



User Guide

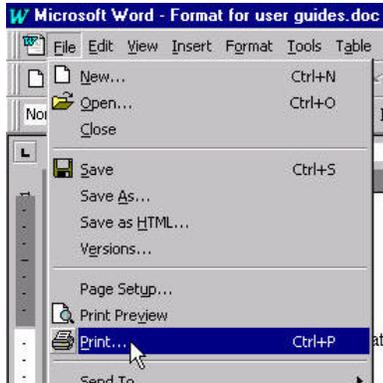
Service Center GPS Intro and Setup

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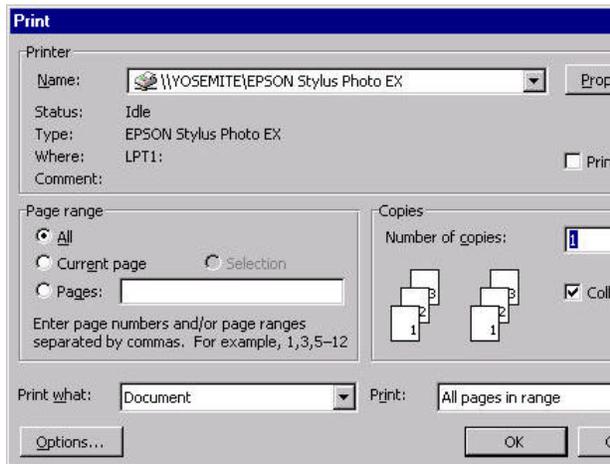
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Conventions used in this guide

The following conventions will be used throughout this user guide. They are illustrated using the example of printing a document in Microsoft Word.

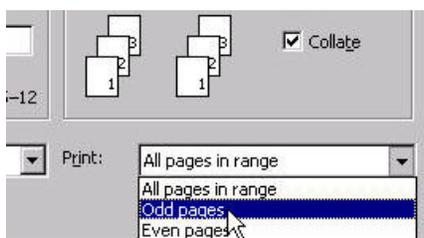


Menu choices are written in bold in the following format: **Menu>Item>SubItem ...** For example, the command used to start printing a file would be written as follows: click on **File>Print**.



The titles of dialog boxes will be written in **Bold**. Clicking on **File>Print** will open the **Print** dialog box.

On screen buttons, those that appear in the program window or in dialog boxes, will be written in bold text and in square brackets: **[Button]**. Click on the **[OK]** button to send the file to the printer



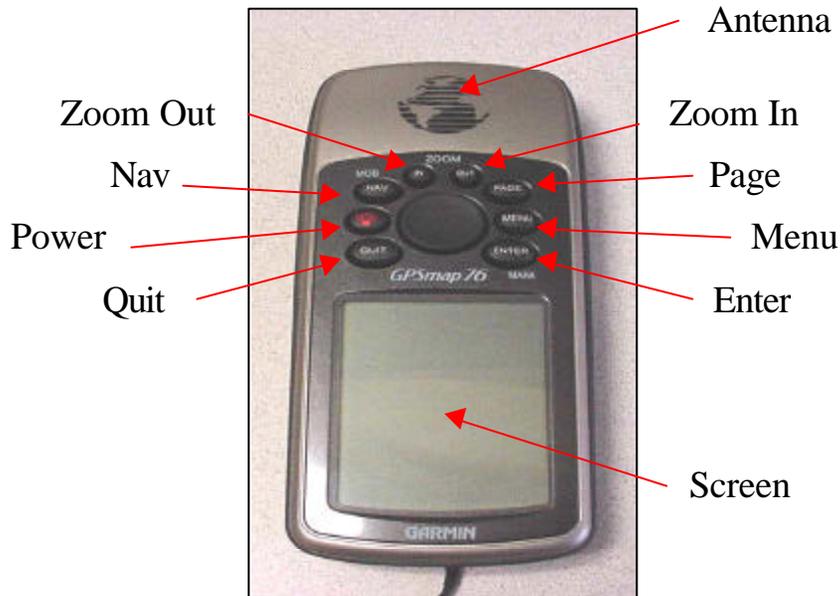
The names of fields in a window will be written in *Italics*. The *Name* field displays the current printer.

Choices available from lists will also be written in "quotation marks". Click on the arrow of the *Print* field to display the choices available. Click on the "Odd pages" choice to print only the odd pages of a document.

Physical buttons, such as on the GPS, will be referred to as **keys** and their names written in **Bold** text. For example, press and hold the **Power** key on the GPS to turn it on.

Intro to Map76 buttons and functions

Layout of the Garmin GPSMap76



Button descriptions:

Power Key: The **Power** key is used to turn the unit on and off. Press *and hold* the Power key to turn off the GPS

Rocker Key: The **Rocker** key is used to control the movement of the cursor on menus and map displays

Page Key: The **Page** key is used to navigate through the 5 main display pages. The Page key will also end an operation in progress and return to one of the main pages

Quit Key: The **Quit** key is also used to navigate through the 5 main display pages in the opposite direction of the Page key.

Menu Key: The **Menu** key will display the page options menu for the current page. Pressing the Menu key twice will display the main options menu.

Enter Key: The **Enter** key is used to activate a data field or make a menu selection. Pressing and holding the Enter key will allow the user to capture the current position as a waypoint.

Nav Key: The **Nav** key is used to start or end navigation functions. Holding down the **Nav** key will store the current position and gives you the opportunity to begin navigating back to that marked point.

Zoom In and Zoom Out Keys : These keys allow you to view a smaller area of the displayed map in greater detail (**Zoom In**) or a larger area in more general detail(**Zoom Out**).

Turning the on the GPS and putting it Simulator Mode

Power up GPS configuration 1 by connecting the power cord of the QuadCom cable to the external battery. The LED on the power cord should light as well as the screen of the MBX beacon receiver. See the assembly instructions at the end of this guide for more detail.

Turn on the Map76 by pressing and holding the **Power** key. The Map76 has three introductory screens, illustrated below. Press the **Page** key to get past them to the main pages of the unit.



The Map76 has a simulator mode in which the unit is on but is not looking for satellites to measure a position. **Simulator mode does not display your real position!** Simulator mode is useful when you are practicing inside, where the unit cannot receive satellite signals. You will also want to have the unit in simulator mode any time you have it connected to your PC for data download or upload.

This mode is started from the **GPS Information** page, usually the first page that opens after the introductory pages. To start simulator mode:

- Press the **Menu** key once with the **GPS Information** page open.
- Use the **Rocker** key to highlight the “Start Simulator” option from the list.
- Press the **Enter** key to accept the choice
- Exit the simulator mode by repeating this procedure and choosing the “Stop Simulator” option.



Main Screen Descriptions

There are five (5) main pages on the Map76.

The pages are:

The **GPS Information** Page

The **Map** Page

