPol As CadObj
' Set default Brush Properties for all CAD objects
MapProl.Cad.Brush.Color = vbRed
MapProl.Cad.Brush.BackColor = vbBlue
MapProl.Cad.Brush.Mode = vbTransparent
MapProl.Cad.Brush.Style = vbCross
' Draw a polygon to test settings
Set RegPol = MapProl.Cad.RegularPolygon(-100, 40, -80, 40, 4)
' refresh the map to see object
MapProl.Refresh
End Sub

```

---

## **.CAD.Clear()**

## **Method**

Clears all CAD objects currently defined in memory. Note that unless you have saved your CAD objects to an external file, you will not be able to recover them following the issuance of .Clear command. Also, remember to refresh the map object following the .Clear call.

**VB Example**

```
Private Sub Command38_Click()
    ' Clear all CAD objects, but first save them to an external file
    MapProl.Cad.SaveToFile ("MyTestCadFile")
    MapProl.Cad.Clear
    MapProl.Refresh
End Sub
```

---

### **.CAD.Count:Integer**

### **Property**

Holds the count of the total CAD objects currently defined in memory. Note that the Objects array is zero-based, so if *CAD.Count* = 5, for example, the Objects() array is represented by Object(0)..Object(4).

**VB Example**

```
Private Sub Command42_Click()
    ' List the types of all current objects (note array is zero based)
    List1.Clear
    For i = 1 To MapProl.Cad.Count
        List1.AddItem "Item # " & i & ", Type: " & MapProl.Cad.Objects(i
- 1).ObjectType
    Next i
End Sub
```

---

### **.CAD.Delete():Integer**

### **Method**

Deletes the currently selected CAD objects. See the *SelectRange* and *SelectRect* methods for selecting CAD objects to operate on. It returns the number of CAD objects that were deleted.

**VB Example**

```
Private Sub Command55_Click()
    ' Delete all selected objects and display the # of
    ' objects deleted (for confirmation purposes)
    n = MapProl.Cad.Delete
    Command55.Caption = "Last Delete=" & n
End Sub
```



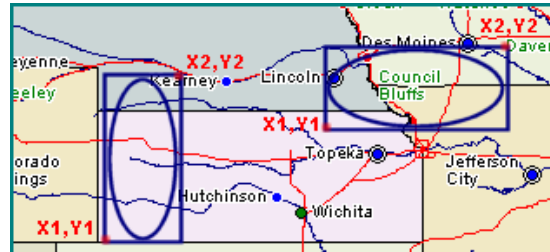
---

**.CAD.Ellipse(X1, Y1, X2, Y2:Double):CadObj**

---

**Method**

Creates an ellipse within the bounding rectangle defined by the two points **X1,Y1** and **X2,Y2**.



**VB Example**

```
Private Sub Command25_Click()  
Dim TEL As CadObj, Trec As CadObj  
    ' Draw the bounding rectangle  
    Set Trec = MapProl.Cad.Rectangle(-120, 40, -82, 30)  
    Trec.Pen.Style = 3  
    Set TEL = MapProl.Cad.Ellipse(-120, 40, -82, 30)  
    ' Set some of the line attributes  
    TEL.Pen.Width = 1  
    TEL.Pen.Color = vbBlue  
    TEL.Pen.BackColor = vbRed  
    TEL.Pen.Style = 1  
    'TEL.Pen.Mode = 0  
    TEL.Brush.Color = vbGreen  
    TEL.Brush.BackColor = vbYellow  
    TEL.Brush.Style = Val(Text18.Text) ' I varried these 0-5  
    TEL.Brush.Mode = Val(Text19.Text) ' Varried these 0-5  
    MapProl.Refresh  
End Sub
```

---

**.CAD.Extents :TExtentRec**

---

**Method**

A record containing the extents of all current CAD objects. This can be used with ZoomWindow to zoom to zoom in or out to the extents of existing CAD objects. The record contains 4 doubles, as shown below:

```
TExtentRec = record  
    Xmin:double;  
    Ymin:double;  
    Xmax:double;  
    Ymax:double;  
end;
```

**VB Example**

```
Private Sub Command54_Click()
    ' Use the CAD. Extents to zoom to all the CAD objects
    With MapProl.Cad.Extents
        MapProl.ZoomWindow .Xmin, .Ymin, .Xmax, .Ymax
    End With
End Sub
```

---

## **.CAD.Font()**

## **Method**

Sets the default font properties for all CAD objects (the caption of the object). When an object is created it inherits these font properties, unless specific font properties are set for the object, either prior to, or after its creation. (See *object.font* later on for a detailed description of the brush properties)

**VB Example**

```
Private Sub Command31_Click()
    ' Set Text Default Attributes
    Mapprol.CAD.Font.Height = 42
    Mapprol.CAD.Font.Mode = -1
    Mapprol.CAD.Font.Angle = 30
End Sub
```

---

## **.CAD.GetMarker(n:Integer):LongInteger**

## **Method**

Returns a handle to the n-th marker in the built-in markers array, which can then be used to place a marker on the map using the CAD.Marker method.

**VB Example**

```
Private Sub Command28_Click()
    Dim Tmk1 As CadObj, Tmk2 As CadObj
    ' Get the handle of one of the built-in markers
    hmark = MapProl.Cad.GetMarker(2)
    ' Now use that handle to paint the marker on the map
    Set Tmk1 = MapProl.Cad.Marker(-92, 27, hmark)
    ' Select a user-defined bitmap to use as a marker
    Set Image1.Picture = LoadPicture("d:\test\mappro71\test.bmp")
    Set Tmk2 = MapProl.Cad.Marker(-72, 42, Image1.Picture.Handle)
    'Refresh the map
    MapProl.Refresh
End Sub
```

---

## **.CAD.GetMetaObj(s:String):LongInteger**

## **Method**

Returns a handle to the windows metafile specified by the user, primarily to be used with the MetaObj object. This method works both with metafiles and enhanced metafiles.

**VB Example**

```
Private Sub Command60_Click()
    Dim Wm1 As CadObj, Mhnd As Long
    ' Get handle to user's metafile
```

```

Mhnd = MapProl.Cad.GetMetaObj("d:\test\mappro71\One.wmf")
' Use handle to set MetaObj
Set Wml = MapProl.Cad.MetaObj(-100, 30, -80, 36, Mhnd)
MapProl.Refresh
End Sub

```

---

### **.CAD.GetSymbol(index:Integer):LongInteger**

**Method**

---

Returns a handle to the built-in symbols windows metafile specified by the user, primarily to be used with the Symbol object. The available range of values for index are 1..95.

**VB Example**

```

Private Sub Command60_Click()
Dim Wml As CadObj, Mhnd As Long
' Get handle to built-in symbol
Mhnd = MapProl.Cad.GetSymbol(5)
' Use handle to set Symbol
Set Wml = MapProl.Cad.Symbol(-100, 30, -80, 36, Mhnd)
MapProl.Refresh
End Sub

```

---

### **.CAD.Group()**

**Method**

---

Groups the currently selected CAD objects into a composite object that can then be modified as a single entity. Grouped CAD objects can be broken down to the components using the *.CAD.Ungroup* method.

**VB Example**

```

Private Sub Command66_Click()
' Ungroup selected COmplex Object
MapProl.Cad.UnGroup
' Update to show new objecs. Mode to show handles.
MapProl.MapMode = MdCad
MapProl.Cad.ObjectType = 0
MapProl.Refresh
End Sub

```

---

### **.CAD.ImportFile()**

**Method**

---

Imports a CMX or OVR file (older overlay file format), and appends the objects to any objects currently defined. Note that at the end of the Import process, the elements in memory have been converted to the native CAD format and can be modified using the CAD interface. This is different than the OpenOverlay method which simply opens the older overlay files without altering their format.

**VB Example**

```

Private Sub Command108_Click()
' Import an older-type OVR overlay file
' Objects in it get converted to CAD objects
MapProl.Cad.ImportFile "d:\test\mappro71\desmgrms.ovr"
' MapProl.OpenOverlay "d:\test\mappro71\desmgrms.ovr"
' Zoom to the extents of the Overlay
MapProl.ZoomOverlay

```

End Sub

---

<b>.CAD.LoadFromFile(s:String; Option:Integer)</b>	<b>Method</b>
--	---------------

---

Loads the CAD object in the specified external file. Note: the map control needs to be refreshed, following the file loading, for the CAD objects to be painted on the map surface. If **Option=0**, then the existing CAD layer is cleared before the file is loaded. If **Option=1**, then the CAD objects in the file are appended to any CAD objects currently defined.

**VB Example**

```
Private Sub Command33_Click()  
    ' Load CAD objects from file (Clear objects first)  
    MapProl.Cad.LoadFromFile "myCadTest01.cad",0  
    ' refresh the map to see the objects  
    MapProl.Refresh  
End Sub
```

---

<b>.CAD.Marker(X, Y:Double; hnd:Integer)</b>	<b>Method</b>
--	---------------

---

Creates an instance of the marker (bitmap) defined by the handle (hnd) at the specified Lon, Lat coordinates. The handle can be that of one of the built-in bitmap markers (see *CAD.GetMarker*), or one externally defined by the user.

**VB Example**

```
Private Sub Command28_Click()  
    Dim Tmk1 As CadObj, Tmk2 As CadObj  
    ' Get the handle of one of the built-in markers  
    hmark = MapProl.Cad.GetMarker(2)  
    ' Now use that handle to paint the marker on the map  
    Set Tmk1 = MapProl.Cad.Marker(-92, 27, hmark)  
    '---  
    ' Select a user-defined bitmap to use as a marker  
    Set Image1.Picture = LoadPicture("d:\test\mappro71\test.bmp")  
    Set Tmk2 = MapProl.Cad.Marker(-72, 42, Image1.Picture.Handle)  
    'Refresh the map  
    MapProl.Refresh  
End Sub
```

---

<b>.CAD.mCircle(Xc, Yc, Xp, Yp, Aspect:Double):CadObj</b>	<b>Method</b>
---	---------------

---

Returns a CadObj structure, and draws a circle given the following information:

- Xc,Yc** Lon, Lat coordinates (in decimal degrees) of the center of the circle.
- Xp,Yp** Lon, Lat coordinates of the first point on the circle circumference.  
Note that if Xp=Xc then Yp-Yc is the radius of the circle in degrees, and if Yp=Yc, then Xp-Xc is the radius of the circle in degrees,
- Aspect** The circle aspect ratio (horizontal to vertical diameter ratio)

**VB Example**

```

Private Sub Command35_Click()
Dim Circ As CadObj
  Set Circ = MapProl.Cad.mCircle(-80, 40, -60, 40, 1.5)
  'Set some properties
  Circ.Brush.Color = vbRed
  Circ.Brush.BackColor = vbYellow
  Circ.Brush.Style = vbDash
  Circ.Brush.Mode = 0
  Circ.Pen.Color = vbGreen
  Circ.Pen.Style = vbDash
  'Refresh the map
  MapProl.Refresh
End Sub

```

---

**.CAD.MetaObj(X1,Y1,X2,Y2:Double; Hnd:LongInteger):CadObj**
**Method**

Draws a symbol within the specified bounding rectangle, using the handle to an external metafile specified by the user. The metafile is automatically scaled to fit within the bounding rectangle, and is then played on the screen.

**VB Example**

```

Private Sub Command20_Click()
Dim hndl As Long, MObj As CadObj
  ' Get handle to external meta file
  MapProl.Cad.GetMetaObj("d:\test\mappro71\One.wmf")
  ' Use handle to create object
  Set MObj = MapProl.Cad.MetaObj(-100, 30, -120, 41, hndl)
  ' No attributes can be changed for these objects
  MapProl.Refresh
End Sub

```

---

**.CAD.mLine(X1, Y1, X2, Y2:Double):CadObj**
**Method**

Draws a line between the two specified points. The line is either a straight line or a Great Circle line depending on the GreatCircle flag of the object.

**X1,Y1** Lon, Lat coordinates of the starting point

**X2,Y2** Lon, Lat coordinates of the end point

**VB Example**

```

Private Sub Command24_Click()
Dim TL As CadObj
  ' Draw a Straight Line
  Set TL = MapProl.Cad.mLine(-89, 32, -112, 42)
  ' Set some of the line attributes
  TL.Pen.Width = Val(Text17.Text)
  TL.Pen.Color = Val(Text7.Text)
  TL.Pen.BackColor = Val(Text8.Text)
  TL.Pen.Style = Val(Text11.Text) 'or vbDash

```

```

Label6.Caption = MapProl.Cad.Count
MapProl.Refresh
End Sub

```

---

### **.CAD.Objects(n:integer) array of CadObj**

### **Method**

---

An indexed array holding all the currently defined CAD objects. Each object can be directly accessed, added, etc. by its index number. This is a zero-based array. The maximum number of objects that can be accommodated is only limited by system resources.

**VB Example**

```

Private Sub Command42_Click()
' List the types and pen colors of all current objects (note array
is zero based)
List1.Clear
With MapProl.Cad
For i = 1 To .Count
List1.AddItem "Item # " & i & ", Type: " & .Objects(i -
1).ObjectType & ", Color: " & .Objects(i - 1).Pen.Color
Next i
' Now let's change the pen color of the 3rd item and list them
again
' this is a zero-based array, so the third item is index #2
.Objects(2).Pen.Color = 11
For i = 1 To .Count
List1.AddItem "Item # " & i & ", Type: " & .Objects(i -
1).ObjectType & ", Color: " & .Objects(i - 1).Pen.Color
Next i
End With
End Sub

```

---

### **.CAD.ObjectType:Integer**

### **Property**

---

Sets the default object type, for interactive object creation. This is one of the ways the user may implement interactive object creation (the other is by invoking the *CAD.Toolbar*).

The user needs to set whatever default CAD Object attributes they want, set the desired CAD.ObjectType and then set the mapMode to mdCAD. The control goes into the interactive drawing mode until the completion of the object, and then refreshes the screen. (Note if ObjectType=0, then the control is in CAD selection mode, and if ObjectType=-1, then the control has finished its previous operation and is in NUL mode, i.e., mapMode can be safely set to mdZoom.

The available ObjectType values are:

#	Object Type
1	Line
2	Rectangle
3	Ellipse
4	Polyline

5	Polygon
6	Marker
7	Text
8	Circle
9	Regular Polygon
10	Free Hand (*)
11	Arrow
12	Bezier
13	Symbol
14	Text Bubble
15	Grouped Object
16	MetaObj

```

VB Example Private Sub Command57_Click()
Dim Otp As Integer
' Get the Object type specified by the user
Otp = Val(Text20.Text)
' Make sure it is a valid type, otherwise pop up message
' Remember ObjectType=-1 is NUL mode and
' ObjectType=0 is Select mode
If (Otp > -2) And (Otp < 14) Then
' Set a global Variable flag to indicate that the control is
' in Programmatic Drawing Mode
IamDrawing = True
MapProl.Cad.ObjectType = Otp
MapProl.Cad.ObjectType = Val(Text20.Text)
MapProl.MapMode = MdCad
' Note: The CADChange event needs to be checked to make sure
it's safe to
' set MapMode back to mdZoom
Else
MsgBox "Sorry, valid Object Types are 1 - 13.", vbOKOnly, "An
Error was encountered!"
' Reset the mode back to mdZoom
MapProl.MapMode = MdZoom
End If
End Sub

Private Sub MapProl_CadChange(ByVal Current As Long)
' Check to see if Current (ObjectType) is -1 and change MapMode
' Also make sure the control was in Programmatic DRAW mode
If ((Current = -1) And (IamDrawing = True)) Then
MapProl.MapMode = MdZoom
IamDrawing = False
Else
End If
Beep
End Sub

```

Sets the default pen properties for all CAD objects. When an object is created it inherits these pen properties, unless specific pen properties are set for the object, either prior to, or after its creation. (See `object.pen` later on for a detailed description of the brush properties)

**VB Example**

```
Private Sub Command44_Click()
Dim Robj As CadObj
' Set some default pen properties for the CAD Interface
MapProl.Cad.Pen.Color = vbRed
MapProl.Cad.Pen.Width = 4
' Create a regular polygon
Set Robj = MapProl.Cad.RegularPolygon(-100, 40, -100, 42, 7)
'change pen color
Robj.Pen.Color = vbBlue
'Refresh the map
MapProl.Refresh
End Sub
```

---

### **.CAD.Polygon(Points:TRPoint; N:Long):CadObj**

### **Method**

---

Draws a polygon object of **N** vertices. **Points** is the starting element in a TRPoints array. This allows the user to use the same array of points to define a number of different polygons. These are all closed polygons.

**VB Example**

```
Private Sub Command27_Click()
Dim Tpt(20) As TrPoint
Dim Tpg1 As CadObj, Tpg2 As CadObj
' Define some points to be used for polygons
Tpt(1).x = -100
Tpt(1).y = 40
Tpt(2).x = -92
Tpt(2).y = 41
Tpt(3).x = -88
Tpt(3).y = 32
Tpt(4).x = -96
Tpt(4).y = 38
Tpt(5).x = -84
Tpt(5).y = 39
Tpt(6).x = -80
Tpt(6).y = 38.5
Tpt(7).x = -85
Tpt(7).y = 34
' Draw Polygon with first 4 Points
Set Tpg1 = MapProl.Cad.Polygon(Tpt(1), 4)
' Set some of the Object attributes
Tpg1.Pen.Width = 2
Tpg1.Pen.Color = vbRed
Tpg1.Brush.Color = vbBlue
' Draw a second polygon with Points 5, 6, and 7
Set Tpg2 = MapProl.Cad.Polygon(Tpt(5), 3)
' Set some of the line attributes
Tpg2.Pen.Width = 1
Tpg2.Pen.Style = vbDash
Tpg2.Pen.Color = vbGreen
Tpg2.Brush.Color = vbRed
' Refresh the map
MapProl.Refresh
```



End Sub

---

<b>.CAD.Polyline(Points:TRPoint; N:Long):CadObj</b>	<b>Method</b>
---	---------------

---

Draws a polyline object of **N** vertices. **Points** is the starting element in a TRPoints array. This allows the user to use the same array of points to define a number of different polylines.

**VB Example**

```
Private Sub Command26_Click()  
Dim Tpt(10) As TrPoint  
Dim Tpg As CadObj, Tpg2 As CadObj  
    ' Define some points  
    Tpt(1).x = -101  
    Tpt(1).y = 32  
    Tpt(2).x = -102  
    Tpt(2).y = 34  
    Tpt(3).x = -103  
    Tpt(3).y = 31  
    Tpt(4).x = -116  
    Tpt(4).y = 40  
    Tpt(5).x = -113  
    Tpt(5).y = 38  
    Tpt(6).x = -86  
    Tpt(6).y = 34  
    ' Draw Polyline with first 4 Points  
    Set Tpg = MapProl.Cad.Polyline(Tpt(1), 4)  
    ' Set some of the line attributes  
    Tpg.Pen.Width = 6  
    Tpg.Pen.Color = vbRed  
    Tpg.Caption = "This is the first Polyline"  
    'Draw another line using points 2 through 6  
    Set Tpg2 = MapProl.Cad.Polyline(Tpt(2), 5)  
    Tpg2.Pen.Width = 2  
    Tpg2.Pen.Color = vbYellow  
    MapProl.Refresh  
End Sub
```

---

<b>.CAD.Rectangle(X1, Y1, X2, Y2:Double):CadObj</b>	<b>Method</b>
---	---------------

---

Creates a rectangle object defined by the Lon/Lat coordinates of two opposite corners.

**VB Example**

```
Private Sub Command46_Click()  
Dim Rec01 As CadObj, Rec02 As CadObj  
    ' Create a rectangle Object  
    Set Rec01 = MapProl.Cad.Rectangle(-100, 30, -80, 40)  
    Rec01.Pen.Color = vbRed  
    'Refresh the map surface  
    MapProl.Refresh  
End Sub
```

---

<b>.CAD.RegularPolygon(Xc, Yc, Xp, Yp:Double; N:Integer):CadObj</b>	<b>Method</b>
---	---------------

---

Creates a regular polygon Object, where...

<b>Xc,Yc</b>	Lon, Lat coordinates (in decimal degrees) of the center of the regular polygon
<b>Xp,Yp</b>	Lon, Lat coordinates of the first point on the circumference of the prescribed circle i.e., the first vertex.
<b>N</b>	The number of sides (and vertices)

**VB Example**

```
Private Sub Command34_Click()  
Dim RegPol As CadObj  
Set RegPol = MapProl.Cad.RegularPolygon(-100, 40, -80, 40, 9)  
RegPol.Caption = "Sample Regular Polygon"  
RegPol.GreatCircle = False  
RegPol.Pen.Color = vbBlue  
RegPol.Pen.BackColor = vbRed  
RegPol.Pen.Style = vbDash  
RegPol.Brush.Color = vbGreen  
RegPol.Brush.BackColor = vbWhite  
  
' RegPol.Brush.Style = Val(Text18.Text)  
' RegPol.Brush.Mode = Val(Text19.Text)  
' RegPol.Pen.Color = Val(Text7.Text)  
' RegPol.Brush.Color = Val(Text9.Text)  
' RegPol.Brush.Mode = mergepaint  
' RegPol.Brush.Style = Val(Text12.Text)  
MapProl.Refresh  
End Sub
```

---

<b>.CAD.Rotate(Xp, Yp, Angle:Double)</b>	<b>Method</b>
--	---------------

---

Rotates any selected objects through an angle specified by *Angle*, about a point specified by *Xp, Yp*.

**VB Example**

```
Private Sub Command63_Click()  
Dim mk As CadObj, nhd As Integer, xt1, yt1, ang As Double  
' Set the rotation point and Angle  
xt1 = -100  
yt1 = 20  
ang = 15  
' Get marker and mark center of rotation point  
nhd = MapProl.Cad.GetMarker(6)  
Set mk = MapProl.Cad.Marker(xt1, yt1, nhd)  
' Select the second CAD object  
MapProl.Cad.Objects(1).Selected = True  
' Rotate the object  
MapProl.Cad.Rotate xt1, yt1, ang  
MapProl.Refresh  
End Sub
```

---

**.CAD.SaveToFile(S:String)****Method**

---

Saves all currently defined CAD objects to a binary CAD file specified by **S**.

**VB Example**

```
Private Sub Command32_Click()  
    ' Save CAD objects to file  
    MapProl.Cad.SaveToFile "myCadTest02"  
    ' Clear all Objects from Map  
    MapProl.Cad.Clear  
    'Refresh the map  
    MapProl.Refresh  
End Sub
```

---

**.CAD.SelectRange(Ns,Nn,Option:Integer)****Method**

---

Sets the *.Selected* property of a user specified number of CAD objects.

**Ns** – The starting index # of the Objects to be acted on

**Nn** – The Last index # of the object to be acted on

**Option** – It can have the following values:

- 0 – De-Select all objects in Selection rectangle, i.e. set their *.Selected* property to False.
- 1 – Select all objects in Selection rectangle, i.e. set their *.Selected* property to True
- 2 – Toggle the *.Selected* property of all objects in the selection rectangle.

**VB Example**

```
Private Sub Command52_Click()  
    Dim Bz As CadObj, Pt1 As CadObj, Pt2 As CadObj, Pt3 As CadObj  
    Dim Ln1 As CadObj, Ln2 As CadObj, Sb1 As CadObj  
    MapProl.Cad.Clear  
    ' Set the coordinates for the three points  
    Pt1X = -100  
    Pt1Y = 30  
    Pt2X = -105  
    Pt2Y = 34  
    Pt3X = -107  
    Pt3Y = 30  
    Set Bz = MapProl.Cad.Bezier(Pt1X, Pt1Y, Pt2X, Pt2Y, Pt3X, Pt3Y)  
    ' Show the Bezier control lines  
    Set Ln1 = MapProl.Cad.mLine(Pt1X, Pt1Y, Pt3X, Pt3Y)  
    Set Ln2 = MapProl.Cad.mLine(Pt2X, Pt2Y, Pt3X, Pt3Y)  
    Ln1.Pen.Style = 3  
    Ln1.Pen.Color = vbBlue  
    Ln2.Pen.Style = 3  
    Ln2.Pen.Color = vbBlue  
    ' We'll use external bitmaps  
    Set Image1.Picture = LoadPicture("d:\test\mappro71\One.gif")  
    Set Image2.Picture = LoadPicture("d:\test\mappro71\Two.gif")
```

```

Set Image3.Picture = LoadPicture("d:\test\mappro71\Three.gif")
Set Pt1 = MapProl.Cad.Marker(Pt1X, Pt1Y, Image1.Picture.Handle)
Set Pt2 = MapProl.Cad.Marker(Pt2X, Pt2Y, Image2.Picture.Handle)
Set Pt3 = MapProl.Cad.Marker(Pt3X, Pt3Y, Image3.Picture.Handle)
' Set some attributes
Bz.Pen.Width = 4
Bz.Pen.Color = vbGreen
Set Sb1 = MapProl.Cad.mCircle(-104, 35, -120, 38, 1)
' Select the seventh and send place it underneath the other
objects
n = MapProl.Cad.SelectRange(6, 7, 1)
MapProl.Cad.SendToBack
MapProl.Refresh
End Sub

```

---

<b>.CAD.SelectRect(x1,y1,x2,y2:Double, Option:Integer)</b>	<b>Method</b>
--	---------------

---

Sets the selected flag of any object within the specified rectangle.

**X1,Y1** – Lon/Lat coordinates of one corner of Selection rectangle

**X2,Y2** – Lon/Lat coordinates of opposite corner of Selection rectangle

**Option** – It can have the following values:

- 0 – De-Select all objects in Selection rectangle, i.e. set their .Selected property to False.
- 1 – Select all objects in Selection rectangle, i.e. set their .Selected property to True
- 2 – Toggle the .Selected property of all objects in the selection rectangle.

**VB Example**

```

Private Sub Command56_Click()
Dim r1 As CadObj
Set r1 = MapProl.Cad.Rectangle(-70, 32, -120, 46)
r1.Brush.Style = 1
n = MapProl.Cad.SelectRect(-70, 32, -120, 46, 1)
Command56.Caption = "Selected =" & n
MapProl.Refresh
End Sub

```

---

<b>.CAD.SendToBack</b>	<b>Property</b>
------------------------	-----------------

---

Sends any currently selected objects to the back, i.e., they are drawn before (underneath) any other CAD objects. See the SelectRange and SelectRect methods for selecting CAD objects to operate on.

**VB Example**

```

Private Sub Command53_Click()
Dim Bz As CadObj, Pt1 As CadObj, Pt2 As CadObj, Pt3 As CadObj

```

```

Dim Ln1 As CadObj, Ln2 As CadObj, rc1 As CadObj, rc2 As CadObj
MapProl.Cad.Clear
' Set the coordinates for the three points
Pt1X = -100
Pt1Y = 30
Pt2X = -105
Pt2Y = 34
Pt3X = -102
Pt3Y = 36
Set Bz = MapProl.Cad.Bezier(Pt1X, Pt1Y, Pt2X, Pt2Y, Pt3X, Pt3Y)
Bz.Caption = "Bezier[1]"
' Show the Bezier control lines
Set Ln1 = MapProl.Cad.mLine(Pt1X, Pt1Y, Pt3X, Pt3Y)
Ln1.Caption = "Line[2]"
Set Ln2 = MapProl.Cad.mLine(Pt2X, Pt2Y, Pt3X, Pt3Y)
Ln2.Caption = "Line[3]"
Ln1.Pen.Style = 3
Ln1.Pen.Color = vbBlue
Ln2.Pen.Style = 3
Ln2.Pen.Color = vbBlue
' Get and then use the handles to the built-in markers.
s1 = MapProl.Cad.GetMarker(2)
s2 = MapProl.Cad.GetMarker(4)
s3 = MapProl.Cad.GetMarker(7)
Set Pt1 = MapProl.Cad.Marker(Pt1X, Pt1Y, s1)
Set Pt2 = MapProl.Cad.Marker(Pt2X, Pt2Y, s2)
Set Pt3 = MapProl.Cad.Marker(Pt3X, Pt3Y, s3)
Pt1.Caption = "point[4]"
Pt2.Caption = "point[5]"
Pt3.Caption = "point[6]"
' Set some attributes
Bz.Pen.Width = 4
Bz.Pen.Color = vbGreen
' create a circle and a triangle
Set rc1 = MapProl.Cad.mCircle(-100, 30, -80, 38, 2)
rc1.Caption = "Circle[7]"
Set rc2 = MapProl.Cad.RegularPolygon(-100, 30, -90, 36, 3)
rc2.Caption = "Triangle[8]"
' Send the last object ToBack, i.e. below the other objects
With MapProl.Cad
.Objects(.Count - 1).Selected = True
.SendToBack
End With
MapProl.Refresh
End Sub

```

---

**.CAD.Symbol(X1,Y1,X2,Y2:Double; Hnd:LongInteger):CadObj**

---

**Method**

Draws a symbol within the specified bounding rectangle, using the built-in symbol metafile specified through the Hnd parameter, i.e., using its handle. The metafile for the selected build-in symbol is automatically scaled to fit within the bounding rectangle, and is then played on the screen.

**VB Example** Private Sub Command60\_Click()  
Dim hndl As Long, Sym0 As CadObj

```

' Get a built-in meta symbol handle
hdl1 = MapProl.Cad.GetSymbol(2)
' USe handle to create object
Set SymO = MapProl.Cad.Symbol(-100, 30, -120, 41, hndl)
' Set some symbol attributes
SymO.Pen.Width = 4
SymO.Pen.Color = vbBlue
MapProl.Refresh
End Sub

```

---

## **.CAD.Text(X,Y: Double; s:String)**

**Method**

---

Creates a text object with the caption specified by **S** and at the specified coordinates. Note that the precise placement of the text is also affected by the **.Font.Align** value.

### **VB Example**

```

Private Sub Command31_Click()
Dim TTx As CadObj
' Create a Text Object
Set TTx = MapProl.Cad.Text(-100, 42, "Sample Text")
TTx.Font.Height = 42
TTx.Font.BackColor = vbRed
TTx.Font.Color = vbBlue
TTx.Font.Style = 3
MapProl.Refresh
' Change the object caption (mod will not be seen till next
refresh)
TTx.Caption = "New one"
End Sub

```

---

## **.CAD.TextBubble(X,Y:Double, S:String)**

**Method**

---

Creates a TextBubble at the specified Lon,Lat location containing the specified string.

### **VB Example**

```

Private Sub Command49_Click()
Dim Txb As CadObj
' Create Text Bubble
Set Txb = MapProl.Cad.TextBubble(-80, 32, "Sample Text Bubble")
MapProl.Refresh
End Sub

```

---

## **.CAD.Toolbar**

**Interface**

---

Controls the CAD Toolbar, which gives the user access to all the CAD capabilities through a visual interface, rather than having to implement them programmatically. See the `CAD.Toolbar` section for a detailed description of the Toolbar's functionality.

### **Toolbar.mode**

Sets the mode of the CAD Toolbar. The following three enumerated modes are available.

**TbFix** – Anchors the CAD toolbar at the top of the application form.

**TbFloat** – Creates a floating instance of the CAD toolbar

**TbHide** – Hides the CAD Toolbar

### **ToolBar.SetPos - Reserved**

---

## **.CAD.Ungroup()**

**Method**

Breaks a grouped CAD object down to the components. (Also see the *.CAD.Group* method)

**VB Example**

```
Private Sub Command65_Click()  
    ' Group selected objects  
    MapProl.Cad.Group  
    ' Update to show grouped objects. Mode to show handles.  
    MapProl.MapMode = MdCad  
    MapProl.Cad.ObjectType = 0  
    MapProl.Refresh  
End Sub
```

---

## **.CAD.Visible**

**Method**

Controls the visibility of the whole CAD layer. A convenient way to turn all objects to visible/invisible.

**VB Example**

```
Private Sub Command61_Click()  
    ' Toggle the CAD layer visibility  
    MapProl.Cad.Visible = Not (MapProl.Cad.Visible)  
    MapProl.Refresh  
End Sub
```

---

## CAD Object Properties

---

All CAD objects defined in MapPro have a common set of properties as defined below.

---

<u>.objects().Brush</u>	<b>Property</b>
	Holds the brush that is used to paint (fill) the interiors of defined objects (polygons, circles, etc.) Default brush is Solid, White, Opaque.
<u>.brush.BackColor</u>	Defines the brush background color
<u>.brush.Color</u>	Defines the brush color
<u>.brush.Mode</u>	Two brush modes are available. 1 – Transparent and 2- Opaque. Note that the mode of the <b>pen</b> , which controls raster operations, is used to define the raster operation of the brush, since the pen object is used for the brush as well.
<u>.brush.Style</u>	Constants specifying the brush style (note that the actual line style is controlled by the pen attribute).  0 – Solid 1 – Clear 2 – Horizontal 3 – Vertical 4 – Left Dash 5 – Right Dash 6 – Cross 7 – Diagonal Cross

### **VB Example**

```
Private Sub Command35_Click()  
Dim Circ As CadObj  
    Set Circ = MapPro1.Cad.mCircle(-80, 40, -60, 40, 3.5)  
    'Set some properties  
    Circ.Brush.Color = vbRed  
    Circ.Brush.BackColor = vbYellow  
    Circ.Brush.Style = 3 'constants only  
    Circ.Brush.Mode = 1 ' Transparent 2 is solid  
    Circ.Pen.Color = vbGreen  
    Circ.Pen.Style = vbSolid  
    'Refresh the map  
    MapPro1.Refresh  
End Sub
```



---

**.objects().Caption**

---

**Property**

Holds the caption text associated with each object. The attributes for the text in the caption are set through the *Object.Font* interface. Note that for Line objects, the caption is automatically aligned parallel with the line in the From-To direction. Any *Font.Angle* set for line objects is added to the automatically calculated angle used for the above arallel placement.

**VB Example**

```
Private Sub Command31_Click()  
Dim TTx As CadObj  
    ' Create a Text Object  
    Set TTx = MapProl.Cad.Text(-100, 42, "Sample Text")  
    TTx.Font.Height = 42  
    TTx.Font.Mode = -1  
    TTx.Font.BackColor = vbRed  
    TTx.Font.Color = vbBlue  
    TTx.Font.Style = Val(Text18.Text)  
    MapProl.Refresh  
    ' Change the object caption (mod will not be seen till nect  
    refresh)  
    Tx.Caption = "New Caption for Text Object"  
End Sub
```

---

**.objects().Font**

---

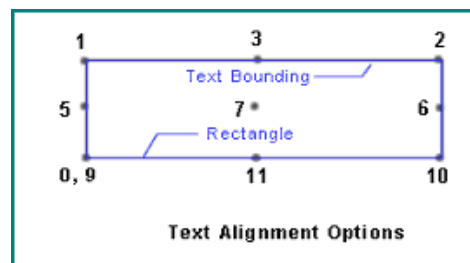
**Property**

Controls the attributes of the text object, as well as of the attributes of the *.Caption* of every other CAD object.

**.font.Align: Integer**

Controls the alignment of the text within the text bounding rectangle. Note that the reference point of any text string is the bottom left corner of the string.

The default vertical alignment is zero, which sets the top of the text bounding rectangle aligned with the reference point. There are basically 3 primary top alignment options, 1=Left, 2=Right, 3=Center. Those options “*ORed with 4*” also provide “*middle*” vertical alignment, while “*ORed with 8*” provide “*bottom*” vertical alignment.

**.font.Angle: Integer**

Sets the angle the text is to be rotated through, in degrees. Positive direction is counter-clockwise.

**.font.BackColor: Integer**

Sets the background color of the text. Note that this has any bearing only when *.font.Mode* is set to opaque or when the *.font.Style* is set to Outline.

**.font.Color:Integer**

Sets the foreground Font Color.

**.font.Height:Integer**

Sets the Font height pixels.

**.font.Mode:Integer**

Two font modes are available. Mode=1 is transparent and Mode=2 is opaque.

**.font.Name:String**

**.font.Size:Integer**

Sets the font size in points.

**.font.Style:Integer**

Three basic font styles are available, which can be combined to achieve a compounded affect.

Style #	Font Style
1	Bold
2	Italic
8	Outline

Setting the style to  $1+2 = 3$ , will result in a Bold, Italic style.

```
VB Example Private Sub Command34_Click()  
Dim RegPol As CadObj  
    ' Making sure we have a clean slate  
    MapProl.Cad.Clear  
    MapProl.Refresh  
    ' Draw Regular Polygon  
    Set RegPol = MapProl.Cad.RegularPolygon(-100, 40, -80, 40, 4)  
    RegPol.Font.Style = 8  
    RegPol.Font.Align = 3  
    RegPol.Font.Color = vbYellow  
    RegPol.Font.BackColor = vbRed  
    UnFlg = Not (UnFlg)  
    If UnFlg = True Then  
        RegPol.Caption = "GC = True"  
        RegPol.GreatCircle = True  
    Else  
        RegPol.Caption = "GC = False"  
        RegPol.GreatCircle = False  
    End If  
End Sub
```

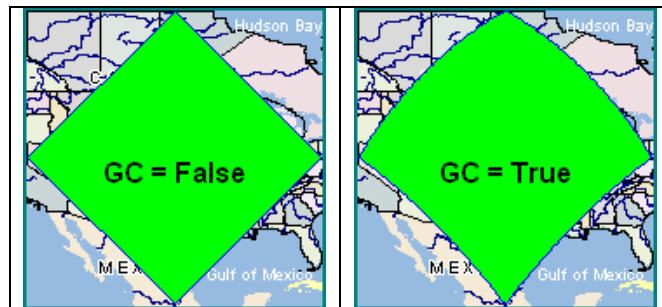
---

**.objects().GreatCircle:Boolean**

---

**Property**

Controls whether an object is drawn using a straight line, or a Great Circle paradigm.



---

**.objects().MoveAbs(X,Y: Double)**

---

**Property**

Move the object to a new absolute Lon, Lat position. The anchor/reference point is moved to the new location. For example, for Lines, Polylines, etc. the first point of the object is used, whereas for Circles, Polygons, etc. the center point is used.

**VB Example**

```
Private Sub Command45_Click()  
    ' Move the first object to a new location  
    MapPro1.Cad.Objects(1).MoveAbs -118, 22  
    MapPro1.Refresh  
End Sub
```

---

**.objects().MoveRel (X,Y: Double)**

---

**Property**

Moves the object to a new location offset by X,Y degrees from its current location. The first point of the object is used as the reference point for the move.

**VB Example**

```
Private Sub Command45_Click()  
    ' Move the first object to a new location 5 degrees  
    ' west 2 degrees north from its current location.  
    MapPro1.Cad.Objects(1).MoveRel -5, 2  
    MapPro1.Refresh  
End Sub
```

---

**.objects().ObjectType:Integer**

---

**Property**

---

Identifies the type of CAD object. The following object types are available in this CAD interface.

#	Object Type
1	Line
2	Rectangle
3	Ellipse
4	Polyline
5	Polygon
6	Marker
7	Text
8	Circle
9	Regular Polygon
10	Free Hand (*)
11	Arrow
12	Bezier
13	Symbol
14	TextBubble
15	Grouped Object
16	MetaObj

- (\*) This is the ObjectType for the Free Hand object in the GUI. Once the object is created, it is internally converted to a polyline, so an object that was created as a free hand object and the saved, will be retrieved as a polyline object.

---

**.objects().Pen**

---

**Property**

---

Sets the properties for the pen that will be used to draw the object.

**.pen.BackColor**

The pen background color, i.e., the color seen in the spaces, when something like a dashed-line style is used.

**.pen.Color**

The main (foreground) pen color.

**.pen.Mode**

The pen mode controls whether the pen will be opaque (=1) or transparent (=2).

**.pen.ROP**

The pen raster operation that defines how it will interact with the colors of the map layer.

The Raster Operations vailable are:

VB Constant	Value	Description
<b>vbBlackness</b>	1	Black
<b>vbNotMergePen</b>	2	Not Merge pen
<b>vbMaskNotPen</b>	3	Mask Not pen
<b>vbNotCopyPen</b>	4	Not Copy pen
<b>vbMaskPenNot</b>	5	Mask pen Not
<b>vbInvert</b>	6	Invert
<b>vbXorPen</b>	7	Xor pen
<b>vbNotMaskPen</b>	8	Not Mask pen
<b>vbMaskPen</b>	9	Mask pen
<b>vbNotXorPen</b>	10	Not Xor pen
<b>vbNop</b>	11	No operation; output remains unchanged
<b>vbMergeNotPen</b>	12	Merge Not pen
<b>vbCopyPen</b>	13	Copy pen
<b>vbMergePenNot</b>	14	Merge pen Not
<b>vbMergePen</b>	15	Merge pen
<b>vbWhiteness</b>	16	White

### .pen.Style

Set the style of the pen used to draw the lines of fill patterns. Note that this style

0	Solid
1	Dash
2	Dot
3	Dash-dot
4	Dash-dot-dot
5	Invisible
6	Inside solid

### .pen.width

The width of the pen in pixels. Please note that the windows GDI supports line styles other than solids, ONLY for pen thicknesses of one pixel!

#### **VB Example**

```
Private Sub Command35_Click()
Dim Circ As CadObj
    Set Circ = MapPro1.Cad.mCircle(-80, 40, -60, 40, 3.5)
    'Set some properties
    Circ.Brush.Color = vbRed
    Circ.Brush.BackColor = vbYellow
    Circ.Brush.Style = 3 'constants only
    Circ.Brush.Mode = 1 ' Transparent 2 is solid
    Circ.Pen.Color = vbGreen
    Circ.Pen.Style = vbSolid
    Circ.Pen.Width = 4
    'Refresh the map
```

```

MapProl.Refresh
End Sub

```

---

**objects().Selected:Boolean**
**Property**


---

A property that indicates if the object is currently selected. Certain methods of the CAD interface (like, Delete, BringToFront, etc.) operate ONLY on selected CAD objects.

---

**objects().Tag:Integer**
**Property**


---

This property is reserved for future use. It could, however, be used by the user to relate the current CAD object to some other external file, etc.

---

**objects().Visible:Boolean**
**Property**


---

Sets the visibility of the object to True or False.

**VB Example**

```

Private Sub Command53_Click()
Dim Bz As CadObj, Pt1 As CadObj, Pt2 As CadObj, Pt3 As CadObj
Dim Ln1 As CadObj, Ln2 As CadObj, rc1 As CadObj, rc2 As CadObj
MapProl.Cad.Clear
' Set the coordinates for the three points
Pt1X = -100
Pt1Y = 30
Pt2X = -105
Pt2Y = 34
Pt3X = -102
Pt3Y = 36
Set Bz = MapProl.Cad.Bezier(Pt1X, Pt1Y, Pt2X, Pt2Y, Pt3X, Pt3Y)
Bz.Caption = "Bezier[1]"
' Show the Bezier control lines
Set Ln1 = MapProl.Cad.mLine(Pt1X, Pt1Y, Pt3X, Pt3Y)
Ln1.Caption = "Line[2]"
Set Ln2 = MapProl.Cad.mLine(Pt2X, Pt2Y, Pt3X, Pt3Y)
Ln2.Caption = "Line[3]"
Ln1.Pen.Style = 3
Ln1.Pen.Color = vbBlue
Ln2.Pen.Style = 3
Ln2.Pen.Color = vbBlue
s1 = MapProl.Cad.GetMarker(2)
s2 = MapProl.Cad.GetMarker(4)
s3 = MapProl.Cad.GetMarker(7)
Set Pt1 = MapProl.Cad.Marker(Pt1X, Pt1Y, s1)
Set Pt2 = MapProl.Cad.Marker(Pt2X, Pt2Y, s2)
Set Pt3 = MapProl.Cad.Marker(Pt3X, Pt3Y, s3)
Pt1.Caption = "point[4]"
Pt2.Caption = "point[5]"

```

```

Pt3.Caption = "point[6]"
' Set some attributes
Bz.Pen.Width = 4
Bz.Pen.Color = vbGreen
' create a circle and a triangle
Set rc1 = MapProl.Cad.mCircle(-100, 30, -80, 38, 2)
rc1.Caption = "Circle[7]"
Set rc2 = MapProl.Cad.RegularPolygon(-100, 30, -90, 36, 3)
rc2.Caption = "Triangle[8]"
' Set the first and last object to invisible
With MapProl.Cad
    .Objects(0).Visible = False
    .Objects(.Count - 1).Visible = False
    .SendToBack
End With
MapProl.Refresh
End Sub

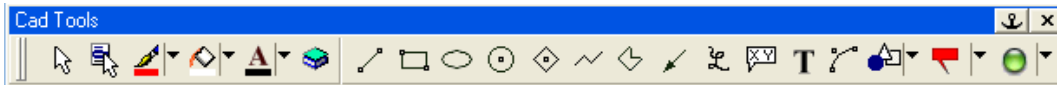
```

---


## Visual CAD Toolbar Interface

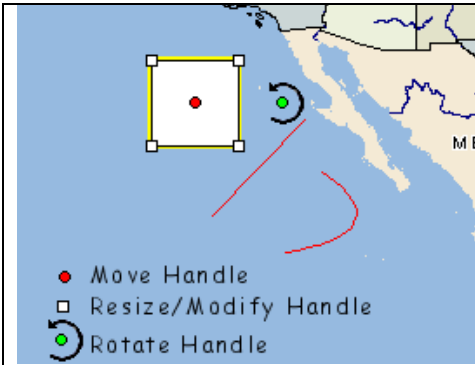
---

The CAD capabilities in MapPro are also accessible through the control's built-in CAD toolbar, which is invoked through the .CAD.Toolbar interface. Once the Toolbar is instantiated, the following capabilities are available to the user:



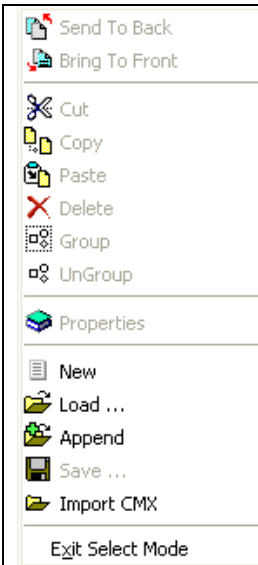
Note that the user may click on the blue caption area of the toolbar and drag it to a new location. In addition to that, the user may Right-Click on the two vertical handles (left side of the toolbar) and select the option to Anchor, UnAnchor and Close.

	<p>This is the Selection action button. Clicking on it toggles the control from an Object-Selection mode, when it's depressed (the mouse pointer changes, as well), to a normal mdZoom mode, when it is not depressed. While in the select mode, the user can select objects for subsequent editing action, either by clicking and dragging the mouse pointer, i.e., enclosing the objects in the dynamically drawn selection rectangle, or by clicking inside or on the object itself. When an object is selected, it's highlighted in Yellow.</p> <p>Holding down the Shift button, while selecting individual objects, adds them to the already selected list.</p> <p>When an object is selected, it's control points are made visible. In addition to that, a red control point is shown (for moving the object) and a rotate control point is shown for rotation the object.</p> <p>The Edit/Select mode stays active until the user clicks on the button once again. Ckiclinng on the Down-Arrow portion of the button invokes the pop-up menu (see later on).</p>
---	--



When an object is selected, it displays three types of handles.

(a) The solid red handle is the **Control Handle** which allows the user to move an object by clicking on it and dragging the mouse cursor. (b) the square white handle with black border is simply a **Vertex** that can be used to resize or modify the shape of the object (where permitted). (c) the **Rotation** handle that permits certain objects to be rotated about their control handle.



If an object (or multiple objects) are selected and the user clicks the Right mouse button, then a pop-up menu appears giving the user a number of editing options, as shown to the left. Most of the commands available are self-explanatory, or are explained in the main portion of the CAD documentation.

- Properties opens up the dialog that allows the user to change the attributes of the selected object(s).
- Load... and Save... permit the user to Load a CAD file (clearing any current objects), or save the current CAD objects to disk.
- Append allows the user to Load a CAD file and append its objects to those currently defined.
- There is also an extra option that allows the user to load old-style CMX files, which are transparently converted to the new CAD format.



This button will also invoke the pop-up menu, described earlier, and does not require that any objects are selected.



This is a dual action button. Clicking on the brush/pen portion, sets the default brush/pen color to that displayed at the bottom portion of the button. If any objects are selected, then the pen/brush color of those objects is set to that color as well.

Clicking on the down-arrow portion of the button, opens up a color selection dialog that allows the user to set the pen/brush color that will be used for any subsequent Objects.






Note that if any objects are selected, then the pen/brush color of those objects is set to that color as well.








It should also be pointed out that the pen/brush color for selected objects, may also be modified by opening the Attributes dialog (see description later on)




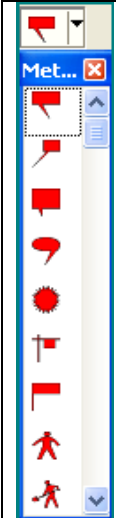





This is a dual action button. Clicking on the fill-bucket portion, sets the default fill



	<p>color to that displayed at the bottom portion of the button. If any objects are selected, then the fill color of those objects is set to that color as well.</p> <p>Clicking on the down-arrow portion of the button, opens up a color selection dialog that allows the user to set the fill color that will be used for any subsequent Objects.</p> <p>Note that if any objects are selected, then the fill color of those objects is set to that color as well.</p> <p>It should also be pointed out that the fill color for selected objects, may also be modified by opening the Attributes dialog (see description later on)</p>
	<p>This is a dual action button. Clicking on the brush portion, sets the default font color to that displayed at the bottom portion of the button. If any objects are selected, then the font color of those objects is set to that color as well.</p> <p>Clicking on the down-arrow portion of the button, opens up a color selection dialog that allows the user to set the font color that will be used for any subsequent Objects.</p> <p>Note that if any objects are selected, then the font color of those objects is set to that color as well.</p> <p>It should also be pointed out that the font color for selected objects, may also be modified by opening the Attributes dialog (see description later on)</p>
	<p>Opens up the attributes dialog that allows the user to set the default pen, fill and font attributes that become the default for any subsequently drawn object. If any objects are selected, then the attributes of those objects are also modified as set by the user.</p> <p>See the section on CAD Attributes for a detailed description of these dialogs.</p>
	<p>Draw a straight line segment. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the starting point of the line segment. Moving the cursor and left-clicking again, sets the end point of the segment, and the start point of the next segment, i.e., the user may create connected straight line segments by sequentially moving the pointer and clicking the left mouse button. The drawing mode is cancelled by clicking the right mouse button, and the screen is updated to reflect the currently drawn object.</p>
	<p>Draw a rectangle. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets one of the corners of the rectangle, the anchor corner. Dragging the mouse pointer dynamically resizes the rectangle until the user clicks the left mouse button again, at which time the rectangle object is created, the screen is updated to reflect the newly created object, and the “object-creation” mode is exited.</p>
	<p>Draw an ellipse. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets one of the corners of the bounding rectangle of the ellipse, the anchor corner. Dragging the mouse pointer dynamically resizes the bounding rectangle, and the ellipse, until the</p>

	user clicks the left mouse button again, at which time the ellipse object is created, the screen is updated to reflect the newly created object, and the “object-creation” mode is exited.
	Draw a circle. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the center of the circle. Dragging the mouse pointer dynamically resizes the circle until the user clicks the left mouse button again, at which time the circle object is created, the screen is updated to reflect the newly created object, and the “object-creation” mode is exited.
	Draw a regular polygon. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the centroid of the regular polygon. Dragging the mouse pointer dynamically resizes the regular polygon until the user clicks the left mouse button again, at which time the object is created, the screen is updated to reflect the newly created object, and the “object-creation” mode is exited. Note that the number of sides of the polygon is set through the CAD Attributes dialog, described later on.
	Draw a PolyLine Object. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the starting point of the object. Moving the cursor and left-clicking again, sets the end point of the current segment of the polyline, and the start point of the next segment. The drawing mode is cancelled by clicking the right mouse button, and the screen is updated to reflect the currently drawn object.
	Draw a Polygon Object. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the starting point (first vertex) of the polygon. Moving the cursor and left-clicking again, sets subsequent vertices. The drawing mode is cancelled by clicking the right mouse button, and the screen is updated to reflect the currently drawn object.
	Draw an Arrow Object. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the point of the arrow. Moving the cursor and left-clicking again, sets the tail (end) point of the arrow, the drawing mode is cancelled, and the screen is updated to reflect the currently drawn object.
	Draw a Freehand Object. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the starting point of the object. Moving the cursor, while keeping the left mouse button pressed, dynamically creates a trace of the mouse movement. The drawing mode is cancelled by releasing the mouse button, and the screen is updated to reflect the currently drawn object.
	Draw a Text Bubble Object. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the pointer of the text bubble, opens up an edit box and allows the user to type in the desired text. When ENTER is pressed, the drawing mode is cancelled and the screen is updated to reflect the currently drawn object.

<p><b>T</b></p>	<p>Draw a Text Object. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the reference point for the text object, opens up an edit box and allows the user to type in the desired text. When ENTER is pressed, the drawing mode is cancelled and the screen is updated to reflect the currently drawn text object.</p>
	<p>Draw a Bezier Object. The cursor changes into a small cross hair to indicate that the control is in the “object-drawing” mode. Clicking the left mouse button sets the starting point of the object. Clicking a second time sets the end point of the bezier object. Moving the cursor, dynamically modifies the bezier by varying its third control point. The bezier object is set by pressing the left mouse button for a third time. The drawing mode is cancelled and the screen is updated to reflect the currently drawn object.</p>
	<p>This is a dual action button. Clicking on the object portion, select the current Windows metafile (has to have been selected by the user) and sets the object creation mode. The cursor changes to a small cross-hair. Clicking the left mouse button sets one of the corners of the metafile bounding polygon. Dragging the mouse pointer dynamically resizes the bounding rectangle until the user clicks the left mouse button again, at which time the metafile object is created.</p> <p>Clicking on the down-arrow portion of the button, opens up a stock windows dialog that permits the user to navigate and select a metafile to be used as the default, until a subsequent, new selection.</p>
	<p>This is a dual action button. Clicking on the icon portion, selects the current built-in metafile object (also reflected on the button’s surface). The cursor changes to a small cross-hair. Clicking the left mouse button sets the current metafile symbol at the user-selected location, and leaves it in a resize mode, i.e., dragging the cursor dynamically resizes the object. Until the left mouse button is pressed.</p> <div data-bbox="293 1245 407 1759" style="border: 1px solid black; padding: 5px; width: fit-content;">  </div> <p>Clicking on the down-arrow portion of the button, opens up a selection list with built-in simple metafile objects, and allows the user to select one of them for subsequent placement on the map surface.</p> <p>Note that unlike the user-specified metafile objects that cannot have their attributes altered, the pen and brush color and line styles of this group of objects may be modified by the user, after the object is placed on the map surface.</p> <p>If the symbol library file is not found, then the button displays “<b>No Lib</b>”, instead.</p>
	<p>This is a dual action button. Clicking on the icon portion, select the current Marker and sets the object creation mode. The cursor changes to a small cross-hair. Clicking the left mouse button sets the current marker at the user-selected location.</p>

	Clicking on the down-arrow portion of the button, opens up a dialog that permits the user select a new marker type. The new marker is reflected on the icon portion of the dual action button.
	Anchors the toolbar to the bottom of the control frame.
	Closes the Toolbar.

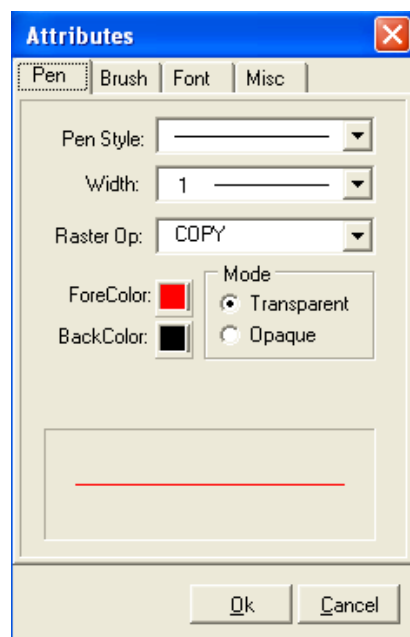
---

## **CAD Attribute Dialog**

---

If the CAD toolbar is visible, clicking on the Attributes button opens up the attributes dialog, which permits the user to set the default attributes for any CAD objects that are subsequently created. If any CAD objects are currently selected, then the attributes of the selected objects are set to those selected by the user. The Attribute dialog is described below.

### **CAD Attributes Dialog – Pen Tab**



**Pen Style** – The user may select one of the available pen styles (solid, dotted, dash, etc.)

**Width** – The user may select the pen width, in pixels. Note that Windows limitations only permit lines of *thickness = 1 pixel* to have any pen style other than solid.

**Raster Op** – The user may select one of four main Windows raster operations: COPY, MERGER, MASK, XOR.

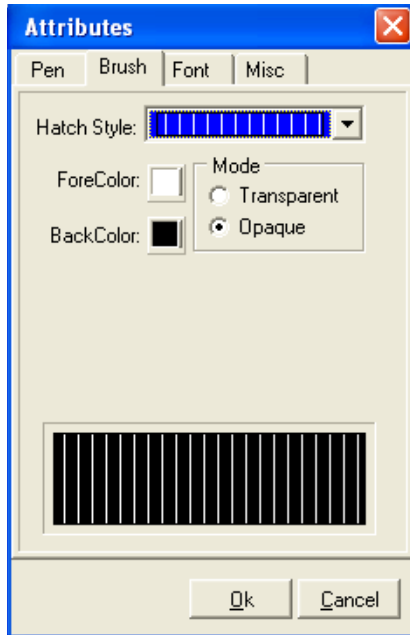
**ForeColor** – Clicking on the color button, a color selection dialog opens up and lets the user select the pen foreground color.

**BackColor** – Clicking on the color button, a color selection dialog opens up and lets the user select the pen background color, i.e., the color visible underneath when a line style other than solid is used.

**Mode** – The user may select either a transparent or an opaque pen mode.

The currently selected pen attributes are reflected in the bottom portion of the dialog.

## CAD Attributes Dialog – Brush Tab



**Hatch Style** – The user may select one of the available hatch styles (vertical, horizontal, slash, solid, etc.)

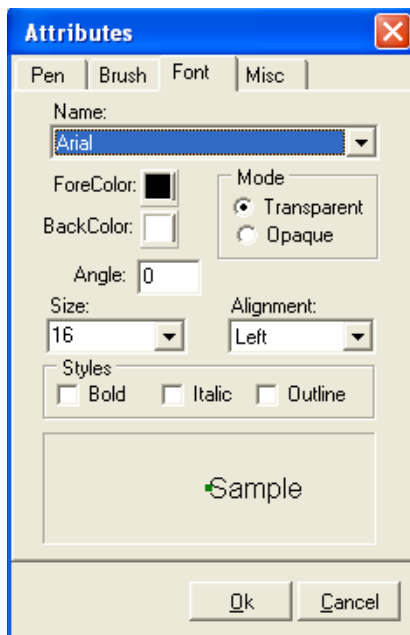
**ForeColor** – Clicking on the color button, a color selection dialog opens up and lets the user select the brush foreground color.

**BackColor** – Clicking on the color button, a color selection dialog opens up and lets the user select the brush background color.

**Mode** – The user may select either a transparent or an opaque pen mode.

The currently selected pen attributes are reflected in the bottom portion of the dialog.

## CAD Attributes Dialog – Font Tab



**Name** – The user may select one of the available installed Windows Fonts.

**ForeColor** – Clicking on the color button, a color selection dialog opens up and lets the user select the brush foreground color.

**BackColor** – Clicking on the color button, a color selection dialog opens up and lets the user select the brush background color.

**Mode** – The user may select either a transparent or an opaque pen mode (applies to the background color).

**Angle** – The user may specify an angle that the Text is to be rotated through, in degrees (positive is counter clockwise).

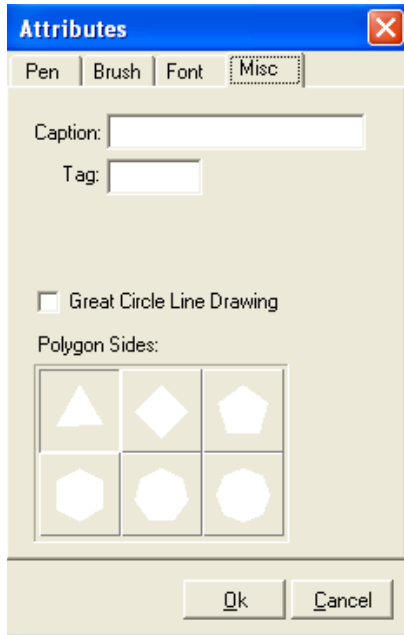
**Size** – The font size in points

**Alignment** – The user may select one of the following text alignments (relative to the text reference point specified): TopLeft, TopRight, TopCenter, Left, Right, Center, BotLeft, BotRight, BotCenter.

**Styles** – The available styles may be combined as desired by the user.

The currently selected pen attributes are reflected in the bottom portion of the dialog.

## CAD Attributes Dialog – Misc Tab



**Caption** – The user may enter the default caption to appear for any subsequently created object.

**Polygon Sides** – Clicking on one of the predefined buttons sets the number of Regular Polygon sides, or the user may enter the number of desired sides.

**Tag** – An extra identifier that can be used by the user.

**Great Circle Line Drawing** – If selected, affected objects are drawn with Great Circle Lines, instead of straight lines.

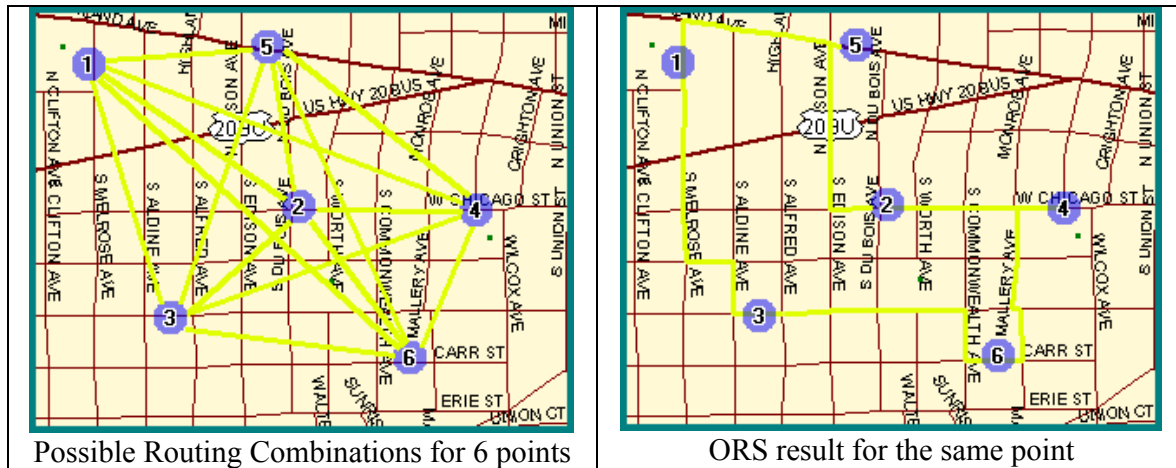
## CAD Attributes Cross-Reference Table

Although all CAD objects seem to include all available attributes (for object consistency) not all attributes are accessible/usable for all objects, as shown in this summary table.

	Brush	Caption	Font	Great Circle	MoveAbs	MoveRel	ObjectType	Pen	Selected	Tag	Visible
Line		x	x	x	x	x	x	x	x	x	x
Rectangle	x	x	x	x	x	x	x	x	x	x	x
Ellipse	x	x	x		x	x	x	x	x	x	x
Polyline		x	x	x	x	x	x	x	x	x	x
Polygon	x	x	x	x	x	x	x	x	x	x	x
Marker	x	x	x	x	x	x	x	x	x	x	x
Text		x	x		x	x	x	x	x	x	x
Circle	x	x	x	x	x	x	x	x	x	x	x
Regular Polygon	x	x	x	x	x	x	x	x	x	x	x
Free Hand		x	x		x	x	x	x	x	x	x
Arrow	x	x	x	x	x	x	x	x	x	x	x
Bezier	x	x	x	x	x	x	x	x	x	x	x
Symbol	x	x	x		x	x	x	x	x	x	x
TextBubble	x	x	x	x	x	x	x		x	x	x
Grouped Object	x	x	x	x	x	x	x	x	x	x	x
MetaObj		x									

## .OptiRouter Interface

A whole collection of new capabilities were added to the Map control in the new release, MapPro71. One of the most important additions is the Optimized Route Solution (ORS), many times referred to as the Traveling Salesman Problem (TSP). This is the solution to the problem where a number of points need to be visited, and the user is interested in the optimized set of routes to all those points. In this, first, implementation, the ORS assumes a closed circle path, i.e., a complete closed path is generated between **all** the user-specified points. Although it may seem to be a trivial problem, for a couple of points, one can quickly see that the number of possible solutions that need to be examined, even for 6 points, can quickly get very high.



The ORS is implemented as a collection of Interfaces, Properties and Methods as described below. Its capabilities can be selected both programmatically, or by invoking the RouteOptimizer built-in dialog.

---

### **.OptiRouter.AddPoint(s:String, x,y:Double)**

**Method**

Adds the specified point to the optimization routing points list. Note that the points currently defined may also be accessed at any time using the StopPoints array.

where:    **s**        = Any string identifying the specified point  
           **x,y**        = The x,y (Lat/Lon) coordinates of the point

Points are appended at the end of the list of any points that have already been added. Also see the MovePoint, DeletePoint and Insert point methods of the OptiRouter interface.

#### **VB Example**

```
Private Sub Command3_Click()
Dim s1b As Double, s1c As Double, s2b As Double, s2c As Double
Dim s3b As Double, s3c As Double, s4b As Double, s4c As Double
' Do some address look-ups and add the points returned
MapPro1.GeoFind "231 sutton Street,North Andover,MA, 01845"
s1a = MapPro1.GeoFindParse(1, MapPro1.Street)
s1b = Val(MapPro1.GeoFindParse(7, MapPro1.Street))
s1c = Val(MapPro1.GeoFindParse(8, MapPro1.Street))
```

```

MapProl.OptiRouter.AddPoint s1a, s1b, s1c
List1.AddItem "Just Set: " & s1a & ", " & s1b & ", " & s1c
'---
MapProl.GeoFind "10 Ashford Lane, Andover,MA, 01810"
s2a = MapProl.GeoFindParse(1, MapProl.Street)
s2b = Val(MapProl.GeoFindParse(7, MapProl.Street))
s2c = Val(MapProl.GeoFindParse(8, MapProl.Street))
MapProl.OptiRouter.AddPoint s2a, s2b, s2c
List1.AddItem "Just Set: " & s2a & ", " & s2b & ", " & s2c
'---
MapProl.GeoFind "245 Summer Street, Boston, MA"
s3a = MapProl.GeoFindParse(1, MapProl.Street)
s3b = Val(MapProl.GeoFindParse(7, MapProl.Street))
s3c = Val(MapProl.GeoFindParse(8, MapProl.Street))
MapProl.OptiRouter.AddPoint s3a, s3b, s3c
List1.AddItem "Just Set: " & s3a & ", " & s3b & ", " & s3c
'---
MapProl.GeoFind "207 Market Street, Lowell, MA 01852"
s4a = MapProl.GeoFindParse(1, MapProl.Street)
s4b = Val(MapProl.GeoFindParse(7, MapProl.Street))
s4c = Val(MapProl.GeoFindParse(8, MapProl.Street))
MapProl.OptiRouter.AddPoint s4a, s4b, s4c
List1.AddItem "Just Set: " & s4a & ", " & s4b & ", " & s4c
'---
' Set some Mark properties (even after the fact)
MapProl.OptiRouter.RoutePath.MarkType = 1
MapProl.OptiRouter.RoutePath.MarkSize = 20
MapProl.OptiRouter.RoutePath.MarkColor = vbRed

' Use a delta Offset to make sure Marks are visible (Ref
point is Mak center)
Delta = 0.01

' Zoom to the extents of the defined points
MapProl.ZoomWindow MapProl.OptiRouter.PointExtent.Xmax +
Delta, MapProl.OptiRouter.PointExtent.Ymax + Delta,
MapProl.OptiRouter.PointExtent.Xmin - Delta,
MapProl.OptiRouter.PointExtent.Ymin - Delta
End Sub

```

**Delphi Example**

```

procedure TForm1.Button1Click(Sender: TObject);
var i,k,code:integer; x,y:double;
    temp:shortstring;
    r:tpointrec ;
begin
    MapProl.OptiRouter.ClearPoints;
    for i:=0 to listbox1.items.count-1 do
    begin
        temp:=listbox1.items[i];
        //---
        k:=pos(', ',temp);
        val(copy(temp,1,pred(k)),x,code);
        val(copy(temp,succ(k),length(temp)-k),y,code);
        MapProl.OptiRouter.AddPoint('Start-'+inttostr(i),x,y);
        r:=MapProl.OptiRouter.stopPoints[i];
        listbox3.Items.add(r.name+', '+floattostr(r.x)+' ,
'+floattostr(r.y));
    end;
    labell.caption:=Inttostr(MapProl.OptiRouter.NumPoints);
end;

```



---

**.OptiRouter.Calculate(n:integer)**

---

**Method**

Performs the route optimization calculation, using the parameters currently specified by the user. The parameter N, specifies whether to return all individual road segments, or consolidate all segments with the same name in the reporting of the calculated route. **N=0** reports **ALL** individual segments, **N=1** consolidates same name segments.

**VB Example**

```
Private Sub AddPt_Click()  
    ' Use the AddPoint to add 4 points to the OptiRouter  
    MapProl.OptiRouter.AddPoint "Poin 1", -88.299318, 42.039389  
    MapProl.OptiRouter.AddPoint "Point 2", -88.306011, 42.036385  
    MapProl.OptiRouter.AddPoint "Point 3", -88.303308, 42.031365  
    MapProl.OptiRouter.AddPoint "Point 4", -88.296486, 42.033983  
    ' Zoom to the defined points extents  
    With MapProl.OptiRouter.PointExtent  
        MapProl.ZoomWindow .Xmin, .Ymin, .Xmax, .Ymax  
    End With  
    ' Save the defined points for later use  
    MapProl.OptiRouter.SavePoints "MyTestOptiPts.pts"  
    'Now Calculate the Optimized Route  
    MapProl.OptiRouter.Calculate (0)  
End Sub
```

---

**.OptiRouter.Clear()**

---

**Method**

Clears the current Nodes and road segment network that was generated durion a prior .Calculate call. This is different than the .ClearPoints method which clears the routing points.

**VB Example**

```
Private Sub AddPt_Click()  
    ' Clear OptiRouting Nodes/segments  
    Mapprol.OptiRouter.Clear  
End Sub
```

---

**.OptiRouter.ClearPoints()**

---

**Method**

Clears Only the currently defined Priority Routing points. But leaves all the rest of the parameters currently specified for this module, intact.

**VB Example**

```
Private Sub AddPt_Click()  
    ' Clear OptiRouting Points ONLY  
    Mapprol.OptiRouter.ClearPoints  
End Sub
```

---

**.OptiRouter.DeletePoint(n:Integer)****Property**

---

Delete the specified OptiRouter point. Remaining points are moved up a position in the points array. If  $N > NumPoints$ , then no action is taken.

**VB Example**

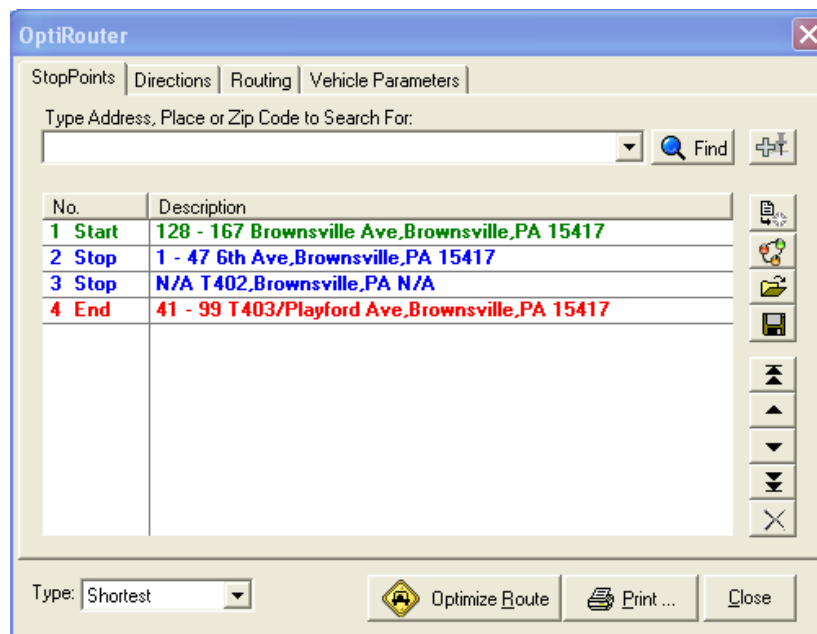
```
Private Sub Command8_Click()  
    MapPro1.OptiRouter.DeletePoint (Val(Text4.Text))  
    MapPro1.Refresh  
End Sub
```

---

**.OptiRouter.ExecOptiRoute()****Method**

---




Opens up a dialog to permit the user to specify all the Route Optimization parameters. The first tab of the Optirouter dialog permits the user to search for and add Stop Points to be used in the calculation.











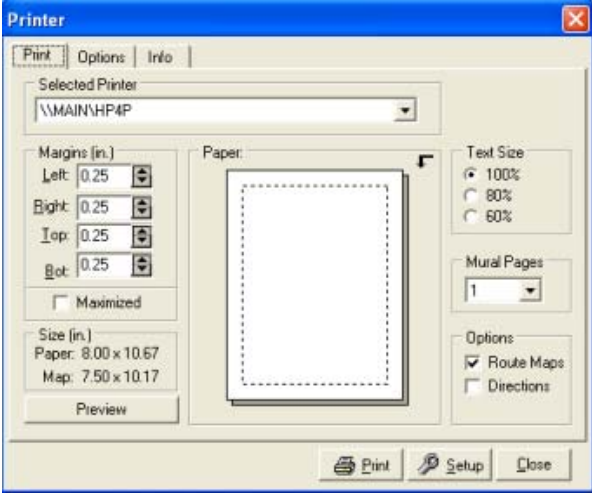



In addition to being able to search for an address to be added in as a stop point, this dialog also allows the user to “bring over” via points that may have been specified for a routing calculation.

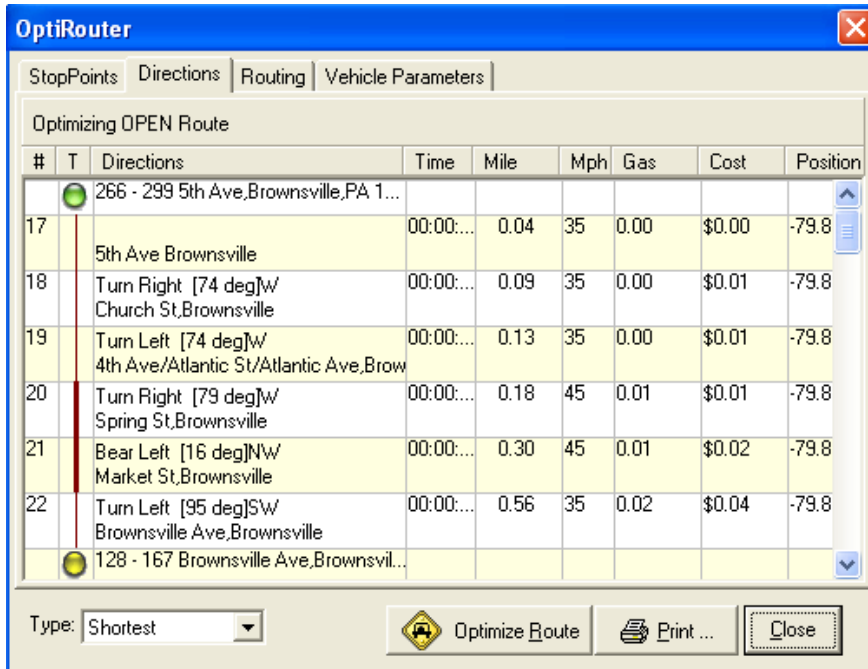
This, in turn, makes it possible for the user to specify Stop Points by Point-and-click. (See introduction section on Mouse Button functionality).

The functionality of all the buttons available in the StopPoints tab of the Optirouter dialog is explained below.

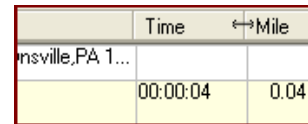
	Search for the address typed in the edit box
	Add the “qualified” address (following a search) that appears in the edit box, to the list of Stop Points.
	Clear the Stop Points list. It also clears the markers on the map and the highlighted Optimized Route.

	“Bring Over” any via points that may have been defined and append them to the Stop Points list, immediately above the “End” point.
	Open (Load) a file containing a list of Stop Points.
	Save the current list of Stop Points to a file.
	Make the currently highlighted Stop Point the “Start” point for the Calculation.
	Move the currently highlighted Stop Point UP one position in the list.
	Move the currently highlighted Stop Point DOWN one position in the list.
	Make the currently highlighted Stop Point the “End” point for the Calculation.
	Delete the currently highlighted Stop Point.
Type: Shortest ▾	Select the Type of Route to calculate
	Calculate an Optimized route through the current Stop Points
 Print ...	Open the Print dialog to print the Optimized Route. The same dialog as the one for printing the Via point routing calculation is used. See the Routing sections for a detailed description.
	
	Close the OptiRouter dialog.

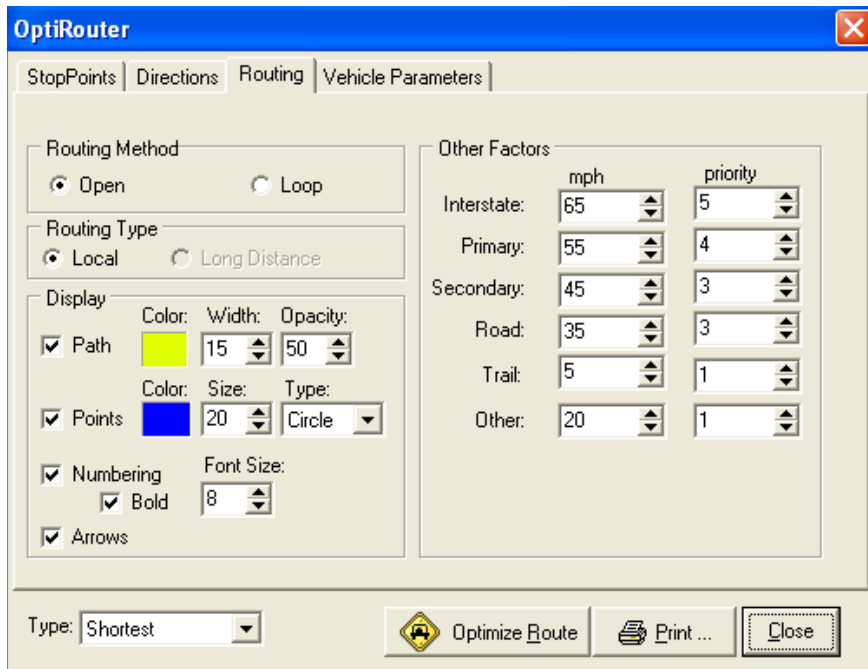
The “Directions” tab of the Optirouter dialog, contains the calculated routing directions, and relative information (distance, cost, etc.), as whown below:



Note that the headers are resizeable. Placing the cursor on one of the vertical dividers and dragging, while holding down the left mouse key, allows the user to resize the column and display more/less information.

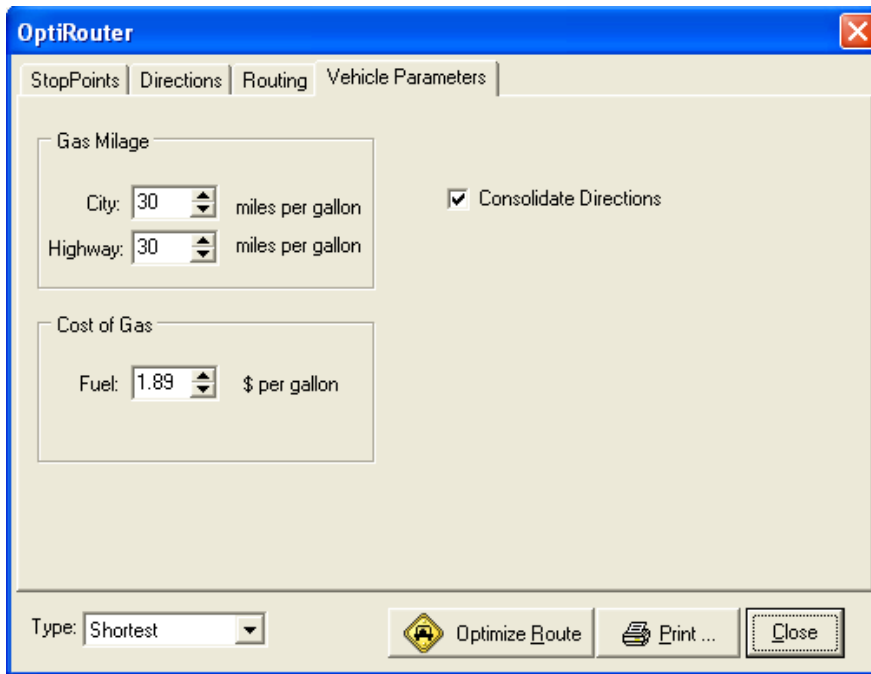


The “Routing” Tab, shown below, allows the user to set a number of the OptiRouter Options, in particular regarding the look of the Stop Points, the calculated route, etc.



Note that the default method “Open”, does an optimization calculation holding the user specified Start and Finish points, in their respective positions, and doing a From/To calculation. If “Loop” is selected, then all points (including Start and Finish) are allowed to be resequenced.

Finally, the vehicle parameters tab, shown below, permits the user to set local and highway MPG consumption, fuel price, etc.




---

### **.OptiRouter.GetFirstRoute():String**

### **Function**

---

The calculated Routes are placed in a list object and can then be accessed using a GetFirst/GetNext construct. This function takes no arguments, as it is assumed that all the required information has already been specified by the user. The function returns the segment # zero, followed by the word Start (tab delimited) to signify the start of the Routing calculations.

**VB Example**

```
Private Sub GetFirstNext_Click()
    ' Calculate the optimized route using already defined points
    MapPro1.OptiRouter.Calculate (0)
    ' Get the segments and populate the Listbox
    Rseg = MapPro1.OptiRouter.GetFirstRoute
    ' Chek to see if the end of the list object has been reached
    While Rseg <> ""
        List1.AddItem Rseg
        Rseg = MapPro1.OptiRouter.GetNextRoute
    Wend
    ' Close the List object to release
    MapPro1.OptiRouter.CloseRoute
End Sub
```

---

### **.OptiRouter.GetNextRoute():String**

### **Function**

---

The calculated Routes are placed in a list object and can then be accessed using a GetFirst/GetNext construct. This function has to be called **after** a GetFirstRoute call (GetFirstRoute opens the list object), and takes no arguments. The function returns a tab-delimited string containing the following information:

- Sequential Segment #
- Road Classification (CFCC)
- Literal Driving Directions - Continue, Bear, Turn Sharp, and Bearing (SE, NW, etc.). Also includes a Left – Right Modifier. Following the Bearing, the angle is included in square brackets, as well
- Street Name
- Place Name
- Segment Travel time
- Tavel Distance in Miles
- Cumulative Travel time to the end of this segment
- Cumulative Travel Distance to the end of this segment
- Speed during this segment (mi/hr)
- X,Y Start Point coordinates separated by a comma

Since routing between multiple points is performed during these calculations, at the beginning of the routing from **each** point, this function returns 0|Start, just like the GetFirstRoute, to indicate that a new segment between two points is started. When the end of the list object has been reached, the function returns a blank string.

**VB Example**

```
Private Sub GetFirstNext_Click()
    ' Calculate the optimized route using already defined points
    MapProl.OptiRouter.Calculate (0)
    ' Get the segments and populate the Listbox
    Rseg = MapProl.OptiRouter.GetFirstRoute
    ' Chek to see if the end of the list object has been reached
    While Rseg <> ""
        List1.AddItem Rseg
        Rseg = MapProl.OptiRouter.GetNextRoute
    Wend
    ' Close the List object to release
    MapProl.OptiRouter.CloseRoute
End Sub
```

---

### **.OptiRouter.CloseRoute()**

### **Function**

Closes the OptiRouter list object containing the routing information, and releases all resource, used by the list object, to the system resource pool. It is important to remember that unless this function is called, those resources will not be released.

---

### **.OptiRouter.ExRadius:Double**

### **Property**

The search radius about the Optirouter points, for which the network is loaded. The default is 5 miles. Care should be taken not to specify a large radius, since this defines the number of street-level data grids that are loaded, and such grids require significant system resources.

---

**.OptiRouter.GetFirstNode - Reserved**

---

**Function**

This is reserved for possible future expansion.

---

**.OptiRouter.GetNextNode - Reserved**

---

**Function**

This is reserved for possible future expansion.

---

**.OptiRouter.StopPoints[n]:PointRec**

---

An indexed array holding all the points that have been specified for the OptiRouter up until this point. (the total number of points is reflected in OptiRouter.NumPoints).

**VB Example**

```
Private Sub Command2_Click()  
    For i = 0 To MapProl.OptiRouter.NumPoints - 1  
        List1.AddItem MapProl.OptiRouter.StopPoints(i).Name & ": " &  
MapProl.OptiRouter.StopPoints(i).x & ", " &  
MapProl.OptiRouter.StopPoints(i).y  
    Next i  
End Sub
```

---

**.OptiRouter.InsertPoint (n:Integer; pt:PointRec)**

---

**Method**

Insert the specified point structure at the Nth position in the currently defined points list.

**VB Example**

```
Private Sub Command12_Click()  
    Dim NewPt As TPointRec  
    ' define the point  
    NewPt.Name = "New point being Inserted"  
    NewPt.x = -88.35  
    NewPt.y = 42.03  
    'Insert a point at position 3  
    MapProl.OptiRouter.InsertPoint 3, NewPt  
End Sub
```

---

**.OptiRouter.LoadFrom...**

---

**Property**

Reserved for possible future expansion of the module's capabilities.

---

**.OptiRouter.LoadPoints(s:String)****Method**

---

Loads a number of pre-specified point to be used by the OptiRouter, form a text file, replacing ANY points currently defined in memory. The text file format is one line per specified point, with each line containing:

**Name, X, Y**

```
VB Example Private Sub Command2_Click()  
    ' Load some points from a point file  
    MapProl.OptiRouter.LoadPoints "MyTestOptiPts.pts"  
    ' Now, list the loaded points  
    For i = 0 To MapProl.OptiRouter.NumPoints - 1  
        List1.AddItem MapProl.OptiRouter.StopPoints(i).Name & ": " &  
MapProl.OptiRouter.StopPoints(i).x & ", " &  
MapProl.OptiRouter.StopPoints(i).y  
    Next i  
End Sub
```

---

**.OptiRouter.MemUsed:Integer****Property**

---

The amount of memory (bytes) used to hold the network of points and edges that define the search area around the OptiRouter points.

```
VB Example Private Sub Command2_Click()  
    ' Get memory used  
    s = Mapprol.optirouter.MemUsed  
End Sub
```

---

**.OptiRouter.MovePoint(From, To: Integer)****Property**

---

Move the point from the specified (From) position to the specified (To) position in the array of the currently defined points.

```
VB Example Private Sub Command13_Click()  
    ' Load some points from a point file  
    MapProl.OptiRouter.LoadPoints "MyTestOptiPts.pts"  
    ' Now, list the loaded points  
    For i = 0 To MapProl.OptiRouter.NumPoints - 1  
        List1.AddItem MapProl.OptiRouter.StopPoints(i).Name & ": " &  
MapProl.OptiRouter.StopPoints(i).x & ", " &  
MapProl.OptiRouter.StopPoints(i).y  
    Next i  
    ' Move Some of the defined points  
    MapProl.OptiRouter.MovePoint 1, 3  
    MapProl.OptiRouter.MovePoint 2, 4  
    ' And, list the newly ordered points  
    For i = 0 To MapProl.OptiRouter.NumPoints - 1
```



```

        List1.AddItem MapProl.OptiRouter.StopPoints(i).Name & ": " &
MapProl.OptiRouter.StopPoints(i).x & ", " &
MapProl.OptiRouter.StopPoints(i).y
    Next i
End Sub

```

---

### **.OptiRouter.NumPoint(s:String)**

### **Property**

The total number of points currently specified in the OptiRouter points array. Note that the points array is a zero-based array, so really NumPoints-1 is the total number of defined points.

**VB Example**

```

Private Sub Command2_Click()
' Load some points from a point file
MapProl.OptiRouter.LoadPoints "MyTestOptiPts.pts"
' Now, list the loaded points
    For i = 0 To MapProl.OptiRouter.NumPoints - 1
        List1.AddItem MapProl.OptiRouter.StopPoints(i).Name & ": " &
MapProl.OptiRouter.StopPoints(i).x & ", " &
MapProl.OptiRouter.StopPoints(i).y
    Next i
End Sub

```

---

### **.OptiRouter.PointExtent:TRPoint**

### **Property**

Extents of all currently defined OpriRouter Points.

**VB Example**

```

Private Sub Command101_Click()
' Zoom Window around OptiRouter Points
MapProl.ZoomWindow MapProl.OptiRouter.PointExtent.Xmin,
    MapProl.OptiRouter.PointExtent.Ymin,
    MapProl.OptiRouter.PointExtent.Xmax,
    MapProl.OptiRouter.PointExtent.Ymax
End Sub

```

---

### **.OptiRouter.Priority:RoadRec**

### **Property**

Uses a RoadRec record structure to set the priorities for the six main road types. The allowable priority values are 1 (lowest) to 6 (highest), no provision exists to completely exclude a type of road, because in some situations that may be the ONLY road type available. The RoadRec Structure is shown below:

#### **RoadRec - Record Structure**

This is a record structure that is used to hold the **speed** and **priority** settings (see OptiRouter Interface properties) for the various road types. There are 6 such road types supported by the system at this point:

- .Interstate:** LongInt (includes all CFCC A10 classification Roads, i.e., Interstate and limited access highways – some US highways \*are\* classified as limited access)
- .Primary:** LongInt (includes all CFCC A20 classification Roads – US Highways that are NOT limited access)
- .Secondary:** LongInt (includes all CFCC A30 classification Roads)
- .Road:** LongInt (includes all CFCC A40 classification Roads)
- .Trail:** LongInt (includes A51, A52 and A53 classification Roads)
- .Other:** LongInt (includes all A61, A62, A64, A73 and A74 classification Roads)

For example, **.OptiRouter.Speed.Interstate = 65** would set the speed limit for the Interstate highways, while performing the OptiRouter calculations, to 65 mi/hr. **.OptiRouter.Speed.Priority = 1** would give interstate highways a selection priority of 1, when thr OptiRouter is attempting to decide which road to select for the route calculations.

**VB Example**

```
Private Sub Command14_Click()
    ' Set Selection priorities for the various road types.
    MapProl.OptiRouter.Priority.Interstate = 1
    MapProl.OptiRouter.Priority.Primary = 1
    ' Set Secondary Roads the preferred ones
    MapProl.OptiRouter.Priority.Secondary = 6
    MapProl.OptiRouter.Priority.Road = 1
    MapProl.OptiRouter.Priority.Trail = 1
    MapProl.OptiRouter.Priority.Other = 1
End Sub
```

---

## **.OptiRouter.RoutePath**

## **Interface**

---

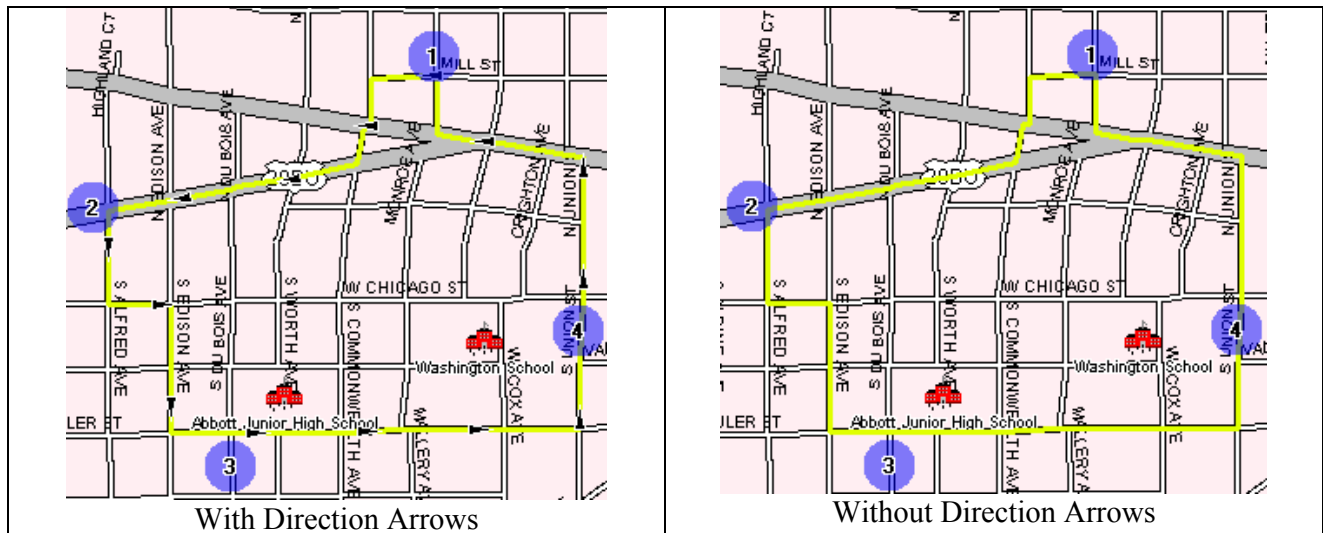
This interface provides the user with the capabilities of setting the way the calculated optimized route will be displayed, as well as other visual parameters.

### **.ArrowVis: Boolean**

Display Travel direction arrows on the calculated Route.

### **.RouteVis: Boolean**

Display/Highlight the calculated Route.



**.RouteColor: LongInt**

Set the color of the Route highlight

**.RouteOpacity: LongInt**

Set the opacity level (from 0=Solid to 100= Clear) of the Route highlight

**.RouteWidth: LongInt**

Set the Width of the route highlight, in pixels.

**.RouteLineStyle: LongInt**

Specify the line type to be used for routing. This is here for future expansion. Path routes are highlighted with transparent solid lines of the width and color specified by the user. The transparency of the highlighting is set using the .RouteOpacity property.

**.MarkVis: Boolean**

Display the Markers used to identify the points you have set for the route optimization.

**.MarkColor: LongInt**

Set the color of the Markers used to identify the points you have set for the route optimization.

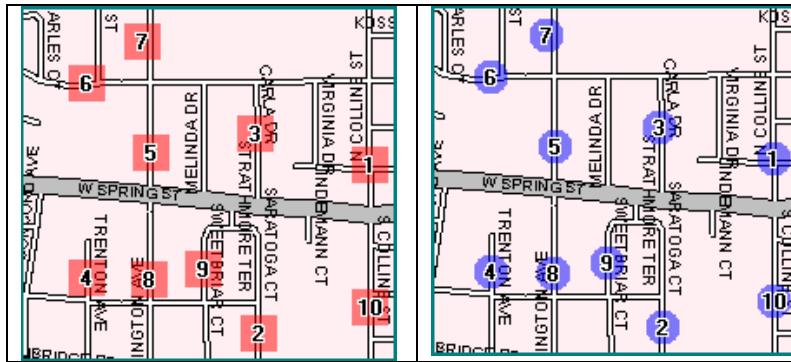
**.MarkSize: LongInt**

Set the size of the Markers used to identify the points you have set for the route optimization (this is actually the size of the circumscribed square), in pixels.

**.MarkType: LongInt**

Specify the Mark type to be used in identifying the points you have set for the route optimization.

The available types of markers are 0-Square, and 1-Round. The squares are painted in a semi-transparent mode, and the point number is displayed in the middle of the marker, if the appropriate properties have been set.



**.MarkColor: LongInt**

Set the color of the Markers used to identify the points you have set for the route optimization.

**.FontVis: Boolean**

Sets the Visibility of the Text used to identify the routing points set by the user. This is controlled independently of the marker available for each point.

**.FontName: String**

Sets the font to be used for the Text used to identify the routing points set by the user.

**.FontSize: Integer**

Sets the Point size of the Text used to identify the routing points set by the user.

**.FontBold: Boolean**

Sets the Bold state of the Text used to identify the routing points set by the user.

**VB Example**

```
Private Sub Command1_Click()
    MapProl.OptiRouter.RoutePath.RouteVis = True
    MapProl.OptiRouter.RoutePath.RouteColor = vbRed
    MapProl.OptiRouter.RoutePath.RouteWidth = 10
    MapProl.OptiRouter.RoutePath.FontSize = 14
    MapProl.OptiRouter.RoutePath.FontBold = True
    MapProl.OptiRouter.RoutePath.MarkVis = True
    MapProl.OptiRouter.RoutePath.MarkColor = vbBlue
    MapProl.OptiRouter.RoutePath.MarkSize = 10
    MapProl.OptiRouter.RoutePath.MarkType = 3
End Sub
```

---

**.OptiRouter.RouteParse( index: Integer; s: string): String**

---

**Function**

Returns the desired portion of S, where S is the composite string returned by .OptiRouter.GetNextRoute. Index can be either the numeric order of the desired field in the composite string, or the actual name of the field.

Index	Field
1	Leg
2	Type
3	Instructions

4	Street
5	Place
6	STime
7	SDistance
8	Time
9	Distance
10	Speed
11	Lon or X
11	Lat or Y

**VB Example**

```

Private Sub GetFirstNext_Click()
    ' Calculate the optimized route using already defined points
    MapProl.OptiRouter.Calculate (0)
    ' Get the segments and populate the Listbox
    Rseg = MapProl.OptiRouter.GetFirstRoute
    ' Chek to see if the end of the list object has been reached
    While Rseg <> ""
        Rseg_1 = MapProl.OptiRouter.RouteParse("Leg", Rseg)
        Rseg_2 = MapProl.OptiRouter.RouteParse("Street", Rseg)
        Rseg_3 = MapProl.OptiRouter.RouteParse("Distance", Rseg)
        Rseg_4 = MapProl.OptiRouter.RouteParse(10, Rseg)
        List1.AddItem "Leg: " & Rseg_1 & ", Street: " & Rseg_2 & ",
Dist: " & Rseg_3 & ", Time: " & Rseg_4
        Rseg = MapProl.OptiRouter.GetNextRoute
    Wend
    ' Close the List object to release
    MapProl.OptiRouter.CloseRoute
End Sub

```

---

### **.OptiRouter.RouteType:TxRouteType**

### **Property**

---

Enumerated list of the route type calculation the user is interested in.

- 0-Shortets
- 1-Fastest
- 2-Direct
- 3-Preferred
- 4-ShortUnbiased

**VB Example**

```

Private Sub Command17_Click()
    ' Set the route type to use in the calculations
    MapProl.OptiRouter.RouteType = Direct
    MapProl.OptiRouter.Calculate 1
End Sub

```

---

### **.OptiRouter.Speed:RoadRec**

### **Property**

---

Uses a RoadRec record structure to set the speed limits (mi/hr) for the six main road types.

**VB Example**

```
Private Sub Command16_Click()
    ' Set Speed Limits for the various road types.
    MapProl.OptiRouter.Speed.Interstate = 65
    MapProl.OptiRouter.Speed.Primary = 55
    MapProl.OptiRouter.Speed.Secondary = 45
    MapProl.OptiRouter.Speed.Road = 30
    MapProl.OptiRouter.Speed.Trail = 5
    MapProl.OptiRouter.Speed.Other = 25
End Sub
```

**Delphi Example**

```
procedure TForm1.SMPSpEdit3Change(Sender: TObject);
// Use custom SpinEdit control to set Speeds
var t:integer;
begin
    t:=tsmpspedit(sender).tag;
    With MapProl.OptiRouter.Speed do
    begin
        Case t of
            0:Interstate:=smpspedit1.ivalue;
            1:Primary:=smpspedit2.ivalue;
            2:Secondary:=smpspedit3.ivalue;
            3:Road:=smpspedit4.ivalue;
            4:Trail:=smpspedit5.ivalue;
            5:Other:=smpspedit6.ivalue;
        end;
    end;
end;
```

---

**.OptiRouter.SaveToFile...**

**Future**

Reserved for possible future expansion of the module's capabilities.

---

**.OptiRouter.SavePoints(s:String)**

**Method**

Saves the currently specified routing points set by the user, to the specified text file. The text file format is one line per specified point, with each line containing:

Name, X, Y

**VB Example**

```
Private Sub Command18_Click()
    ' Save currently defined Points for later use
    MapProl.OptiRouter.SavePoints "MyTestOptiPts2.pts"
End Sub
```

# APPENDIX A - Overlay File Format

## FORMAT OF OLDER PRECISION MAPPING OVERLAY FILE

The format of the Precision Mapping older, binary format Overlay files is proprietary, and is only released to licensed users of the OCX unit, to be used according to the terms of their licensing Agreement with Undertow Software, Inc.

- (1) Each entity is in a complete block of data, each block of similar format.
- (2) All record elements described here are required. Elements marked as reserved may be left blank, but still need to be allocated.
- (3) File is terminated with a single FD byte.

Record Type (1) - Line

Byte #	Variable	Type	Explanation
1	CODE	Byte	1 = Line
2..3	LAYER	Sm Int	Color, Style, etc. See (a)
4	THICKNESS	byte	Line thickness ID
5..10	Xc	Real	Start Pt. X coordinate
11..16	Yc	Real	Start Pt. Y coordinate
17..22	Xa	Real	End Pt. X coordinate
23..28	Ya	Real	End Pt. Y coordinate
29..34	Xb	Real	Reserved
35..40	Yb	Real	Reserved

Example of Overlay file consisting of a single line

```
01 00 00 00 95 78 D5 40 00 C8 94 93 42 44 BE 17 95
4A C7 1B FD C7 94 40 BA 6B BC 17 84 10 6C 00 43 04
FE 00 C4 05 84 01 FD
```

Example of Overlay file consisting of a single line with a thick line attribute.

```
11 00 00 06 95 78 D5 40 00 C8 94 93 42 44 BE 17 95
4A C7 1B FD C7 94 40 BA 6B BC 17 84 10 6C 00 43 04
FE 00 C4 05 84 01 FD
```

Note (a) When used, the LAYER variable holds the following information:

```
bits 1..4 : Foreground color
bits 5..8 : Background color
bits 9..12 : Fill Style
bits 13..16 : Line Style
```

Record Type (3) - Circle (Defined in terms of a bounding box)

Byte #	Variable	Type	Explanation
1	CODE	Byte	3 = Circle
2..3	LAYER	Sm Int	Color, Style, etc. See (a)
4	THICKNESS	byte	Line thickness ID
5..10	Xc	Real	Top Left Pt. X coordinate
11..16	Yc	Real	Top Left Pt. Y coordinate
17..22	Xa	Real	Bot. Right Pt. X coordinate
23..28	Ya	Real	Bot. Right Pt. Y coordinate
29..34	Xb	Real	Reserved
35..40	Yb	Real	Reserved

Example of Overlay file consisting of a Circle

```

03 00 00 01 95 50 15 38 00 C8 94 93 42 44 BE 17 95
FB 46 0A FD C7 94 93 42 A4 C4 17 23 04 F1 00 43 04
FE 00 C4 05 84 01 FD

```

Record Type (6) - Bezier

```

-----
Byte #   Variable           Type           Explanation
-----
1        CODE                Byte           6 = Bezier
2..3    LAYER                  Sm Int        Color, Style, etc. See (a)
4        THICKNESS           byte          Line thickness ID
5..10   Xc                      Real          Start Pt. X coordinate
11..16  Yc                      Real          Start Pt. Y coordinate
17..22  Xa                      Real          End Pt. X coordinate
23..28  Ya                      Real          End Pt. Y coordinate
29..34  Xb                      Real          MidPoint X coordinate
35..40  Yb                      Real          MidPoint Y coordinate

```

Example of Overlay file consisting of a Bezier

```

-----
06 00 00 01 95 50 15 38 00 C8 94 44 C2 32 BE 17 95
72 87 24 FD C7 94 8F 3A 7D BC 17 95 D6 0A E5 FD C7
94 D3 CF 34 C1 17 FD

```

Record Type (8) - Text

```

-----
Byte #   Variable           Type           Explanation
-----
1        CODE                Byte           8 = Text
2..3    LAYER                  Sm Int        Color, Style, etc. See (a)
4        THICKNESS           byte          Line thickness ID
5..10   Xc                      Real          Lower Left X coordinate
11..16  Yc                      Real          Lower Left Y coordinate
17..22  Xa                      Real          Reserved
23..28  Ya                      Real          Reserved
29..34  Xb                      Real          Reserved
35      L                    Byte          Length of String
36..291 S                    String        Text

```

Example of Overlay file consisting of Text

```

-----
08 00 00 01 95 33 33 41 00 C8 94 00 80 41 BE 17 00
00 00 00 00 00 00 00 00 00 00 00 0F 00 00 00 00 00
06 53 41 4D 50 4C 45 37 22 A8 0C 37 22 AA 05 00 00
00 8C 10 AC 00 E1 24 DF 24 64 0D 37 22 EC 05 37 22
F7 FF FF FF 60 00 80 00 8C 10 94 00 00 00 5A 0D 30
C2 00 00 C0 C0 C0 02 00 00 00 00 00 FF 00 00 8C 10
7C 00 00 00 00 00 00 00 00 00 00 00 FD 12

```

Record Type (10) - Polyline

```

-----
Byte #   Variable           Type           Explanation
-----
1        CODE                Byte           10 = Polyline
2..3    LAYER                  Sm Int        Color, Style, etc. See (a)
4        THICKNESS           byte          Line thickness ID
5..10   Xc                      Real          Reserved
11..16  Yc                      Real          Reserved
17..22  Xa                      Real          Reserved
23..28  Ya                      Real          Reserved
29..30  N                        Sm Int        No. of points (max=100)
variable variable          N number of X,Y coordinate pairs.

```

Example of Overlay file consisting of a 3-segment Polyline.

```

-----
0A 00 00 01 95 72 87 24 FD C7 94 BE CC 85 C0 17 95

```



```

78 D5 40 00 C8 94 52 B5 53 BB 17 04 00 95 78 D5 40
00 C8 94 93 42 44 BE 17 95 60 8C 3C FE C7 94 BE CC
85 C0 17 95 EB CF 05 FF C7 94 52 B5 53 BB 17 95 72
87 24 FD C7 94 40 BA 6B BC 17 FD

```

Record Type (12) - Bubble

Byte #	Variable	Type	Explanation
1	CODE	Byte	12 = Bubble
2..3	LAYER	Sm Int	Color, Style, etc. See (a)
4	TP	byte	Reserved
5..10	Xc	Real	Bubble X coordinate
11..16	Yc	Real	Bubble Y coordinate
17..22	Xa	Real	Reserved
23..28	Ya	Real	Reserved
29..284	S	string[256]	Bubble string. First byte is the actual length of the string

Example of Overlay file consisting of a text bubble

```

0C 00 00 01 95 50 15 38 00 C8 94 93 42 44 BE 17 95
E7 05 CD FC C7 94 85 4F 23 C1 17 0D 42 75 62 62 6C
65 20 53 61 6D 70 6C 65 35 70 0C 7F 35 AA 05 00 00
73 14 1D EC 00 E1 24 DF 24 58 18 7F 35 EC 05 37 22
F7 FF FF FF 60 00 52 4E 14 1D D4 00 27 25 DF 24 58
18 7F 35 B4 18 7F 35 14 1D C4 00 00 00 8E 0D 30 C2
00 00 C0 C0 C0 02 00 00 00 00 00 29 7C 2A 14 1D AC
00 00 00 00 00 00 00 00 00 00 14 00 14 00 01 00
14 1D 98 00 00 00 00 00 00 00 01 00 14 1D 7F
35 F8 18 7F 35 CE 00 14 1D 80 00 00 00 00 2C 19 7F
35 44 19 7F 35 58 19 7F 35 00 00 00 00 C6 00 88 00
A3 40 DF 24 E0 18 7F 35 7F 59 DF 24 E0 18 7F 35 E0
18 7F 35 AA 05 00 00 01 14 1D 4C 00 E1 24 DF 24 F8
18 7F 35 EC 05 37 22 FF FF FF 00 60 00 AB 01 68 19
14 00 04 25 DF 24 F8 18 7F 35 A4 06 37 22 04 02 03
02 14 1D 20 00 27 25 DF 24 F8 18 7F 35 14 10 7F 35
14 1D 10 00 14 1D 0C 00 14 1D 08 00 FD

```

Record Type (14) - Group

Byte #	Variable	Type	Explanation
1	CODE	Byte	14 = Group
2..3	LAYER	Sm Int	Reserved
4	THICKNESS	byte	Reserved
5..10	Xc	Real	Reserved
11..16	Yc	Real	Reserved
17..22	Xa	Real	Reserved
23..28	Ya	Real	Reserved
29..30	QCOUNT	Sm Int	No. of elements (max=100)
variable			QCOUNT number of records, each record consistent with the format given above.

Example of Overlay file consisting of a a Grouped object made up of a line, a circle and a polyline

```

1E 10 9C 02 49 F8 B0 00 52 F8 B0 00 58 F8 B0 00 5A
F8 B1 00 5B F8 B1 00 60 F8 B1 00 03 00 01 00 00 01
95 33 33 41 00 C8 94 00 80 41 BE 17 95 CD 0C 24 FD
C7 94 9A 99 73 BC 17 0A 37 22 AA 05 00 00 02 5C 0B
0C 00 0A 00 00 01 95 CD 0C 24 FD C7 94 00 00 75 C1
17 95 00 C0 39 00 C8 94 33 B3 3A BB 17 04 00 95 00
C0 39 00 C8 94 00 80 41 BE 17 95 66 66 F9 FE C7 94
00 00 75 C1 17 95 33 B3 CC FE C7 94 33 B3 3A BB 17
95 CD 0C 24 FD C7 94 00 80 82 BC 17 03 00 00 01 95
CD 4C 32 00 C8 94 00 80 41 BE 17 95 33 F3 32 FD C7
94 00 80 41 C4 17 30 C6 00 00 C0 C0 C0 00 00 00 00
00 FD

```

Record Type (FD) - End of file

Byte #	Variable	Type	Explanation
1	CODE	Byte	FD = End Of File

## APPENDIX B – Color Palette

### COLOR PALETTE

The color palette used in the OCX unit(s) is a 256 color palette. The palette uses the 20 system colors, plus 16 colors defined for shading, with the rest of the colors in the palette being undefined.

The 16 colors used for shading are as follows (in RGB hex notation):

- 1 \$DFDFDF
- 2 \$BAC9BC
- 3 \$B4CFCA
- 4 \$D1DAD5
- 5 \$CACABB
- 6 \$BBC8C8
- 7 \$C5BEC5
- 8 \$DDCECE
- 9 \$B5CECE
- 10 \$C5BEBE
- 11 \$A0B8C5
- 12 \$ABCCCF
- 13 \$B8BECB
- 14 \$C7C6BC
- 15 \$B3C2C6
- 16 \$C9E2E2

The user should be aware that the entries in the [Shades] section of the .CFG file may be of two different types. If the high bit is set, then that entry is simply an index to the above table and not a real color. If the highbit is not set, then the last three bytes are the RGB color (remember they are reversed). For example, an entry of STSH=17,\$08000003 indicates that the 17th state (IL) uses the 3rd color in the above table, whereas an entry of STSH=17,\$000000FF would indicate that the 17th state uses the color red.

It is recommended that if any sort of bitmap is used with the OCX, these 16 colors be part of its palette to avoid any palette conflict problems.

# APPENDIX C – Configuration File

## CONFIGURATION (.CFG) FILE

This Appendix contains a copy of a 'typical' .CFG file that is created every time an application using the OCX terminates normally, or when the Map object properties change at design time. It is read every time the application is started. Note that the information written out to the .CFG file is for general reference only.

```
[Directories]
CDSTATE=D:\pmap40\states
CDDATA1=D:\pmap40\data1
CDDATA2=D:\pmap40\data2
CDDATA3=D:\pmap40\data3
CDOVR=
CDLIB=
CDCONT=
CDHELP=
BMP=
OVR=
LIB=

[Registration]
NAME= {Reserved}
IDTYPE= {Reserved}

[Visible]
UNDER=TRUE {Underlay Visibility flag}
OVER=TRUE {Overlay Visibility flag}
MAIN=TRUE {Mainlay Visibility flag}
DBASE=TRUE

[Modules]
ASP=1.000
BRATIO=4.000
TIGER=2
CSPC=5
PMODE=1
BKPNT=FALSE

[Overlays]
LMAIN=TRUE {main}
LHYDRO=TRUE {Hydro}
LHNET=TRUE {Highway Network}
LSTATE=TRUE {State Outlines}
LCITY=TRUE {City Outlines}
LAIR=TRUE {Airports}
LLAND=TRUE {Landmarks}
LCNTY=TRUE {County Outlines}

[Options]
HINT=TRUE
TOOL=TRUE
STATUS=TRUE
GLOBE=TRUE
XDT=TRUE
PC=TRUE
```

```
BEEP=TRUE
OPTID=TRUE
UMONO=0
UMNT=10

[ Font Info ]
IMAX=9
IMIN=6
SMJ=0.500
SHADO=TRUE
SHFACT=128
SHPOL=128
BWON=FALSE
SCBAR=TRUE
LVIEW=TRUE
LWIND=-133.706624,16.801664,-55.718080,58.773184

[Printer]
MLT=0.25 {Left margin}
MRT=0.25 {Right margin}
MTP=0.25 {Top margin}
MBT=0.25 {Bottom margin}
SIZE=1
FSIZE=1
TITLE=Current Map
FPS=0
XYMODE=0
UNIT=1
PRTBDR=2

[Search]
PLC=LEMONT {Last city/place searched for}
STR=127 {Last street searched for}
ZIP=60439 {Last Zip Code searched for}
ACODE=630 {Last Area Code searched for}
STNUM=56 {Last block/Street number searched for}
SMODE=2
ZMARD=1,0,2
ZMARD=2,0,0
ZMARD=3,0,0
ZMARD=4,0,0
ZMARD=5,0,0
ZMARD=6,0,2

[Landmarks] {Visibily of each 1:Visible, 0:Invisible}
LAND=1,1
LAND=2,1
LAND=3,1
LAND=4,1
LAND=5,1
LAND=6,1
LAND=7,1
LAND=8,1
LAND=9,1
LAND=10,1
LAND=11,1
LAND=12,1
LAND=13,1
LAND=14,1
LAND=15,1
```

LAND=16,1  
LAND=17,1  
LAND=18,1  
LAND=19,1  
LAND=20,1  
LAND=21,1  
LAND=22,1  
LAND=23,1  
LAND=24,1  
LAND=25,1  
LAND=26,1  
LAND=27,1  
LAND=28,1  
LAND=29,1  
LAND=30,1  
LAND=31,1  
LAND=32,1  
LAND=33,1  
LAND=34,1  
LAND=35,1  
LAND=36,1  
LAND=37,1  
LAND=38,1  
LAND=39,1  
LAND=40,1  
LAND=41,1  
LAND=42,1  
LAND=43,1  
LAND=44,1  
LAND=45,1  
LAND=46,1  
LAND=47,1  
LAND=48,1  
LAND=49,1  
LAND=50,1  
LAND=51,1  
LAND=52,1  
LAND=53,1  
LAND=54,1  
LAND=55,1  
LAND=56,1  
LAND=57,1  
LAND=58,1  
LAND=59,1  
LAND=60,1  
LAND=61,1  
LAND=62,1  
LAND=63,1  
LAND=64,1  
LAND=65,1  
LAND=66,1  
LAND=67,1  
LAND=68,1  
LAND=69,1

[Layers]

The visibility flags for Layers 1-29 are stored in this section of the .CFG file. A flag of 1 indicates visible, while a flag of "0" indicates invisible. The 29 layers used are composite layers based primarily on Tiger type entities, as identified below. Note

that the composition of each layer may be changed at any time, if required.

-----  
Composition of the 29 layers, in terms of their Tiger identifiers.  
Consult the Tiger documentation, of the Precision Mapping Streets  
help file for the Tiger classification IDs.

Layer # 1 = Reserved  
Layer # 2 = Reserved  
Layer # 3 = Reserved

Layer # 4 = Reserved  
Layer # 5 = Reserved  
Layer # 6 = Reserved  
Layer # 7 = Reserved  
Layer # 8 = Reserved  
Layer # 9 = A10, A11, A12, A13, A14, A15, A16,  
A17, A18  
Layer # 10 = A20, A21, A22, A23, A24, A25,  
A26, A27, A28  
Layer # 11 = A30, A31, A32, A33, A34, A35  
Layer # 12 = A36, A37, A38  
Layer # 13 = A00, A01, A02, A03, A04, A05, A06,  
A07, A08, A45, A46, A47, A48,  
A50, A51, A52, A53, A60, A61, A62,  
A63, A64, A65, A70, A71, A72, A73  
Layer # 14 = A40, A41, A42, A43, A44  
Layer # 15 = Reserved  
Layer # 16 = Reserved  
Layer # 17 = B00, B01, B02, B03, B10, B11, B12,  
B13, B20, B21, B22, B23, B30, B31,  
B32, B33, B40, B50, B51, B52  
Layer # 18 = C00, C10, C20, C30, C31  
Layer # 19 = D00, D10, D20, D21, D22, D23, D24,  
D25, D26, D27, D28, D29, D30, D31,  
D32, D33, D34, D35, D36, D37, D40,  
D41, D42, D43, D44, D50, D51, D52,  
D53, D54, D55, D60, D61, D62, D63,  
D64, D65, D66, D70, D71, D80, D81,  
D82, D83, D84, D85, D90, D91  
Layer # 20 = E00, E10, E20, E21, E22  
Layer # 21 = F00, F10, F11, F12, F13, F14, F15,  
F20, F21, F22, F23, F24, F25, F30,  
F40, F50, F60, F70, F71, F72, F73,  
F74, F80, F81, F82  
Layer # 22 = Reserved  
Layer # 23 = H00, H01, H10, H11, H13, H20, H21,  
H30, H31, H40, H41, H50, H51, H53,  
H60, H70, H71, H73, H74, H75, H80,  
H81  
Layer # 24 = H02, H12, H22, H32, H42, H72  
Layer # 25 = Reserved  
Layer # 26 = X00  
Layer # 27 = Reserved  
Layer # 28 = Reserved  
Layer # 29 = Reserved

-----

LAYER=1,1  
LAYER=2,1  
LAYER=3,1  
LAYER=4,1  
LAYER=5,1  
LAYER=6,1  
LAYER=7,1  
LAYER=8,1  
LAYER=9,1  
LAYER=10,1  
LAYER=11,1  
LAYER=12,1  
LAYER=13,1  
LAYER=14,1  
LAYER=15,1  
LAYER=16,1  
LAYER=17,1  
LAYER=18,1  
LAYER=19,1  
LAYER=20,1  
LAYER=21,1  
LAYER=22,1  
LAYER=23,1  
LAYER=24,1  
LAYER=25,1  
LAYER=26,1  
LAYER=27,1  
LAYER=28,1  
LAYER=29,1

[Shades]

CNTYON=TRUE {Shade Counties}  
MCDON=TRUE {Shade MCDs}  
PLCON=TRUE {Shade Places}  
AUTOQ=TRUE {AutoQuery flag}  
STATEON=TRUE {Shade States}

[Fills]

FILLS=  
FILLS=  
FILLS=

[Shades]

STSH=1,\$08000004  
STSH=2,\$08000000  
STSH=3,\$08000000  
STSH=4,\$08000002  
STSH=5,\$08000003  
STSH=6,\$08000003  
STSH=7,\$08000000  
STSH=8,\$08000004  
STSH=9,\$08000006  
STSH=10,\$08000002  
STSH=11,\$08000003  
STSH=12,\$08000002  
STSH=13,\$08000003  
STSH=14,\$08000000  
STSH=15,\$08000000  
STSH=16,\$08000003



STSH=17,\$08000006  
STSH=18,\$08000002  
STSH=19,\$08000002  
STSH=20,\$08000006  
STSH=21,\$08000003  
STSH=22,\$08000002  
STSH=23,\$08000007  
STSH=24,\$08000003  
STSH=25,\$08000003  
STSH=26,\$08000007  
STSH=27,\$08000006  
STSH=28,\$08000006  
STSH=29,\$08000004  
STSH=30,\$08000006  
STSH=31,\$08000003  
STSH=32,\$08000004  
STSH=33,\$08000006  
STSH=34,\$08000006  
STSH=35,\$08000003  
STSH=36,\$08000004  
STSH=37,\$08000003  
STSH=38,\$08000003  
STSH=39,\$08000004  
STSH=40,\$08000002  
STSH=41,\$08000002  
STSH=42,\$08000007  
STSH=43,\$08000000  
STSH=44,\$08000004  
STSH=45,\$08000006  
STSH=46,\$08000004  
STSH=47,\$08000002  
STSH=48,\$08000006  
STSH=49,\$08000006  
STSH=50,\$08000002  
STSH=51,\$08000004  
STSH=52,\$08000000  
STSH=53,\$08000004  
STSH=54,\$08000006  
STSH=55,\$08000003  
STSH=56,\$08000002  
STSH=57,\$00DFDFDF  
STSH=58,\$00B5CECE  
STSH=59,\$00BAC9BC  
STSH=60,\$00C5BEBE  
STSH=61,\$00B4CFCA  
STSH=62,\$00A0B8C5  
STSH=63,\$00D1DAD5  
STSH=64,\$00ABCCCF  
STSH=65,\$00CACABB  
STSH=66,\$00B8BECB  
STSH=67,\$00BBC8C8  
STSH=68,\$00C7C6BC  
STSH=69,\$00C5BEC5  
STSH=70,\$00B3C2C6  
STSH=71,\$00DDCECE  
STSH=72,\$00C9E2E2

[Route]  
PRIOR=1,65,5  
PRIOR=2,50,4

PRIOR=3,45,3  
PRIOR=4,35,3  
PRIOR=5,5,1  
HTYPE=2  
HCLR=65535  
TFACOR=5  
RTERAD=10

## APPENDIX D – Abbreviations in Searching

### ABBREVIATIONS IN SEARCHING

When searching for a street, the following abbreviations may be used:

#### **Suffix Abbreviations**

Lane, Ln  
Street, St  
Place, Pl  
Drive, Dr  
Trail, Tr  
Avenue, Ave  
Parkway, Pkwy  
Circle, Cir  
Highway, Hiway, Hwy  
Terrace, Ter  
Court, Ct  
Turnpike, Tpke  
Road, Rd

For example, Searching for 'Linda Dr' or 'Linda Drive' should return the same results.

#### **Prefix Abbreviations**

West, W  
East, E  
North, No., N  
South, So., S

For example, searching for 'West Main', or 'W Main' should return the same results.

# APPENDIX E - Visual Basic Sample Code

## Visual Basic Sample Code

This Appendix contains sample Visual Basic code using various aspects of MapPro.OCX.

### General Basic Examples

**Note:** Declarations, Events and Functions have been included ' to illustrate how MapPro can be used with Visual Basic.

'The following declarations are required in order to use the  
'WinApi calls provided in the examples.

```
Public Type POINTAPI
    x As Long
    y As Long
End Type

Dim LPoint As POINTAPI
Declare Function MoveToEx Lib "gdi32" (ByVal hdc As Long, ByVal x As Long, ByVal y As Long, LpPoint As POINTAPI) As Long
Declare Function LineTo Lib "gdi32" (ByVal hdc As Long, ByVal x As Long, ByVal y As Long) As Long
Declare Function CreatePen Lib "gdi32" (ByVal nPenStyle As Long, ByVal nWidth As Long, ByVal crColor As Long) As Long
Declare Function SelectObject Lib "gdi32" (ByVal hdc As Long, ByVal hObject As Long) As Long
Declare Function DeleteObject Lib "gdi32" (ByVal hObject As Long) As Long
Declare Function Ellipse Lib "gdi32" (ByVal hdc As Long, ByVal X1 As Long, ByVal Y1 As Long, ByVal X2 As Long, ByVal Y2 As Long) As Long
Declare Function SetROP2 Lib "gdi32" (ByVal hdc As Long, ByVal nDrawMode As Long) As Long
Declare Function GetDC Lib "user32" (ByVal hwnd As Long) As Long
Declare Function GetDeviceCaps Lib "gdi32" (ByVal hdc As Long, ByVal nIndex As Long) As Long
Declare Function ReleaseDC Lib "user32" (ByVal hwnd As Long, ByVal hdc As Long) As Long
```

' The following functions can be used to parse delimited strings

```
Public Function CommaDelStr(ByRef CommaStr) As String
    ' If CommaStr contains a comma delimited string
    ' Then CommaDelStr returns all characters up to
    ' but not including the first comma. All Characters
    ' up to (and including) the first comma are removed
    ' from CommaStr
Dim Tstr, CommaPos
    Tstr = CommaStr
    CommaPos = InStr(1, Tstr, ",", vbTextCompare)

    If CommaPos = 0 Then
        CommaDelStr = CommaStr ' Return the entire string since it has no comma
    ElseIf CommaPos > 0 Then
        CommaDelStr = Left(Tstr, CommaPos - 1)
        CommaStr = Right(Tstr, Len(Tstr) - CommaPos)
```

```

    End If
End Function

```

```

Public Function TabDelStr(ByRef TabStr) As String
    ' If TabStr contains a Tab delimited string
    ' Then TabDelStr returns all characters up to
    ' but not including the first Tab. All Characters
    ' up to (and including) the first Tab are removed
    ' from TabStr

Dim Tstr, TabPos
    Tstr = TabStr
    TabPos = InStr(1, Tstr, Chr(9), vbTextCompare)
    If TabPos = 0 Then
        TabDelStr = TabStr ' Return the entire string since it has no comma
    ElseIf TabPos > 0 Then
        TabDelStr = Left(Tstr, TabPos - 1)
        TabStr = Right(Tstr, Len(Tstr) - TabPos)
    End If
End Function

```

```

Private Sub MapProl_Find()
    ' The Find Event is called for every street segment located by
    ' the MapProl.FindStr Function.
    ' The TabDelStr Function shown is not included as an OCX method.
    ' See the examples for parsing comma and tab delimited strings.
    ' TabDelStr returns all text up to the first Tab. The function
    ' removes all characters up to and including the tab from Tstr.
    ' This example converts the Tab Delimited String to a Comma Delimited
    ' and places it in a list.
    ' (Remember to clear the list before calling FindStr)

```

```

Dim Tstr, ListStr
    Tstr = MapProl.Street ' Put the street results in a temp var
    ListStr = TabDelStr(Tstr) ' Street Name
    ListStr = ListStr & "," & TabDelStr(Tstr) ' City
    ListStr = ListStr & "," & TabDelStr(Tstr) ' Address range
    ListStr = ListStr & "," & TabDelStr(Tstr) ' State
    ListStr = ListStr & "," & TabDelStr(Tstr) ' Zip
    ListStr = ListStr & "," & TabDelStr(Tstr) ' Longitude
    ListStr = ListStr & "," & TabDelStr(Tstr) ' Latitude
    ListStr = ListStr & "," & TabDelStr(Tstr) ' Distance
    List1.AddItem (ListStr)
End Sub

```

```

Private Sub MapProl_paintAfter(ByVal DC As Long)
    ' This event is where much of your application drawing activity
    ' can be handled. Lines will be drawn over streets.
    ' This example shows several WinApi calls

```

```

Dim Lp As POINTAPI
Dim hp As Long
Dim tmpXLoc, tmpYLoc, diff As Double
    Call MapProl.DrawScalebar(DC, 1, 10) ' Place the scale bar on the map
    MagEd.Text = MapProl.Magnitude ' Report some properties to user
    ScaleEd.Text = MapProl.Scale
    MileEd.Text = MapProl.Miles

```

```

AspEd.Text = MapProl.Screen_Aspect

hp = CreatePen(0, 1, 0)          ' Pen used to draw with WinApi
hp = SelectObject(DC, hp)

With MapProl
    tmpXLoc = (.LonLeft + .LonRight) / 2 ' Get the center of the map
    tmpYLoc = (.LatTop + .LatBottom) / 2
    .DeleteAllItems                ' Clear any previous items.
    .SetItem 1, tmpXLoc, tmpYLoc    ' Place an item on the map
    .SetItemBitmap 1, Picture1.Picture.Handle ' Associate bitmap with item
    .SetItemString 1, "My Bitmap"  ' String will appear above bitmap
    ' Draw a text bubble pointing to item.
    Call .DrawBubble(DC, tmpXLoc, tmpYLoc, "Bubble")

    ' Draw line from lower left to upper right using WinApi calls
    Call MoveToEx(DC, .Lon2Int(.LonLeft), .Lat2Int(.LatBottom), Lp)
    Call LineTo(DC, .Lon2Int(.LonRight), .Lat2Int(.LatTop))
End With
Call DeleteObject(SelectObject(DC, hp)) ' Do NOT forget this!!!!
End Sub

Private Sub MapProl_PaintBefore(ByVal dc As Long)
' Lines can be drawn under streets in this event if all map
' shading is turned OFF. The line will disappear if shading
' is on however.
' The DirectBefore event can be used in a similar manner when
' when using DirectDraw to draw to another bitmap or the printer.
Dim tmpXLoc, tmpYLoc As Double

    With MapProl
        tmpXLoc = (.LonLeft + .LonRight) / 2 ' Get the center of the map
        tmpYLoc = (.LatTop + .LatBottom) / 2
        ' Draw a red line from upper right to center of the map.
        Call .DrawLine(DC, .LonRight, .LatTop, tmpXLoc, tmpYLoc, 1, ClRed, 13);
    End With
End Sub

Private Sub DirDrawNotScaled_Click()
' Demonstrates DirectDraw not Scaled.
' DirDrawFrm contains a PictureBox called DirDrawPic
' The Map aspect ratio is maintained to prevent
' distortion.

    DirDrawFrm.Show
    DirDrawFrm.Caption = "Direct Draw Not Scaled "
    DirDrawFrm.DirDrawPic.Width = MapProl.Width \ 4
    DirDrawFrm.DirDrawPic.Height = MapProl.Height \ 4
    With DirDrawFrm
        Call MapProl.DirectDraw(.DirDrawPic.hdc, 0, 0, .DirDrawPic.Width,
        .DirDrawPic.Height, True,
        False, True)
    End With
End Sub

Private Sub DirDrawScaled_Click()

```

```
' Demonstrates DirectDraw Scaled.  
' DirDrawFrm contains a PictureBox called DirDrawPic  
' The Map aspect ratio is maintained to prevent  
' distortion.
```

```
DirDrawFrm.Show  
DirDrawFrm.Caption = "Direct Draw Scaled "  
DirDrawFrm.DirDrawPic.Width = MapProl.Width \ 4  
DirDrawFrm.DirDrawPic.Height = MapProl.Height \ 4  
With DirDrawFrm  
    Call MapProl.DirectDraw(.DirDrawPic.hdc, 0, 0, .DirDrawPic.Width,  
.DirDrawPic.Height, True,  
                            True, False)  
End With  
End Sub
```

```
Private Sub GotoBtn_Click()  
Dim Lon, Lat  
  
    Lon = -83.436  
    Lat = 42.732  
    Call MapProl.GotoPoint(Lon, Lat)  
End Sub
```

```
Private Sub ZoomWin_Click()  
Dim X1, X2, Y1, Y2 As Variant  
  
    X1 = -88  
    Y1 = 41.56  
    X2 = -88.01  
    Y2 = 41.575  
    Call MapProl.Zoomwindow(X1, Y1, X2, Y2)  
End Sub
```

# APPENDIX F – CFCC Definitions

## Census Feature Class Codes (CFCC) Definitions

A CFCC is used to identify the most noticeable characteristic of a feature. The CFCC is applied only once to a chain or landmark with preference given to classifications that cover features that are visible to an observer and are part of the ground transportation network. Thus a road that is also the boundary of a town would have a CFCC describing its road characteristics not its boundary characteristics. The CFCC, as used in the TIGER/Line(TM) files, is a three-character code; the first character is a letter describing the feature class; the second character is a number describing the major category; and the third character is a number describing the minor category.

A - Roads  
B - Railroad - Ground Transportation  
D - Landmarks  
E - Physical Features  
F - Non Visible Features  
H - Hydrography  
X - NonClassified

### Feature Class A, Road

The definition of a divided highway has been the source of considerable discussion. Earlier specifications have defined a "divided" road as having "... opposing traffic lanes that are physically separated by a median strip no less than 70 feet wide in former GBF/DIME areas or no less than 200 feet wide in nonGBF/DIME areas." This definition caused confusion in the proper coding of interstates having narrow medians. To clarify the situation, the Census Bureau now uses the term "divided" to refer to a road with opposing traffic lanes separated by any size median, and "separated" to refer to lanes that are represented in the Census TIGER data base as two distinct complete chains.

Earlier operations may have depicted widely separated lanes as a single line in the data base or created separate lines when the median was small, depending on the available source used during the update. The term "rail line in center" indicates that a rail line shares the road right-of-way. The rail line may follow the center of the road or be directly next to the road, representation is dependent upon the available source used during the update. The rail line can represent a railroad, a street car line, or other carline.

### Road With Major Category Unknown [A00-A08]

Source materials do not allow determination of the major road category. These codes should not, under most circumstances, be used since the source materials usually provide enough information to determine the major category.

A00 Road, major and minor categories unknown  
A01 Road, unseparated  
A02 Road, unseparated, in tunnel  
A03 Road, unseparated, underpassing  
A04 Road, unseparated, with rail line in center  
A05 Road, separated  
A06 Road, separated, in tunnel  
A07 Road, separated, underpassing  
A08 Road, separated, with rail line in centercategory

### Primary Highway with Limited Access [A10-A18]

This road is distinguished by the presence of interchanges, access to the highway is by way of ramps, and there are multiple lanes of traffic. A road in this category has the opposing traffic



lanes "divided" by a median strip. Interstate highways and some toll highways are in this major category. The TIGER/Line(TM) files may depict the opposing lanes of a road in this category as two distinct lines; in this case the road is called "separated."

A10 Primary road with limited access or interstate highway, major category used alone when the minor category could not be determined

A11 Primary road with limited access or interstate highway, unseparated

A12 Primary road with limited access or interstate highway, unseparated, in tunnel

A13 Primary road with limited access or interstate highway, unseparated, underpassing

A14 Primary road with limited access or interstate highway, unseparated, with rail line in center

A15 Primary road with limited access or interstate highway, separated

A16 Primary road with limited access or interstate highway, separated, in tunnel

A17 Primary road with limited access or interstate highway, separated, underpassing

A18 Primary road with limited access or interstate highway, separated, with rail line in center

### **Primary Road without Limited Access [A20-A28]**

A road in this major category must be hard surface, that is, concrete or asphalt, and may be divided or undivided and have multi-lane or single lane characteristics. This road has intersections with other roads, usually controlled with traffic lights. This major category includes nationally and regionally important highways that do not have limited access as required by major category A1. Thus, major category A2 includes most U.S. and State highways and some county highways that connect cities and larger towns

A20 Primary road without limited access, U.S. and State highway, major category used alone when the minor category could not be determined

A21 Primary road without limited access, U.S. and State highways, unseparated

A22 Primary road without limited access, U.S. and State highways, unseparated, in tunnel

A23 Primary road without limited access, U.S. and State highways, unseparated, underpassing

A24 Primary road without limited access, U.S. and State highways, unseparated, with rail line in center

A25 Primary road without limited access, U.S. and State highways, separated

A26 Primary road without limited access, U.S. and State highways, separated, in tunnel

A27 Primary road without limited access, U.S. and State highways, separated, underpassing in center

A28 Primary road without limited access, U.S. and State highways, separated, with rail line

### **Secondary and Connecting Road [A30-A38]**

A road in this major category must be hard surface, that is, concrete or asphalt, usually undivided with single lane characteristics. This road has intersections with other roads, controlled with traffic lights and stop signs. This major category includes State and county highways that connect smaller towns, subdivisions, and neighborhoods, thus the road is smaller than a road in major category A2. This road, usually with a local name along with a route number, intersects with many other roads and driveways.

A30 Secondary and connecting road, State and county highways, major category used alone when the minor category could not be determined

A31 Secondary and connecting road, State and county highways, unseparated

A32 Secondary and connecting road, State and county highways, unseparated, in tunnel

A33 Secondary and connecting road, State and county highways, unseparated, underpassing

A34 Secondary and connecting road, State and county highways, unseparated, with rail line in center

A35 Secondary and connecting road, State and county highways, separated

A36 Secondary and connecting road, State and county highways, separated, in tunnel

A37 Secondary and connecting road, State and county highways, separated, underpassing

A38 Secondary and connecting road, State and county highway, separated, with rail line in center

### **Local, Neighborhood, and Rural Road [A40-A48]**

A road in this major category is used for local traffic, usually with a single lane of traffic in each direction. In an urban area, this is a neighborhood road and street that is not a thoroughfare belonging in categories A2 or A3. In a rural area, this is a short distance road connecting the smallest towns; the road may or may not have a State or county route number. In addition, this major category includes scenic park roads, unimproved or unpaved roads, and industrial roads. Most roads in the Nation are classified in this major category.

A40 Local, neighborhood, and rural road, city street, major category used alone when the minor category could not be determined

A41 Local, neighborhood, and rural road, city street, unseparated

A42 Local, neighborhood, and rural road, city street, unseparated, in tunnel

A43 Local, neighborhood, and rural road, city street, unseparated, underpassing

A44 Local, neighborhood, and rural road, city street, unseparated, with rail line in center

A45 Local, neighborhood, and rural road, city street, separated

A46 Local, neighborhood, and rural road, city street, separated, in tunnel

A47 Local, neighborhood, and rural road, city street, separated, underpassing

A48 Local, neighborhood, and rural road, city street, separated, with rail line in center

### **Vehicular Trail [A50-A53]**

A road in this major category is usable only by four-wheel drive vehicles and is usually a one lane, dirt trail. The road is found almost exclusively in a very rural area, sometimes the road is called a fire road or logging road and may include an abandoned railroad grade where the tracks have been removed. Minor, unpaved roads usable by ordinary cars and trucks belong in major category A4.

A50 Vehicular trail, road passable only by four-wheel drive (4WD) vehicle, major category used alone when the minor category could not be determined

A51 Vehicular trail, road passable only by 4WD vehicle, unseparated

A52 Vehicular trail, road passable only by 4WD vehicle, unseparated, in tunnel

A53 Vehicular trail, road passable only by 4WD vehicle, unseparated, underpassing

### **Road with Special Characteristics [A60-A65]**

A road, portion of a road, intersection of a road, or the ends of a road that are parts of the vehicular highway system that have separately identifiable characteristics

A60 Road with characteristic unspecified, major category used alone when the minor category could not be determined

A61 Cul-de-sac, the closed end of a road that forms a loop or turn around (the node symbol that appears on some census maps is not included in the TIGER/Line(TM) files)

A62 Traffic circle, the portion of a road or intersection of roads that form a roundabout (the node symbol that appears on some census maps is not included in the TIGER/Line(TM) files)

A63 Access ramp, the portion of a road that forms a cloverleaf or limited access interchange (the node symbol that appears on some census maps is not included in the TIGER/Line(TM) files)

A64 Service drive, the road or portion of a road that provides access to businesses, facilities, and rest areas along a limited access highway, this frontage road may intersect other roads and be named

A65 Ferry crossing, the portion of a road over water that consists of ships, carrying automobiles, connecting roads on opposite shores

### **Road as Other Thoroughfare [A70-A73]**

A road that is not part of the vehicular highway system. This road is used by bicyclists or pedestrians and is typically inaccessible to mainstream motor traffic except by service vehicles. A stair and walkway may follow a road right-of-way and be named as if it were a road. This major category includes foot and hiking trails located on park and forest land.

A70 Other thoroughfare, major category used alone when the minor category could not be determined

A71 Walkway, nearly level road for pedestrians, usually unnamed

A72 Stairway, stepped road for pedestrians, usually unnamed

A73 Alley, road for service vehicles, usually unnamed, located at the rear of buildings and property

## **Feature Class B, RAILROAD & Ground Transportation**

### **Railroad With Major Category Unknown [B00-B03]**

Source materials do not allow determination of the major railroad category. These codes should not, under most circumstances, be used since the source materials usually provide enough information to determine the major category.

B00 Railroad, major and minor categories unknown

B01 Railroad track, not in tunnel or underpassing, major category used alone when the minor category could not be determined

B02 Railroad track, in tunnel

B03 Railroad track, underpassing

### **Railroad Main Line [B10-B13]**

A railroad in this major category is the primary track that provides service between destinations. A main line track often carries the name of the owning and operating railroad company.

B10 Railroad main track, major category used alone when the minor category could not be determined

B11 Railroad main track, not in tunnel or underpassing

B12 Railroad main track, in tunnel

B13 Railroad main track, underpassing

### **Railroad Spur [B20-B23]**

A railroad in this major category is the track that leaves the main track, ending in an industrial park, factory, or warehouse area or forming a siding along the main track.

B20 Railroad spur track, major category used alone when the minor category could not be determined

B21 Railroad spur track, not in tunnel or underpassing

B22 Railroad spur track, in tunnel

B23 Railroad spur track, underpassing

### **Railroad Yard [B30-B33]**

A railroad yard track has parallel tracks that form a working area for the railroad company. Train cars and engines are repaired, switched, and dispatched from a yard.

B30 Railroad yard track, major category used alone when the minor category could not be determined

B31 Railroad yard track, not in tunnel or underpassing

B32 Railroad yard track, in tunnel

B33 Railroad yard track, underpassing

### **Railroad with Special Characteristics [B40]**

A railroad or portions of a railroad track that are parts of the railroad system and have separately identifiable characteristics.

B40 Railroad ferry crossing, the portion of a railroad over water that consists of ships, carrying train cars to connecting railroads on opposite shores. These are primarily located on the Great Lakes.

### **Railroad as Other Thoroughfare [B50-B52]**

A railroad that is not part of the railroad system. This major category is for a specialized rail line or railway that is typically inaccessible to mainstream railroad traffic.

B50 Other rail line, major category used alone when the minor category could not be determined

B51 Carline, a track for street cars, trolleys, and other mass transit rail systems, used when the carline is not part of the road right-of-way

B52 Cog railroad, incline railway, or logging tram

## **Feature Class C, Miscellaneous Ground Transportation**

### **Miscellaneous Ground Transportation With Category Unknown [C00]**

Source materials do not allow determination of the miscellaneous ground transportation category. This code should not, under most circumstances, be used since the source materials usually provide enough information to determine the major category.

C00 Miscellaneous ground transportation, not road or railroad, major and minor categories unknown

### **Pipeline [C10]**

Enclosed pipe, carrying fluid or slurry, situated above ground or, in special conditions, below ground when marked by a cleared right-of-way and signage.

C10 Pipeline, major category used alone

### **Power Transmission Line [C20]**

High voltage electrical line, on towers, situated on cleared right-of-way.

C20 Power transmission line, major category used alone

### **Miscellaneous Ground Transportation with Special Characteristics [C30-C31]**

A portion of a ground transportation system that has separately identifiable characteristics. This major category is for specialized transportation, usually confined to a local area, that is separate from other ground transportation.

C30 Other ground transportation that is not a pipeline or a power transmission line. The major category is used alone when the minor category could not be determined.

C31 Aerial tramway, monorail, or ski lift

## **Feature Class D, Landmark**

Definition Applicable to Landmark. Landmark is the general name given to a cartographic or locational landmark, a land use area, and a key geographic location. A cartographic landmark is identified for use by an enumerator while working in the field. A land use area is identified in order to minimize enumeration efforts from where people are restricted or nonexistent. A key geographic location is identified in order to more accurately geocode and enumerate a place of work or place of residence. TIGER/Line(TM) files contain only cartographic landmarks or land use areas, if identified within the county area, but not key geographic locations.

### **Landmark With Category Unknown [D00]**

Source materials do not allow determination of the landmark category. This code should not, under most circumstances, be used since the source materials usually provide enough information to determine the major category.

D00 Landmark, major and minor categories unknown

### **Military Installation [D10]**

Base, yard, or depot used by any of the armed forces or the Coast Guard

D10 Military installation or reservation, major category used alone

### **Multihousehold or Transient Quarters [D20-D29]**

D20 Multihousehold or transient quarters, major category used alone when the minor category could not be determined

D21 Apartment building or complex

D22 Rooming or boarding house

D23 Trailer court or mobile home park

D24 Marina

D25 Crew of vessel

D26 Housing facility for workers

D27 Hotel, motel, resort, spa, YMCA, or YWCA

D28 Campground

D29 Shelter or mission

### **Custodial Facility [D30-D37]**

This major category is for an institution that maintains guards, nurses, caretakers, and so forth to preserve the welfare of those individuals resident in the facility.

D30 Custodial facility, major category used alone when the minor category could not be determined

D31 Hospital

D32 Halfway house

D33 Nursing home, retirement home, or home for the aged

D34 County home or poor farm

D35 Orphanage

D36 Jail or detention center

D37 Federal penitentiary, State prison, or prison farm

### **Educational or Religious Institution [D40-D44]**

D40 Educational or religious institution, major category used alone when the minor category could not be determined

D41 Sorority or fraternity

D42 Convent or monastery

D43 Educational institution, including academy, school, college, and university

D44 Religious institution, including church, synagogue, seminary, temple, and mosque

### **Transportation Terminal [D50-D55]**

The facility where transportation equipment is stored, the destination for travel on the transportation system, or the intermodal connection facility between transportation systems.

D50 Transportation terminal, major category used alone when the minor category could not be determined

D51 Airport or airfield

D52 Train station

D53 Bus terminal

D54 Marine terminal

D55 Seaplane anchorage

### **Employment Center [D60-D66]**

This major category is for a location with high density employment.

D60 Employment center, major category used alone when the minor category could not be determined

D61 Shopping center or major retail center

D62 Industrial building or industrial park

D63 Office building or office park

D64 Amusement center

D65 Government center

D66 Other employment center

### **Tower [D70-D71]**

D70 Tower, major category used alone when the minor category could not be determined

D71 Lookout tower

### **Open Space [D80-D85]**

This major category contains areas of open space with no inhabitants or with inhabitants restricted to known sites within the area.

D80 Open space, major category used alone when the minor category could not be determined

D81 Golf course

D82 Cemetery

D83 National park or forest

D84 Other Federal land

D85 State or local park or forest

### **Special Purpose Landmark [D90-D91]**

Use this category for landmarks not otherwise classified.

D90 Special purpose landmark, major category used alone when the minor category could not be determined

D91 Post office box ZIP Code(R)

## **Feature Class E, Physical Feature**

### **Physical Feature With Category Unknown**

Source materials do not allow determination of the physical feature category. This code should not, under most circumstances, be used since the source materials usually provide enough information to determine the major category.

E00 Physical feature, tangible but not transportation or hydrographic. The major and minor categories are unknown.

### **Fence**

This major category describes a fence that separates property. For example, a fence around a military reservation or prison separates the reservation from civilian land, thus, a fence line is a property line marked by a fence.

E10 Fence line locating a visible and permanent fence between separately identified property

### **Topographic Feature**

This category refers to topographical features that may be used as boundaries or as a reference for an area. The Census TIGER data base contains topographic features used to define the limits of statistical entities in locations where no other visible feature could be identified.

E20 Topographic feature, major category used when the minor category could not be determined

E21 Ridge line, the line of highest elevation of a linear mountain

E22 Mountain peak, the point of highest elevation of a mountain

## **Feature Class F, Nonvisible Features**

Definition Applicable to Nonvisible Features. Nonvisible features are used to delimit tabulation entities, property areas, and legal and administrative entities. The Census Bureau separately identifies nonvisible boundaries only when they do not follow a visible feature such as a road, stream, or ridge line.

### **Nonvisible Boundary With Classification Unknown or Not Elsewhere Classified [F00]**

F00 Nonvisible boundary, major and minor categories unknown

### **Nonvisible Legal or Administrative Boundary [F10-F15]**

This major category refers to nonvisible boundaries of legal or administrative areas.

F10 Nonvisible jurisdictional boundary of a legal or administrative entity, major category used when the minor category could not be determined

F11 Offset boundary of a legal or administrative entity

F12 Corridor boundary of a legal or administrative entity

F13 Interpolated boundary of a legal or administrative entity used for closure through hydrological areas

F14 Superseded legal or administrative boundary

F15 Superseded legal or administrative boundary, corrected through post census process



### **Nonvisible Features for Data Base Topology [F20-F25]**

This category contains various types of nonvisible lines used to maintain the topology in the Census TIGER data base.

F20 Nonvisible feature for data base topology, major category used when the minor category could not be determined

F21 Automated feature extension to lengthen existing physical feature

F22 Irregular feature extension, determined manually, to lengthen existing physical feature

F23 Closure extension to complete data base topological closure between extremely close features (used to close small gaps between complete chains and create polygons to improve block labeling on cartographic products)

F24 Nonvisible separation line used with offset and corridor boundaries

F25 Nonvisible centerline of area enclosed by corridor boundary

### **Point-to-Point Line [F30]**

F30 Point-to-point line, follows a line of sight and should not cross any visible feature, for example, from the end of a road to a mountain peak.

### **Property Line [F40]**

F40 Property line, nonvisible boundary of either public or private lands, e.g., a park boundary

### **ZIP Code(R) Boundary [F50]**

F50 ZIP Code(R) boundary, reserved for future use in delineating ZIP Code(R) Tabulation Areas

### **Map Edge [F60]**

F60 Map edge, now removed, used during data base creation

### **Nonvisible Statistical Boundary [F70-F74]**

F70 Statistical boundary, major category used when the minor category could not be determined

F71 1980 statistical boundary

F72 1990 statistical boundary, used to hold collection and tabulation census block boundaries not represented by existing physical features

F73 1990 statistical boundary and extent of land use, it is not classifiable as a physical feature

F74 1990 statistical boundary, used to hold a tabulation census block boundary not represented by an existing physical feature

### **Nonvisible Other Tabulation Boundary [F80-F82]**

F80 Nonvisible other tabulation boundary, major category used when the minor category could not be determined

F81 School district tabulation boundary

F82 Special census tabulation boundary

## **Feature Class H, Hydrography**

### **Basic Hydrography [H00-H02]**

This category includes shorelines of all water regardless of the classification of the water itself.

H00 Water feature, classification unknown or not elsewhere classified

H01 Shoreline of perennial water feature

H02 Shoreline of intermittent water feature

### **Naturally Flowing Water features [H10-H13]**

H10 Stream, major category used when the minor category could not be determined

H11 Perennial stream or river

H12 Intermittent stream, river, or wash

H13 Braided stream or river

### **Man-Made Channel to Transport Water [H20-H22]**

These features are used for purposes such as transportation, irrigation, or navigation.

H20 Canal, ditch, or aqueduct, major category used when the minor category could not be determined

H21 Perennial canal, ditch, or aqueduct

H22 Intermittent canal, ditch, or aqueduct

### **Inland Body of Water [H30-H32]**

H30 Lake or pond, major category used when the minor category could not be determined

H31 Perennial lake or pond

H32 Intermittent lake or pond

### **Man-Made Body of Water [H40-H42]**

H40 Reservoir, major category used when the minor category could not be determined

H41 Perennial reservoir

H42 Intermittent reservoir

### **Seaward Body of Water [H50-H53]**

H50 Bay, estuary, gulf, sound, sea, or ocean, major category used when the minor category could not be determined

H51 Bay, estuary, gulf, or sound

H53 Sea or ocean

### **Body of Water in a Man-Made Excavation [H60]**

H60 Gravel pit or quarry filled with water

### **Nonvisible Definition Between Water Bodies H70-H74]**

The Census Bureau digitizes nonvisible definition boundaries to separate named water areas, for instance, an artificial boundary is drawn to separate a named river from the connecting bay.

H70 Nonvisible water area definition boundary, used to separate named water areas and as the major category when the minor category could not be determined

H71 USGS closure line, used as maritime shoreline

H72 Census water center line, computed to use as median positional boundary

H73 Census water boundary, international in waterways or at 12-mile limit, used as area measurement line

H74 Census water boundary, separates inland from coastal or Great Lakes, used as area measurement line

H75 Census water boundary, separates coastal from territorial at 3-mile limit, used as area measurement line

### **Special Water Feature [H80-H81]**

Includes area covered by glaciers or snow fields.

H80 Special water feature, major category used when the minor category could not be determined

H81 Glacier

### **Feature Class X, Not Yet Classified [X00]**

Classification Unknown or Not Elsewhere Classified:

X00 Feature not yet classified

## **APPENDIX H – Underlay File Format**

### **UNDERLAY FILE FORMAT**

Each underlay image (256-color .BMP file) must have an associated .SAT file that contains the reference coordinates for the image. The ASCII text file contains the northwest corner coordinates followed by the southeast corner coordinates. The .SAT file must be saved with the same name as the graphic image, but with a .SAT extension (e.g. hoover.bmp would require a hoover.sat). The .SAT file layout is DD.dddd format imported as a double: UpperLON, UpperLAT, LowerLON, LowerLAT.

## **APPENDIX I – Autoload.Cty File Format**

### **FORMAT OF AUTOLOAD.CTY**

An external file, AUTOLOAD.CTY, may now be used to locate user defined place names on the map (to add places that may not be in the GNIS database used in our data). This is a plain ASCII file, two lines per place, with the structure described below.

Line-1: CTY "PlaceName" "State" Population Elevation

Line-2: Longitude Latitude

The quotes around PlaceName and State are optional, however, they are required if the PlaceName definition contains multiple words (separated with spaces, commas, etc.). State is the proper two-letter state abbreviation.

This file needs to be in the same path as the application, and it gets loaded automatically when the application is started.

The data becomes visible at scales below 2 miles, and is included in the search used by the ExecDialog, FindPlace and FindClosestPlace methods of the OCX.

# APPENDIX J – CMX File Format

## CMX FILE FORMAT

This file format is used to export/import user designed overlays from/to Precision Mapping Streets Ver 4.0 and 5.0, and the MAPPRO40.OCX (v4.00.03) and MAPPRO50.OCX mapping control from Chicago Map Corp.

The format consists of a header and a series of keyword "elements" with the required information for each element, as described below. Please, note that text between the dashed lines below is only for information purposes, and not part of the CMX file format.

### HEADER Information

Required text at the beginning of the file. It describes the type of data file. Files created by subsequent releases of the program would possibly use a slightly modified header.

```
CHICAGO MAP EXCHANGE FORMAT v40
REAL
DATA
```

### LINE Element

Defined by two end-points  $x1,y1$  and  $x2,y2$  and a set of brush and pen attributes. The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

```
Line X1,Y1 X2,Y2
Pen(Style,Thickness,Color)
Brush(Pattern,Color)
```

### PLINE (Polyline) Element

Defined by a number of contiguous straight line segments (two end-points each) and a set of brush and pen attributes. Up to 100 line segments may be joined. If  $X1,Y1$  and  $Xn,Yn$  are identical, the Pline forms a closed polygon that may have a fill pattern (based on the Brush attributes). The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

```
Pline N
X1,Y1
X2,Y2
.....
Xn,Yn
Pen(Style,Thickness,Color)
Brush(Pattern,Color)
```

### ELLIPSE Element

Defined by a center point  $(x1,y1)$ , a point on the circumference  $(x2,y2)$ , and a set of brush and pen attributes. The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

```
Ellipse
X1,Y1
X2,Y2
Pen(Style,Thickness,Color)
Brush(Pattern,Color)
```

### BEZIER Element

Defined by two end-point (x1,y1 and x2,y2), an inflection point (x3,y3) and a set of brush and pen attributes. The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

```
Bezier  
  
X1, Y1  
X2, Y2  
X3, Y3  
Pen(Style, Thickness, Color)  
Brush(Pattern, Color)
```

### **TEXT Element**

Defined by an X,Y coordinate, the user specified string (or road name when using the label command), the text size (in degrees latitude multiplied by 1.0E+06 and divided by 64 for internal unit consistency, see note below), text rotation angle (degrees, clockwise from due East), and a set of brush and pen attributes. The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

\* Note: The user should remember that the size given here is for the bounding box, including descenders, etc. For example, if the desired text bounding box size (height) was 0.35 degrees, then the CMC entry for the Text element size value would be:  $0.35 * (1000000/64) = 5469$

Also, note the 0,0 entry following the X1,Y1 coordinates below. It's reserved, required, and is always 0,0.

```
Text  
X1, Y1  
0, 0  
Str("Enter Sample Text here", TextSize, TextAngle)  
Pen(Style, Thickness, Color)  
Brush(Pattern, Color)
```

### **MCIRCLE Element**

Mercator circle, defined by a center point (x1,y1), a point on the circumference (x2,y2), and a set of brush and pen attributes. The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

```
Mcircle  
X1, Y1  
X2, Y2  
Pen(Style, Thickness, Color)  
Brush(Pattern, Color)
```

### **MLINE Element**

Mercator Line, defined by two end-points (x1,y1 and x2,y2), and a set of brush and pen attributes. The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

```
Mline  
X1, Y1  
X2, Y2  
Pen(Style, Thickness, Color)  
Brush(Pattern, Color)
```

### **META Element**

Symbol elements in the Precision Mapping Symbol library. Defined by an point (x1,y1), X and Y size of bounding rectangle (in degrees latitude and longitude, respectively, multiplied by 1.0E+06 and divided by 64 for internal unit consistency, similar to the Text element entry), the internal name of the individual metafile (built into the Precision Mapping library see note further down), a rotation angle (degrees, clockwise from due East), and a set of brush and pen attributes. The pen and brush attributes are described at the end of the format description, prior to the sample file listing.

```
Meta X1,Y1 ScaleX,ScaleY Name("FileName.WMF",RotationAngle)
Pen(Style,Thickness,Color) Brush(Pattern,Color)
```

### **GROUP Element**

Simply specifies that the preceding "N" elements are grouped together in a composite element.

```
Group N
Pen(Style,Thickness,Color)
Brush(Pattern,Color)
```

\*\* Note that the Pen and brush information for this element is redundant and has NO effect on the individual Group Elements.

### **Pen(Style,Thickness, Color)**

*Pen Style:* An index number pointing to line styles array shown below.

- 0: Solid
- 1: Dash
- 3: Dot
- 4: Dash-Dot
- 5: Dash-Dot-Dot
- 6: Clear
- 7: Inside Frame

*Pen thickness:* 0-15 pixels

*Pen Color:* 0-15 system colors

### **Brush(Pattern, Color)**

*Brush Pattern:* Index pointing to fill pattern array.

- 0: Clear
- 1: Solid
- 3: Horizontal
- 4: VErtical
- 5: Forward Diagonal
- 6: Backward Diagonal
- 7: Horizontal Cross
- 8: Diagonal Cross

*Brush Color:* 0-15 system colors

### **Internal Meta file name**



The symbol library distributed with Precision Mapping (PMAP.LIB), contains a total of 92 symbol meta files. The names of the files are 001.WMF to 092.WFM in the order in which they appear in the toolbox when invoked in Precision Mapping streets. For example, 009.WMF would refer to the symbol of the worker with the shovel, 018.WMF would be the hi-rise building, etc.

### Sample CMX File #1

```
CHICAGO MAP EXCHANGE FORMAT v40
REAL
DATA
Pline 5
-88.485504,41.917952
-88.485504,41.910848
-88.477824,41.910848
-88.477824,41.917952
-88.485504,41.917952
  Pen(0,0,0)
  Brush(4,0)

Ellipse
-88.473460,41.913998
-88.469620,41.917838
  Pen(0,0,9)
  Brush(7,12)
Pline 4
-88.464128,41.916672
-88.468608,41.912896
-88.463104,41.910912
-88.464128,41.916672
  Pen(0,0,0)
  Brush(0,0)
Bezier
-88.460350,41.910745
-88.458773,41.917842
-88.462322,41.918334
  Pen(0,0,0)
  Brush(0,0)
Pline 4
-88.455424,41.912896
-88.452864,41.918848
-88.452096,41.913216
-88.449280,41.917440
  Pen(0,0,0)
  Brush(0,0)
Text
-88.489428,41.905521
  0.0, 0.0
  Str("Sample Text Entry",25,0)
  Pen(0,0,0)
  Brush(0,0)
Text
-88.477173,41.902645
  0.0, 0.0
  Str("SampleTextObject",0,0)
  Pen(0,0,0)
  Brush(0,0)
Meta
-88.467349,41.920996
36.62551,25.55604
  Name("003.WMF",339)
  Pen(0,0,0)
  Brush(0,0)
Meta
-88.460646,41.921094
48.22439,46.78055
  Name("002.WMF",0)
  Pen(0,0,0)
  Brush(0,0)
Line
```

```

-88.482478,41.924345
-88.478421,41.921235
  Pen(0,0,9)
  Brush(5,12)
Line
-88.491596,41.914885
-88.484105,41.920996
  Pen(0,0,0)
  Brush(0,0)
Pline 5
-88.498368,41.924096
-88.498368,41.918016
-88.491776,41.918016
-88.491776,41.924096
-88.498368,41.924096
  Pen(0,0,9)
  Brush(7,12)
Pline 4
-88.495040,41.918080
-88.497984,41.912960
-88.492096,41.912960
-88.495040,41.918080
  Pen(15,0,11)
  Brush(5,15)
Group 3
  Pen(6,1,0)
  Brush(5,0)

```

## Sample CMX File #2

```

CHICAGO MAP EXCHANGE FORMAT
REAL
DATA

Line
-132.926549,57.492981
-57.271921,13.989185
  Pen(0,5,0)
  Brush(0,0)
Line
-132.831146,13.989185
-57.176518,57.302175
  Pen(0,5,0)
  Brush(0,0)
Ellipse
-94.956130,35.645680
-89.518178,41.083632
  Pen(0,3,12)
  Brush(0,0)
Text
-95.433146,26.582389
  0.0, 0.0
  Str("Sample Text (Yellow)",23851,0)
  Pen(0,3,14)
  Brush(5,0)
Pline 5
-110.411426,39.080190
-110.411426,32.688185
-103.351600,32.688185
-103.351600,39.080190
-110.411426,39.080190
  Pen(0,3,14)
  Brush(5,0)
Meta
-80.264059,36.504308
29533.95563,31956.29900
  Name("009.WMF",0)
  Pen(0,3,14)
  Brush(5,0)
Line
-113.220141,53.805239
-105.702091,46.287189
  Pen(0,0,0)

```

```
Brush(0,0)
Line
-105.702091,46.287189
-101.525397,55.371500
Pen(0,0,0)
Brush(0,0)
Line
-101.525397,55.371500
-96.408946,45.347433
Pen(0,0,0)
Brush(0,0)
Line
-96.408946,45.347433
-91.501330,54.327326
Pen(0,0,0)
Brush(0,0)
Line
-91.501330,54.327326
-87.429052,45.138598
Pen(0,0,0)
Brush(0,0)
Line
-87.429052,45.138598
-81.894932,53.805239
Pen(0,0,0)
Brush(0,0)
Line
-81.894932,53.805239
-77.509403,45.973937
Pen(0,0,0)
Brush(0,0)
Pline 5
-134.312449,41.170738
-134.312449,27.387646
-118.858679,27.387646
-118.858679,41.170738
-134.312449,41.170738
Pen(0,0,0)
Brush(0,0)
Line
-127.420903,43.676755
-127.420903,24.672795
Pen(0,0,0)
Brush(0,0)
Bezier
-119.171931,41.066321
-134.416866,41.066321
-134.312449,27.492064
Pen(0,0,0)
Brush(0,0)
Group 3
Pen(8,1,13)
Brush(4,10)
```

## APPENDIX K - Street Editing Mode

### STREET EDITTING MODE

A mode was created in the OCX for adding/deleting or editing user defined street segments. The mode is invoked by setting MapMode=2.

- f) When the mode is invoked, the cursor changes to a plain cross-hair, that can be used to locate vertices of a new street segment.
- g) As the cursor moves around, a circle of "snap" or "attach" influence can be seen tracking the cursor movement always being on an existing road segment. If the cursor is inside this influence circle, when the left mouse button is clicked, then the current vertice will attach (snap) to the existing road point in the circle.
- h) The user may continue to press the left mouse button and define new vertices (belonging to the same street polyline) at will. When the desired number of vertices have been defined, the user may press the right mouse button to signify completion of the current street polyline definition.
- i) It should be noted that when the Street editing mode is invoked, all user-defined road segments become cyan for better/quicker identification.
- j) When the right mouse button is pressed, a dialog appears that permits the user to specify the name for the created segment, as well as to assign the desired road attribute. The options available in this dialog are:



**(File) New** Clears all currently defined segments from memory (make certain you have saved any road segments you want, prior to selecting this command ).

**(File) Open** Load a user specified external roads file, (see further down for file structure). Note that this operation will erase ALL user-defined segments currently in memory before loading the specified roads file (also see File, Merge.)

**(File) Save** The user may save the currently defined street segments to a file (the extension .STR is automatically appended)

**(File) Merge** Load a user specified external roads file, (see further down for file structure). Note that this operation will does NOT erase-user defined segments currently in memory but merges them with the ones loaded from the specified file.

**(File) Exit** Close the street editing dialog (note that this does NOT cancel the street editing mode, which can only be done by setting the appropriate MapMode value.)

**(Options) ZoomAll** Zooms the view port to the extents of all User Defined streets currently in memory.

**(Options) Attach** Toggles the display and operation of the "attach" circle on or off.

**(Options) Ortho** When toggled on, only horizontal and vertical street orientations are permitted.

**Name** This is the name assigned to the current road segment by the user. It's used to label the road segment, search for it, etc. (Note: When searching for streets, these road segments are identified as "User Defined" in the listbox that appears in the search dialog.)

**Road Type** Five Road types are allowed. The descriptions of these types in the dialog are self-explanatory.

**Add [Button]** Adds a newly defined road segment to the list of road segments already in memory. Note that these segments are NOT saved unless the File, Save command (from this dialog) is executed.

**Modify [Button]** Replaces the attributes of the currently selected road segment with new ones specified in the dialog.

**Delete [Button]** Deletes the currently selected road segment from the list of segments in memory (but not from a file such segments have been saved in, unless the File, Save command is executed subsequent to the deletion). Note the segments are selected by holding down the Shift when clicking the left mouse button.

**Cancel [Button]** Close the street editing dialog (note that this does NOT cancel the street editing mode, which can only be done by setting the appropriate MapMode value.)

- k) A defined road segment is selected for editing, or deletion, by placing the cursor on the segment and pressing the left mouse button while holding down the Shift key. The selected road segment will assume flashing highlight attribute to clearly show the used that it is being modified
- l) The user-created road segments are NOT visible at scales above the Tiger Street level scale, i.e. about 2 miles. Also, the editing mode should not be activated if the current scale is not at the Tiger street level scale or lower.
- m) The number of road segments that can be loaded at any given time is 50,000.
- n) User defined road segments may be "searched for" using the standard searching techniques of MAPPRO, by specifying the assigned street name.

- o) While in the street editing mode, road segment vertices may be moved by placing the mouse cursor on them, and holding down the control key and the left mouse button. This action engages the vertex which may then be dynamically moved to a new location. When the mouse button is released, the new location of the vertex becomes permanent.

### **User-Created Street file format (plain text)**

```
Street File:Chicago Map Corporation
STR "RoadName/SecondaryFileName" Class N
x1 y1
x2 y2
...
...
xN yN
```

where: *First Line is an identifying header line*

*STR* - Keyword used internally

*RoadName* - Name specified for the road by the user. Used for display and search purposes. Note that a secondary name may also be specified using the slash character as a separator.

*Class* - 50: Interstate  
59: Primary Highway  
68: Major Road  
77: Minor Road  
93: Ramp

*N* - Number of points for this Road segment

*x1, y1* - The longitude and latitude (x and y) coordinates for each of the segments defining this road (in decimal degree units). It should be noted that streets files created with earlier releases of MAPPRO40.OCX, i.e., without the header line and using internal coordinates, may still be read by the OCX transparently.

### **Sample File**

```
Street File:Chicago Map Corporation
STR "I-440" 50 2
-92.163200 34.775040
-92.163072 34.780928
STR "S70/Scenic Route" 59 5
-92.199424 34.766656
-92.194752 34.762752
-92.187072 34.762816
-92.184384 34.766912
-92.187392 34.770560
STR "Rt61/Main Street" 68 5
-92.200192 34.775744
-92.205056 34.775744
-92.206400 34.777280
-92.207616 34.781440
-92.204352 34.782528
STR "My Street" 77 8
-92.201856 34.773888
```

```
-92.202688 34.774848
-92.206080 34.774592
-92.208384 34.776768
-92.209216 34.778112
-92.210432 34.777280
-92.208640 34.775296
-92.210304 34.774912
STR "Exit-001" 93 4
-92.196736 34.764416
-92.196736 34.766144
-92.196160 34.767424
-92.194944 34.769280
```

### **Using the AUTOLOAD.STR file**

The AUTOLOAD.STR file, is a file containing user-defined streets, and as the name indicates, is automatically loaded when an application using MAPPRO40.OCX is started, if found in the default directory. Its loading is transparent.

Once the application is started, if the user invokes the street editing mode, it will be apparent that the AUTOLOAD.STR is loaded, as the New Road counter (next the dialog caption) will display the streets loaded from AUTOLOAD.STR.

If new streets are added, then the above counter will advance, and if the user saves the file, both the streets loaded from AUTOLOAD.STR and the newly added ones will be saved in the user-specified file. So, if the user re-started the application 5 times adding new streets in each session and saving each session to a different file, each file would also contain whatever streets were loaded from AUTOLOAD.STR.

That would be fine, if that's what the user intended to do. However, if the intent is to have different files containing new streets for "specific" areas, in order to avoid having the duplicity of the data in AUTOLOAD.STR in each of the generated files, here is what the user should do:

- (1) If practical, the AUTOLOAD.STR street can be temporarily renamed, while the creation of such files takes place, or
- (2) Prior to starting the generation of each of these "regional" or otherwise "specific" files, the Street editing mode should be started and the File, New command should be executed (making sure, of course, that any needed data is stored as desired by the user).
- (3) When all new streets have been designed/created and saved to individual .STR files, the final step might be to add the changes to the AUTOLOAD.STR file. To do that:
  - a. Exit the application.
  - b. Restore the AUTOLOAD.STR name (if you want to add the changes to the existing AUTOLOAD.STR data)
  - c. Restart the application
  - d. Use File, Import (from the Streets dialog), to load and combine each individual street file.
  - e. Save the combined data with the AUTOLOAD.STR file name.
  - f. Exit and restart the application.

# APPENDIX L - Delphi Code Examples

## Delphi Code Examples

This appendix contains a number of Delphi source code snippets for performing useful operations, while using the MapPro.OCX.

### Printing to A printer Using DirectDraw

```
//-----  
// Print Displayed Map using the current default printer  
//-----  
var l,t,w,h,r,b,PixPerInX,PixPerInY:integer;  
    margin:real;  
    dc:hdc;  
    syscolors:integer;  
begin  
    Label2.caption:='printing';  
    application.processmessages; // let it paint the control  
  
    // start the print job  
    printer.begindoc;  
    // Lock the printer device canvas to avoid problems  
    printer.canvas.lock;  
  
    dc:=printer.canvas.handle;  
    // Get the horizontal and vertical resolution for the device  
    pixperinx:=getdevicecaps(dc,logpixelsx);  
    pixperiny:=getdevicecaps(dc,logpixelsy);  
    syscolors:=getdevicecaps(dc,NUMCOLORS); //new for info  
    labell1.caption:=inttostr(syscolors);  
  
    // L,T : Left and top margins, set to x.xx inches  
    Margin:=0.7;  
    L:=round(Margin*pixperinx);  
    T:=round(Margin*pixperiny);  
  
    // R,B : Right and Bottom margins, set to 2 inches  
    R:=round(Margin*pixperinx);  
    B:=round(Margin*pixperiny);  
  
    // w,h: Width and height of print  
    w:=printer.pagewidth-L-R;  
    h:=printer.pageheight-T-B;  
    // Make sure dimensions are at least 300x300 pixels  
    if (w>300) and (h>300) then  
    begin  
        // Print color map: clear, scale, Mono  
        pmap61.directdraw(dc,L,T,W,H,true,true,true);  
        messagebeep(31);  
        // Print border around map  
        with printer.canvas do  
        begin  
            brush.style:=tbrushstyle(bsclear);  
            pen.width:=3;
```



```

        pen.color:=clblack;
    end;
    rectangle(dc,L,T,L+W,T+H);
end;
printer.canvas.unlock;
printer.enddoc;
label2.caption:='Done';
label2.update;
end;

```

### **Saving to a Meta File**

implementation

```
{ $R *.DFM }
```

```
const inn:integer=0;
      SetUserPoint:boolean=false;
```

```
procedure TForm1.Button1Click(Sender: TObject);
```

```
var metadc,MetaHn:integer;
```

```
    d,metarect:trect;
```

```
begin
```

```
    // You could use this to create a memory file, if you wanted, and then
```

```
    // manipulate it as needed
```

```
    // MetaDc:=CreateEnhMetaFile(canvas.handle,nil,nil,nil);
```

```
    //--
```

```
    // Or, this one so that you can create an external MetaFile
```

```
    // Create an enhanced meta file canvas and get the dc to it
```

```
MetaDc:=CreateEnhMetaFile(canvas.handle,'Test.wmf',nil,nil);
```

```
    //--
```

```
    // Use DirectDraw to draw the image on the metafile canvas.
```

```
    // (Note that you need to set the appropriate options, depending on
```

```
    // aht your desired outcome is) This is without scaling.
```

```
MapProl.DirectDraw(MetaDc,0,0,MapProl.width,MapProl.height,true,false,false);
```

```
    // Close the metafile
```

```
MetaHn:=CloseEnhMetaFile(MetaDc);
```

```
    // Set the dimension of the PaintBox so you can play the metafile.
```

```
setrect(metaRect,0,0,MapProl.width,MapProl.height);
```

```
d:=metarect;
```

```
PlayEnhMetaFile(paintbox1.canvas.handle,MetaHn,d);
```

```
    // Delete the enhanced-format metafile handle.
```

```
DeleteEnhMetaFile(metaHn);
```

```
end;
```

```
procedure TForm1.Button2Click(Sender: TObject);
```

```
var metadc,MetaHn:integer;
```

```
    d,metarect:trect;
```

```
begin
```

```
    // You could use this to create a memory file, if you wanted, and then
```

```
    // manipulate it as needed
```

```
    // MetaDc:=CreateEnhMetaFile(canvas.handle,nil,nil,nil);
```

```
    //--
```

```
    // Or, this one so that you can create an external MetaFile
```

```
    // Create an enhanced meta file canvas and get the dc to it
```

```
MetaDc:=CreateEnhMetaFile(canvas.handle,'Test2.wmf',nil,nil);
```

```
    //--
```

```
    // Use DirectDraw to draw the image on the metafile canvas.
```

```

    // (Note that you need to set the appropriate options, depending on
    // that your desired outcome is). This is WITH scaling to show that the
    created
    // output is not grainy, i.e., it is vector, and thus scaled as a vector.

MapProl.DirectDraw(MetaDc,0,0,MapProl.width*2,MapProl.height*2,true,true,false);
// Close the metafile
MetaHn:=CloseEnhMetaFile(MetaDc);
// Set the dimension of the PaintBox so you can play the metafile.
setrect(metaRect,0,0,MapProl.width*2,MapProl.height* 2);
d:=metarect;
PlayEnhMetaFile(paintbox1.canvas.handle,MetaHn,d);
// Delete the enhanced-format metafile handle.
DeleteEnhMetaFile(metaHn);
end;

procedure TForm1.MapProlPaintAfter(Sender: TObject; dc: Integer);
var i:integer;
    x,y:real;
begin
    if SetUserPoint=true then
        begin
            inc(inn);
            for i:=1 to inn do
                begin
                    x:=-100-i*1;
                    y:=40+i*1;
                    MapProl.DrawObject(dc,x,y,2,clblue);
                end;
            listbox1.Items.add(inttostr(i)+' : DC = '+inttostr(dc)+'      x,y =
'+floattostr(x)+' ,'+floattostr(y));
            SetUserPoint:=false;
        end;
    end;

procedure TForm1.Button3Click(Sender: TObject);
begin
    SetUserPoint:=true;
    MapProl.redraw;
end;

```

### **Using DirectView**

```

unit Unit_new1;

interface

uses
    Windows, Messages, SysUtils, Classes, Graphics, Controls, Forms, Dialogs,
    ExtCtrls, StdCtrls, OleCtrls, MapPro61_TLB;

type
    TForm1 = class(TForm)
        Panel1: TPanel;
        Panel2: TPanel;
        Panel3: TPanel;
        Panel4: TPanel;
        Pmap61: TPmap6;
        Panel5: TPanel;
    end;

```

```

    Button1: TButton;
    Image1: TImage;
    ScrollBar1: TScrollBar;
    Label1: TLabel;
    Label2: TLabel;
    Image2: TImage;
    Label3: TLabel;
    Label4: TLabel;
    Button4: TButton;
    Button5: TButton;
    Button2: TButton;
    Button3: TButton;
    Label5: TLabel;
    Button6: TButton;
    Label6: TLabel;
    Panel6: TPanel;
    Image3: TImage;
    Button7: TButton;
    PaintBox1: TPaintBox;
    Image4: TImage;
    procedure ScrollBar1Change(Sender: TObject);
    procedure Pmap61PaintAfter(Sender: TObject; dc: Integer);
    procedure Button1Click(Sender: TObject);
    procedure Button2Click(Sender: TObject);
    procedure Button3Click(Sender: TObject);
    procedure Pmap61MouseMove(Sender: TObject; Shift: TShiftState; X,
        Y: Integer);
    procedure Button4Click(Sender: TObject);
    procedure Button5Click(Sender: TObject);
    procedure Button6Click(Sender: TObject);
    procedure Button7Click(Sender: TObject);
private
    { Private declarations }
    Procedure WmDoWindow(var msg:tmsg);message wm_User+1;
public
    { Public declarations }
    Procedure DoWindow1(image:timage;f:double);
    Procedure MakeSkin(scanvas:tcanvas;s:trect;dcanvas:tcanvas;d:trect);
end;

var
    Form1: TForm1;

implementation

{$R *.DFM}

Procedure TForm1.DoWindow1(image:timage;f:double);
var dc:integer; bmp:tbitmap; x1,y1,x2,y2:double; sf:double;
    sbefore_after:string;
begin
    if image.picture.bitmap.width=0 then
    begin
        bmp:=tbitmap.create;
        bmp.width:=image1.width;
        bmp.height:=image1.height;
        image.picture.bitmap:=bmp;
    end;

    image.picture.bitmap.canvas.lock;

```

```

dc:=image.picture.bitmap.canvas.handle;
with pmap61 do
begin
  x1:=lonleft;
  x2:=lonright;
  y1:=latbottom;
  y2:=lattop;
end;
sf:=pmap61.miles /f;
sbefore_after:=format('%6.2f',[x1]);
pmap61.DirectView(dc,imagel.width,imagel.height,x1,y1,x2,y2,sf);
sbefore_after:=sbefore_after+' / '+format('%6.2f',[x1]);
label6.caption:='In/Out: '+sbefore_after;
imagel.picture.bitmap.canvas.unlock;
imagel.Refresh;
end;

Procedure TForm1.WmDoWindow(var msg:tmsg);
begin
  DoWindow1(imagel,scrollbar1.position);
end;

procedure TForm1.ScrollBar1Change(Sender: TObject);
begin
  labell1.caption:=Inttostr(scrollbar1.position);
  DoWindow1(imagel,scrollbar1.position);
end;

Procedure TForm1.MakeSkin(scanvas:tcanvas;s:trect;dcanvas:tcanvas;d:trect);
var sx,sy,dx,dy:integer;
    ul,uls:trect;

  Procedure Transparent(scanvas:tcanvas;s:trect;dcanvas:tcanvas;d:trect);
  var r:trect; bmp:tbitmap;
  begin
    bmp:=tbitmap.create;
    bmp.pixelformat:=pf24bit;
    bmp.width:=(s.right-s.left);
    bmp.height:=(s.bottom-s.top);
    r:=s;
    offsetrect(r,-r.left,-r.top); // zero bse
    bmp.canvas.copyrect(r,scanvas,s);
    bmp.transparent:=true;
    bmp.transparentcolor:= clblack;
    bmp.transparentmode:=tmFixed ;

    dcanvas.draw(d.left ,d.top,bmp);
    bmp.free;
  end;

begin
  sx:=s.right-s.left;
  sy:=s.bottom-s.top;

  dx:=d.right-d.left;
  dy:=d.bottom-d.top;
  // upper left
  setrect(ul,0,0,dx div 2,dy div 2);
  uls:=ul;

```

```

    Transparent(scanvas,uls,dcanvas,ul);
  //- lower left
  setrect(ul,0,0,dx div 2,dy-dy div 2);
  uls:=ul;
  offsetrect(uls,0,sy-(ul.bottom-ul.top));
  offsetrect(ul,0,dy-(ul.bottom-ul.top));
  Transparent(scanvas,uls,dcanvas,ul);
  //-- upper right
  setrect(ul,0,0,dx-dx div 2,dy div 2);
  uls:=ul;
  offsetrect(uls,sx-(ul.right-ul.left),0);
  offsetrect(ul,dx-(ul.right-ul.left),0);
  Transparent(scanvas,uls,dcanvas,ul);
  //-- lower right
  setrect(ul,0,0,dx-dx div 2,dy-dy div 2);
  uls:=ul;
  offsetrect(uls,sx-(ul.right-ul.left),sy-(ul.bottom-ul.top));
  offsetrect(ul,dx-(ul.right-ul.left),dy-(ul.bottom-ul.top));
  Transparent(scanvas,uls,dcanvas,ul);
end;

procedure TForm1.Pmap61PaintAfter(Sender: TObject; dc: Integer);
var cv:tcanvas;
    d,s:trect;
    x1,x2,y1,y2,factor:double;
    dc3:integer;
begin
  pmap61.SetItem(1,pmap61.LonCenter, pmap61.latcenter);
  pmap61.SetItemBitmap(1,image4.picture.bitmap.handle);

  setrect(d,0,0,pmap61.width,pmap61.height);
  setrect(s,0,0,image2.picture.bitmap.width,image2.picture.bitmap.height);
  cv:=tcanvas.create;
  cv.handle:=dc;
  MakeSkin(image2.picture.bitmap.canvas,s,cv,d);
  cv.free;
  PostMessage(handle,wm_user+1,0,0);
end;

procedure TForm1.Button1Click(Sender: TObject);
begin
  Pmap61.ExecMethod('CONFIG');
end;

procedure TForm1.Button2Click(Sender: TObject);
begin
  Pmap61.ZoomIn;
end;

procedure TForm1.Button3Click(Sender: TObject);
begin
  Pmap61.ZoomOut;
end;

procedure TForm1.Pmap61MouseMove(Sender: TObject; Shift: TShiftState; X,
  Y: Integer);
begin
  label3.caption:=format('%8.6f,%8.6f',[pmap61.xcord,pmap61.ycord]);
end;

```

```

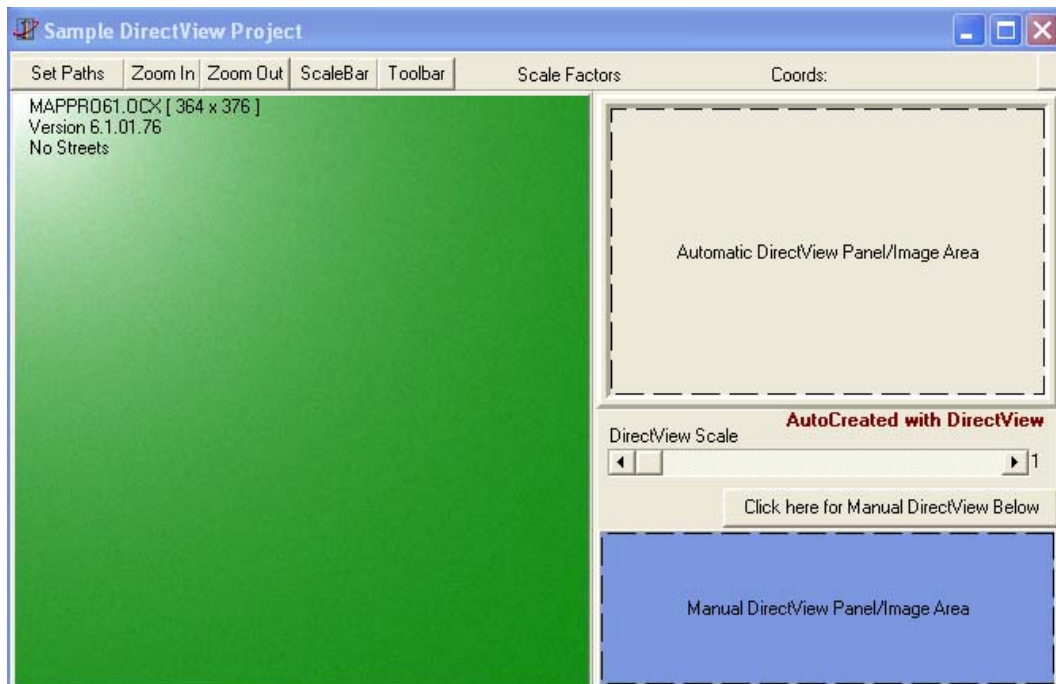
procedure TForm1.Button4Click(Sender: TObject);
begin
  pmap61.ScaleBar:=sbbottomleft;
end;
procedure TForm1.Button5Click(Sender: TObject);
begin
  Pmap61.toolbarmode:=tbfix;
end;

procedure TForm1.Button6Click(Sender: TObject);
begin
  Pmap61.path_states0:='d:\mapdata\statesgdt';
  Pmap61.path_states1:='d:\mapdata\statesgdt';
  Pmap61.path_data1:='d:\mapdata\data1';
  Pmap61.path_data2:='d:\mapdata\data2';
  Pmap61.path_data3:='d:\mapdata\data3';
  Pmap61.DataSource:=2;

end;
procedure TForm1.Button7Click(Sender: TObject);
var x1,x2,y1,y2,factor:double;
    dc3:hdc;
begin
  dc3:=paintbox1.Canvas.Handle;
  paintbox1.Canvas.Lock;
  x1:=pmap61.lonleft;
  x2:=pmap61.lonright;
  y1:=pmap61.latbottom;
  y2:=pmap61.lattop;
  factor:=pmap61.miles*0.4;
  pmap61.DirectView(dc3,PaintBox1.width,Paintbox1.height,x1,y1,x2,y2,factor);
  PaintBox1.canvas.unlock;

end;
end.

```



Delphi DirectView Project Form

# APPENDIX M - Enumerated Properties & Record Structures

## **TxDegFormat**

dfDMS = 0  
dfDEC = 1  
dfDECMIN = 2

## **TxRasterOps**

RopBlack = 1  
RopNotMergePen = 2  
RopMaskNotPen = 3  
RopNotCopyPen = 4  
RopMaskPenNot = 5  
RopNot = 6  
RopXor = 7  
RopNotMaskPen = 8  
RopMask = 9  
RopNotXorPen = 10  
RopNop = 11  
RopMergeNotPen = 12  
RopCopy = 13  
RopMergePenNot = 14  
RopMerge = 15  
RopWhite = 16

## **TxMagnitude**

M500\_0 = 0  
M300\_0 = 1  
M200\_0 = 2  
M100\_0 = 3  
M050\_0 = 4  
M030\_0 = 5  
M020\_0 = 6  
M010\_0 = 7  
M005\_0 = 8  
M003\_0 = 9  
M002\_0 = 10  
M001\_0 = 11  
M000\_5 = 12  
M000\_3 = 13  
M000\_2 = 14  
M000\_1 = 15

## **TxMapMode**

MdZoom = 0  
MdUser = 1  
MdStreet = 2  
MdCad = 3  
MdDistance = 4

## **TxMapunit**

MuMi = 0  
Mukm = 1

## **TxBtMode**

TbHide = 0  
TbFix = 1  
TbFloat = 2

**TxMouseButton**

mbLeft = 0  
mbRight = 1  
mbMiddle = 2

**TxLLMode**

TmHMS = 0  
TmDEG = 1  
TmBIG = 2  
TmSMALL = 3

**TxCoord**

CdLonlat = 0  
CdLatLon = 1

**TxRteOps**

RT\_Clear = 0  
RT\_Spots = 1  
RT\_Hatch = 2  
RT\_Zoom = 4  
RT\_Short = 16  
RT\_Fast = 32  
RT\_Direct = 48  
RT\_Hours = 64  
RT\_Km = 128  
RT\_Total = 512  
RT\_PrtMap = 1024  
RT\_PrtDir = 2048  
RT\_NoERR = 4096  
RT\_NoDLG = 8192  
RT\_Degree = 16384

**TxAlignment**

taLeftJustify = 0  
taRightJustify = 1  
taCenter = 2

**TxDragMode**

dmManual = 0  
dmAutomatic = 1

**TxSourceData**

Z\_NONE = 0  
ZP5\_TIGER = 1  
ZPG\_GDTUSA = 2  
ZPG\_RESV1 = 3  
ZPG\_GDTCDN = 4  
ZPG\_RESV2 = 5  
ZPG\_GDTUSACDN = 6

**TxScaleBar**

sbNone = 0  
sbTopLeft = 1  
sbTopRight = 2  
sbBottomLeft = 3  
sbBottomRight = 4



**TxRouteType**

Shortest = 0  
Fastest = 1  
Direct = 2  
Preferred = 3  
ShortUnbiased = 4

**TxRasterOps**

RopBlack = 1  
RopNotMergePen = 2  
RopMaskNotPen = 3  
RopNotCopyPen = 4  
RopMaskPenNot = 5  
RopNot = 6  
RopXor = 7  
RopNotMaskPen = 8  
RopMask = 9  
RopNotXorPen = 10  
RopNop = 11  
RopMergeNotPen = 12  
RopCopy = 13  
RopMergePenNot = 14  
RopMerge = 15  
RopWhite = 16

**TxDegFormat**

dfDMS = 0  
dfDEC = 1  
dfDECMIN = 2

**Record TPointRec**

double x  
double y  
BSTR Name

**Record TExtentRec**

double Xmin  
double Ymin  
double Xmax  
double Ymax

**Record TrPoint**

double x  
double y

# SAMPLE COPYRIGHT LICENSE AGREEMENT

This Agreement, effective April 1, 2004, by and between UNDERTOW SOFTWARE, INC., an Illinois corporation, having its principal place of business at 26011 Lauren Drive, Channahon, Illinois 60410, (hereinafter referred to as "USI") and \_\_\_\_\_, a \_\_\_\_\_ Corporation, having its principal place of business at \_\_\_\_\_ (hereinafter referred to as "LICENSEE").

WHEREAS, USI is the owner of certain mapping Software, Data and Documentation and the copyrights for the work(s) listed in Exhibit A attached (hereinafter referred to as the "USI Software" or "USI Copyrights" or "Copyrighted Works"); and

WHEREAS, LICENSEE desires to incorporate and/or employ USI Software and USI Copyrighted Works into its products pursuant to the terms of this Agreement; and

WHEREAS, LICENSEE desires to obtain and USI is willing to grant, a non-transferable, non-exclusive, worldwide license to use the USI Software and related documentation in accordance with the terms and conditions of this Agreement; and

WHEREAS, LICENSEE is willing to obtain and USI is willing to grant the rights and licenses as provided in this Agreement.

NOW, THEREFORE, in consideration of the promises and mutual agreements herein contained, it is hereby agreed as follows:

## 1. DEFINITIONS

1.1 "COPYRIGHTS" means the common law Copyrights and the U.S. Copyright Registrations for the works described in the attached Exhibit A.

1.2 "Licensee Products" or "Products" means LICENSEE custom applications and any other product utilizing the USI Software, Data, Copyrighted Works or any portions thereof during the term of this Agreement.

1.3 "Licensed Software" or "Software" shall mean USI computer programs, data and data files in machine readable object code form for the works listed in Exhibit A and any subsequent updates supplied by USI to LICENSEE pursuant to this Agreement which may be amended from time to time by the parties in writing.

1.4 "Directions" shall mean visual, verbal, and/or textual representation of a Route, Itinerary and/or Location(s).

1.5 "Location" shall mean a point such as a longitude/latitude coordinate used to represent a physical location or the placement of a Mobile Unit etc. within the Enhanced Product(s). Location may be described in visual, verbal or textual terms.

1.6 "Map Display" shall mean a visual rendering of any portion of the Product(s) which may display lines, points or polygons that are sourced, in whole or in part, from the Product(s).

1.7 "Mobile Units" shall mean any mobile assets such as cars, vans, trucks, boats, trailers, buses, personnel, etc., equipped with the mobile component of the AVL Application. The mobile units need not be attached to the mobile asset, self-propelled or motorized.

1.8 "Route" shall mean the use of the Enhanced Product(s) to determine a logical means of progression from one Location to another.

1.9 "Transaction" shall mean a single distinct use of the USI Product to determine Location, Map Display, Route, or convey Directions to a user.

1.10 "Premier License" shall mean a license to use the Product(s), as incorporated into the Enhanced Products (a) in AVL Applications, Routing, scheduling and dispatch applications or route optimization applications any of which are used for the management of fleets of fifty (50) or more Mobile Units, or (b) the developer receives periodic service fees from Endusers, or (c) the application is delivered over the Internet or is server based.

1.11 "GDT" shall mean third party data licensed from Geographic Data Technologies, Inc.

1.12 "Enduser(s)" shall mean purchaser(s) of licenses to use the Enhanced Product for their own use and not with a view to the resale thereof. Enduser is further defined as a single, nonconcurrent user of the Enhanced Product. The Enhanced Product is to be installed on a specific workstation, or licensed to a named person.

1.13 "Enhanced Product" shall mean the Product(s) together with the proprietary product(s) and/or service(s) of Licensee described in Attachment A

1.14 "Map Display" shall mean a visual rendering of any portion of the Product(s) which may display lines, points or polygons that are sourced, in whole or in part, from the Product(s).

1.15 "Product(s)" shall mean USI's proprietary software and/or databases(s) more particularly described in Attachment A.

## **2. LICENSE GRANT**

2.1 For the consideration recited herein, USI grants to LICENSEE a non-exclusive, non-transferable worldwide right and license to copy and use the USI Licensed Software in LICENSEE products and to distribute and sell those Products under the Copyrights anywhere in the world.

2.2 No right or license is granted hereby by implication or otherwise to LICENSEE or any Third Party Manufacturer under any copyright, except as specifically provided herein.

2.3 No right or license is granted to copy, distribute or sell the Licensed Software unless packaged and bundled for sale by LICENSEE with USI's map engine and database.

2.4 The right and license granted is restricted and limited by the terms and conditions set forth in the attached Exhibit B.

## **3. DELIVERY**

3.1 USI shall deliver to LICENSEE a master copy of the current version of the Licensed Software licensed hereunder in object code form, suitable for reproduction, in electronic files only upon execution of this Agreement.

3.2 USI shall also deliver to LICENSEE one copy of the applicable Documentation for the Software. The Documentation can, if so desired, be delivered electronically to the LICENSEE.

3.3 LICENSEE acknowledges that Licensed Software may require user registration for activation and LICENSEE may be required to establish a pre-paid royalty fund with USI for the purposes of activating the LICENSEE products sold.

#### **4. CONSIDERATION, LICENSE FEES AND PAYMENT**

4.1 As consideration for the grant of this License, LICENSEE agrees to pay royalties to USI on all Licensee Products distributed or sold in accordance with the terms and conditions set forth in the attached Exhibit B.

4.2 If this License does not require an escrow account, then on or before the 15TH day of each month of each year during the term hereof and/or the thirtieth (30th) day after termination hereof, LICENSEE shall send USI a written report in the format provided in the attached Exhibit C to USI. The report shall be certified by a financial officer of LICENSEE as to its correctness, and shall compute the amount due USI, for the preceding calendar month. Unless LICENSEE shall be otherwise directed in writing by USI, each such report shall be accompanied by a check in the proper amount then payable to USI as shown on such report and sent to:

Undertow Software, Inc.  
Attention: Steve Peskaitis  
26011 Lauren Drive  
Channahon, IL 60410

4.3 All amounts due and payable hereunder by LICENSEE shall be made in United States funds without deductions for taxes, assessments, fees, hold-backs or charges of any kind. Checks shall be made payable to USI and shall be forwarded to USI at the address in paragraph 4.2 above along with a Royalty Report in the form designated by USI.

4.4 LICENSEE shall keep complete and prepare records of all Products produced, distributed, sold or otherwise used or disposed of by LICENSEE with credit shown for returns for which actual credit is given to customers, such records to show separately the identity of and quantity of Licensee Product sold or otherwise used or disposed. Sales shall be considered as made on either the date of shipment of the products, or registration activation, if such registration is required under this License.

4.5 USI shall have the right, upon at least 90 days' written notice to LICENSEE, to have the correctness of any Royalty Report audited, at its expense, by an independent certified public accountant chosen by USI who shall examine LICENSEE's business records only on material pertinent to this Agreement. In the event the royalties reported and/or paid by LICENSEE are underreported by more than 5% as determined by the audit report, then LICENSEE shall immediately pay the balance owed plus audit expenses and an additional 20% of that amount owed as a penalty for said underreporting. The results of any audit shall remain confidential to the parties. USI shall have the right to terminate this Agreement if, after audit, LICENSEE has underreported royalties for any two months in a 12-month period. Royalty-based records of LICENSEE shall be kept available by LICENSEE for at least a period of time as such records are maintained in the ordinary course of business by LICENSEE after termination of the calendar year in which they are made.

4.6 LICENSEE shall pay USI interest at the rate of ten percent (10%) per annum, compounded quarterly on any payment that is more than thirty (30) days overdue from the date such payment is due to the date of payment. This interest payment shall be in addition to any other remedy provided USI by law or this Agreement.

#### **5. PROTECTION OF SOFTWARE**

5.1 Proprietary Notices. LICENSEE agrees to respect and not to remove, obliterate, or cancel from view any copyright, trademark, confidentiality or other proprietary notice, mark, or legend appearing on any of the Software or output generated by the Software, and to reproduce and include same on each copy of the Software.

5.2 No Circumvention or Reverse Engineering. LICENSEE agrees not to modify, reverse engineer, circumvent any technological measure used to control access to the copyright work, disassemble, or decompile the Software, or any portion thereof.

5.3 Ownership. LICENSEE further acknowledges that all copies of the Licensed Software and Copyrighted Works in any form provided by USI are the sole property of USI and/or its suppliers. LICENSEE shall not have any right, title, or interest to any such Licensed Software or Copyrighted Works or copies thereof except as provided in this Agreement, and further shall secure and protect all Licensed Software and Documentation consistent with maintenance of USI's proprietary rights therein.

## **6. CONFIDENTIALITY**

6.1 Acknowledgment. LICENSEE hereby acknowledges and agrees that the USI Software and Documentation constitute and contain valuable proprietary products and trade secrets of USI and/or its suppliers, embodying substantial creative efforts and confidential information, ideas, and expressions. Accordingly, LICENSEE agrees to treat (and take precautions to ensure that its employees treat) the USI Software and Documentation as confidential in accordance with the confidentiality requirements and conditions set forth below.

6.2 Maintenance of Confidential Information. Each party agrees to keep confidential all confidential information disclosed to it by the other party in accordance herewith, and to protect the confidentiality thereof in the same manner it protects the confidentiality of similar information and data of its own (at all times exercising at least a reasonable degree of care in the protection of confidential information); provided, however, that neither party shall have any such obligation with respect to use or disclosure to others not parties to this Agreement of such confidential information as can be established to: (1) have been known publicly; (2) have been known generally in the industry before communication by the disclosing party to the recipient; (3) have become known publicly, without fault on the part of the recipient, subsequent to disclosure by the disclosing party; (4) have been known otherwise by the recipient before communication by the disclosing party; or (5) have been received by the recipient without any obligation of confidentiality from a source (other than the disclosing party) lawfully having possession of such information.

6.3 Injunctive Relief. LICENSEE acknowledges that the unauthorized use, transfer or disclosure of the USI Software and Documentation or copies thereof will: (1) substantially diminish the value to USI of the trade secrets and other proprietary interests that are the subject of this Agreement; (2) render USI's remedy at law for such unauthorized use, disclosure or transfer inadequate; and (3) cause irreparable injury in a short period of time. If LICENSEE breaches any of its obligations with respect to the use or confidentiality of the Software or Documentation, USI shall be entitled to equitable relief to protect its interests therein, including, but not limited to, preliminary and permanent injunctive relief.

6.4 Survival. LICENSEE's obligations under this Section will survive the termination of this Agreement or of any license granted under this Agreement for whatever reason.

## **7. INFRINGEMENT**

7.1 LICENSEE shall notify USI of any infringement or threatened infringement by a third party of the USI Copyrights which shall become known to it. USI shall be entitled to the exclusive right to use its own discretion in deciding whether to act on this information, and its refusal to act thereon shall not affect this Agreement.

7.2 USI shall not be liable for any consequences or damage arising out of or resulting from anything made available hereunder or the exercise by LICENSEE of any rights granted hereunder nor be liable to LICENSEE for consequential damages under any circumstances.

## **8. WARRANTY**

8.1 Ownership. USI represents and warrants that it owns free and clear of any liens or claims of ownership all of the proprietary rights licensed to LICENSEE.

8.2 Indemnity. LICENSEE agrees to indemnify and hold USI, its officers, directors, shareholders, representatives and agents harmless from against any and all liabilities, damages, injuries, claims, suits, including USI's attorneys' fees incurred in its own defense (a) brought by any governmental authority concerning the Products or any portion thereof, or (b) that may in any way arise from breach of warranty, express or implied, or any tort actions or claims, as to the quality or defectiveness of the Products, or any portion thereof, or its merchantability, its fitness for the purpose for which it was sold.

8.3 Notice of Proceedings. LICENSEE shall, within ten (10) days after receipt of notice of any legal proceeding against it with regard to the Products manufactured for LICENSEE, notify USI. LICENSEE shall have the right to defend any claim relating to production, distribution or consumption of the Products at its sole expense.

8.4 Limited Warranty. USI represents and warrants to LICENSEE that the Licensed Software, when properly installed by LICENSEE and used with LICENSEE's application, will perform substantially as described in USI's then current Documentation for such Software for a period of ninety (90) days from the date of shipment.

8.5 Limitations. Notwithstanding the warranty provisions set forth herein, all of USI's obligations with respect to such warranties shall be contingent on LICENSEE's use of the Software in accordance with this Agreement and in accordance with USI's instructions as provided by USI in the Documentation, as such instructions may be amended, supplemented, or modified by USI from time to time. USI shall have no warranty obligations with respect to any failures of the Software which are the result of accident, abuse, misapplication, extreme power surge or extreme electromagnetic field.

8.6 LICENSEE's Sole Remedy. USI's entire liability and LICENSEE's exclusive remedy shall be, at USI's option, either: (1) return of the price paid; or (2) repair or replacement of the Software upon its return to USI; provided USI receives written notice from LICENSEE during the warranty period of a breach of warranty. Any replacement Software will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer.

8.7 Disclaimer of Warranties. USI DOES NOT REPRESENT OR WARRANT THAT ALL ERRORS IN THE SOFTWARE AND DOCUMENTATION WILL BE CORRECTED. THE WARRANTIES STATED IN THIS SECTION ARE THE SOLE AND THE EXCLUSIVE WARRANTIES OFFERED BY USI. THERE ARE NO OTHER WARRANTIES RESPECTING THE SOFTWARE AND DOCUMENTATION OR SERVICES PROVIDED HEREUNDER, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF DESIGN, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, EVEN IF USI HAS BEEN INFORMED OF SUCH PURPOSE. NO AGENT OF USI IS AUTHORIZED TO ALTER OR EXCEED THE WARRANTY OBLIGATIONS OF USI AS SET FORTH HEREIN.

8.8 Limitation of Liability. LICENSEE ACKNOWLEDGES AND AGREES THAT THE CONSIDERATION WHICH USI IS CHARGING HEREUNDER DOES NOT INCLUDE ANY CONSIDERATION FOR ASSUMPTION BY USI OF THE RISK OF LICENSEE'S CONSEQUENTIAL OR INCIDENTAL DAMAGES WHICH MAY ARISE IN CONNECTION WITH LICENSEE'S USE OF THE SOFTWARE AND DOCUMENTATION. ACCORDINGLY, LICENSEE

AGREES THAT USI SHALL NOT BE RESPONSIBLE TO LICENSEE FOR ANY LOSS-OF-PROFIT, INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE LICENSING OR USE OF THE SOFTWARE OR DOCUMENTATION. Any provision herein to the contrary notwithstanding, the maximum liability of USI to any person, firm or corporation whatsoever arising out of or in the connection with any license, use or other employment of any Software delivered to LICENSEE hereunder, whether such liability arises from any claim based on breach or repudiation of contract, warranty, tort or otherwise, shall in no case exceed the actual price paid to USI by LICENSEE for the Software whose license, use, or other employment gives rise to the liability. The essential purpose of this provision is to limit the potential liability of USI arising out of this Agreement. The parties acknowledge that the limitations set forth in this Section are integral to the amount of consideration levied in connection with the license of the Software and Documentation and any services rendered hereunder and that, were USI to assume any further liability other than as set forth herein, such consideration would of necessity be set substantially higher.

## **9. COPYRIGHT OWNERSHIP AND USE**

9.1 LICENSEE shall not use the USI Copyrights in connection with any product other than the Licensed Products.

9.2 LICENSEE agrees to apply appropriate legends on its labels or other printed materials indicating ownership by USI and, as appropriate, registration of said Copyrights (including, at a minimum, the notation "Portions Copyrighted by Undertow Software, Inc.").

9.3 Neither this Agreement, the fact of this Agreement or its termination, or LICENSEE's exercise of the rights granted under this Agreement, including use of said Copyrights, shall effect, diminish or otherwise alter USI's right, title and interest in and to the Copyrights and LICENSEE agrees to assign, and hereby does assign to USI any and all right, title and interest in to said Copyrights which may accrue to or otherwise be acquired by LICENSEE during or as a result of this Agreement or any other undertaking or contract between the parties hereto. Nothing in this Agreement shall be construed to grant or otherwise convey to LICENSEE any ownership or any like right to LICENSEE relating to said Copyrights.

9.4 LICENSEE acknowledges USI's ownership of and exclusive rights in the Copyrights and agrees that it will not use the Copyrights except as authorized hereunder or as may hereafter be agreed by USI in writing. LICENSEE agrees that the benefits of its use of said Copyrights shall inure solely to the benefit of USI. LICENSEE agrees to execute and deliver to USI such documentation relating to the Copyrights as may be required by law, or be requested by USI, including, but not limited to, any documents needed in conjunction with any trademark registration, application for registration, renewal or registered user agreement.

## **10. PRODUCT QUALITY**

10.1 LICENSEE agrees that Products sold pursuant hereto shall conform to standards of quality established by any state or federal agency having jurisdiction over said products.

10.2 LICENSEE agrees, at least once every year and at USI's request, to supply USI with a copy of all Products of LICENSEE's current manufacture to permit USI to determine if its said quality standards are being maintained by LICENSEE.

10.3 LICENSEE agrees to supply USI, upon request, with copies of written material including packaging, advertising, labels and the like on or in which the Copyright Notices appear to permit USI to determine if LICENSEE's use of the Copyrights insure that the Copyrights are being properly used.

## 11. TERM AND TERMINATION

11.1 The initial term of this Agreement shall begin on the date of acceptance by LICENSEE and continue for two (2) years and shall automatically continue in full force and effect for additional two-year periods, unless sooner terminated as hereinafter provided, or written notice of termination is provided to the other party at least 90 days prior to expiration of the term.

11.2 USI may terminate this Agreement upon written notice to LICENSEE if LICENSEE remains in default in making any payment or report required hereunder, or fails to comply with any other provision hereof for a period of thirty (30) days after written notice of such default or failure is given by USI to LICENSEE. USI shall have the right to place LICENSEE'S account on hold, and prohibit registrations, if LICENSEE is overdue on any payment for more than 30 days.

11.3 Any termination of this Agreement shall not relieve LICENSEE of liability for any payments accrued prior to the effective date of such termination, or for any payments on Products marked with said Copyrights pursuant to this Agreement prior to the effective date of such termination and sold thereafter.

11.4 Upon termination of this Agreement, LICENSEE agrees to cease and desist from any and all further use of USI Copyrights.

11.5 Upon termination of this Agreement, USI shall be entitled to all relief in law and equity, including but not limited to, entry of judgment on the amount of consideration then due and owing, preliminary and permanent injunctive relief, as well as USI's costs and attorney's fees incurred in any enforcement action.

## 12. ASSIGNMENT

12.1 This Agreement may not be assigned by LICENSEE without written authorization by USI. Such authorization shall not be unnecessarily withheld.

12.2 This Agreement shall inure to the benefit of, and be binding upon, the successors and assigns of both parties, but no assignment by LICENSEE of this Agreement or any part thereof, including any transfer or the like in conjunction with a sale, merger or the like of LICENSEE or any part thereof, shall have any force or validity whatsoever, except, unless and until approved in writing by USI.

## 13. MISCELLANEOUS

13.1 All notices or communications which either party may desire, or be required, to give to the other shall be in writing and shall be deemed to have been duly served if and when forwarded by registered or certified mail or overnight delivery by Federal Express to such address as shall have been designated by notice from the addressee for addressing of notices to it, or if no such designation shall have been made, to the address of the party appearing below:

(LICENSOR):

Undertow Software, Inc.  
Attention: Steven Peskaitis  
26011 Lauren Drive  
Channahon, Illinois 60410

(LICENSEE):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



13.2 The failure to act upon any default hereunder shall not be deemed to constitute a waiver of such default.

13.3 The validity, legality and enforceability of any provision hereof shall not be affected or be impaired in any way by any holding that any other provision contained herein is invalid, illegal or unenforceable in any respect.

13.4 LICENSEE hereby assumes responsibility for obtaining all necessary official governmental approval for the Products produced and sold under this Agreement.

13.5 Dispute Resolution. All disputes other than non-payment of consideration set forth in paragraph 4 which arise in connection with performance under this Agreement shall be first submitted to good faith, face-to-face mediation with a qualified mediator chosen by the parties and located in Chicago, Illinois before any party shall be entitled to file any legal action hereunder. This Agreement and any mediation, arbitration or litigation hereunder shall be governed by the rules and laws of the State of Illinois. Termination for non-payment of consideration under paragraph 4 shall entitle USI to seek immediate relief from the court in accordance with the terms of this Agreement.

13.6 Jurisdiction. If the parties are unable to resolve any dispute by good faith negotiations or mediation as set forth above, the parties agree that the exclusive venue for all actions relating in any manner to this Agreement shall only be brought in the courts of the State of Illinois, County of Cook, or in the United States District Court for the Northern District of Illinois, and each party consents and submits to the personal jurisdiction of such courts (and of the appropriate appellate courts) in any such action or proceeding and irrevocably waives any objection to venue laid therein. Process in any action or proceeding referred to in the preceding sentence may be served on any party anywhere in the world.

13.7 This Agreement and the terms thereof shall be construed, interpreted, applied and enforced under and pursuant to the laws of the State of Illinois.

#### 14. INTEGRATION

This Agreement constitutes the entire understanding of the parties, and revokes and supersedes all prior agreements between the parties and is intended as a final expression of their Agreement. It shall not be modified or amended except in writing signed by the parties hereto and specifically referring to this Agreement. This Agreement shall take precedence over any other documents that may be in conflict therewith.

The LICENSEE warrants and represents that the signator or person accepting this License is an officer of LICENSEE and is authorized to enter into this Agreement on behalf of the LICENSEE.

IN WITNESS WHEREOF, the parties have executed this Agreement effective as of the date first written above.

UNDERTOW SOFTWARE, INC.

By: \_\_\_\_\_

Steven Peskaitis, President

Date: \_\_\_\_\_

LICENSEE:

By: \_\_\_\_\_

Title:

Date: \_\_\_\_\_

**LICENSING EXHIBIT A**  
**LICENSED PRODUCT AND COPYRIGHTS**

**Licensed Software:**

MapOCX Pro7.0

MapOCX Pro 7.1

Tiger 2000 Data for the United States Dataset

GDT Data for the United States Dataset

GDT Data for Canada Dataset

**Copyrights**

USI is the owner of certain mapping Software, Data and Documentation and the common law copyrights for the work entitled "Map OCX Pro 7.0 or MapOCX Pro 7.1, and United States Copyright Certificates of Registration for the works entitled: "Map OCX Pro 4.0", Registration No. ATX 5-571-581, effective August 16, 2002; and "Precision Mapping Streets 3.0", Registration No. TX 4-526-524, effective April 21, 1997, (hereinafter referred to as the "USI Software" or "USI Copyrights" or "Copyrighted Works").

**LICENSING EXHIBIT B  
CONSIDERATION AND PAYMENT TERMS  
RESTRICTIONS AND LIMITATIONS TO LICENSE**

The following pricing applies to each individual dataset: Tiger 2000 covering the United States, GDT data covering the United States, and GDT data covering Canada. For each dataset distributed or registered Licensee will compensate USI based upon the following guidelines:

Licensee will pay USI for each single user client seat distributed or registered. Each single user client seat license must be either paid for at the time of distribution or at registration for the software. If the Licensee has account escrow funds available at the time of registration, the licensing fee will be deducted from the account automatically; in the event that sufficient funds are not available, the registration system will either prompt the user to purchase the client seat license or prohibit the registration process entirely. It is Licensees sole responsibility to contact USI to establish the desired account settings.

All license purchases are non-refundable. Should Licensee dispute a registration or deduction from their escrow account, licensee has 30 days from the date of the charge to refute these charges. After 30 days, all transactions are considered final.

Discount pricing is only available based upon the quantity purchased for each order; pricing is not accumulative based upon past purchases. If distributing Tiger 2000 Data, discount the following pricing by 20%.

For Applications that DO NOT provide Routing and/or Directions capability the following fees shall apply:

<u>Number of Seats *</u>	<u>Royalty per Seat</u>	<u>3x Quarterly Updates(optional)</u>
--------------------------	-------------------------	---------------------------------------

***Contact Undertow Software, Inc. for Detailed Pricing***

For Applications that DO provide Routing and/or Directions capability the following fees shall apply:

<u>Number of Seats*</u>	<u>Royalty per Seat</u>	<u>3x Quarterly Updates (optional)</u>
-------------------------	-------------------------	--

\* Number of Seats shall mean the number of seat licenses purchased at one time.

***Contact Undertow Software, Inc. for Detailed Pricing***

**Premier Licenses**

For Premier Licenses, the following royalty fees shall apply:  
Royalties are based on a per Mobile Unit per Month basis.

For Applications that include Mobile Unit tracking but DO NOT provide Routing or Directions the royalty due USI shall be xx Dollars (\$xx.00) per Mobile Unit per month.

For Applications that include Mobile Unit tracking and ALSO provide Routing or Directions the royalty due USI shall be xx Dollars xx Cents (\$xx.xx) per Mobile Unit per month.

NOTE: the above pricing for Premier Licenses does not include Map Display in Mobile Units

Server or Internet Server Licensing will be licensed to Licensee on a Transactional basis. The number of Transactions permitted for each customer on an annual basis shall be determined by the amount of the Royalty paid to USI according to the following schedule:

Yearly Royalty

# of Transactions Permitted

***Contact Undertow Software, Inc. for Detailed Pricing***

NOTE: Transactional pricing does not apply to Premier Licenses.

**EXHIBIT C - ROYALTY REPORT**  
**ROYALTY REPORT FOR UNDERTOW SOFTWARE, INC.**

**Licensee:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

Country: \_\_\_\_\_

**Remit To:**

**Undertow Software**  
**26011 Lauren Dr**  
**Channahon, IL 60410**  
**815-521-9950 Fax 815-521-9952**

Reports the following information for \_\_\_\_\_ 20\_\_\_\_ :  
(Month) (YY)

**Royalty Per Mobile Unit:**

**Royalty Per Unit**

**(OR)**

a. Total Units: \_\_\_\_\_

a. Total Units Sold: \_\_\_\_\_

b. Fee Per Unit: \_\_\_\_\_

b. Royalty Fee Per Unit: \_\_\_\_\_

c. Total Royalty Fee: \_\_\_\_\_

c. Total Royalty Fee: \_\_\_\_\_

**(OR)**

Internet Transaction Count Number: \_\_\_\_\_

Amount Enclosed: \_\_\_\_\_

Check Number: \_\_\_\_\_

\*If there were no royalties for this month, please leave a brief explanation:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I \_\_\_\_\_ am acting as an authorized representative of the company listed above. The information is accurate and true, which meets the criteria of our agreed upon contract.

\_\_\_\_\_  
Signature

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Date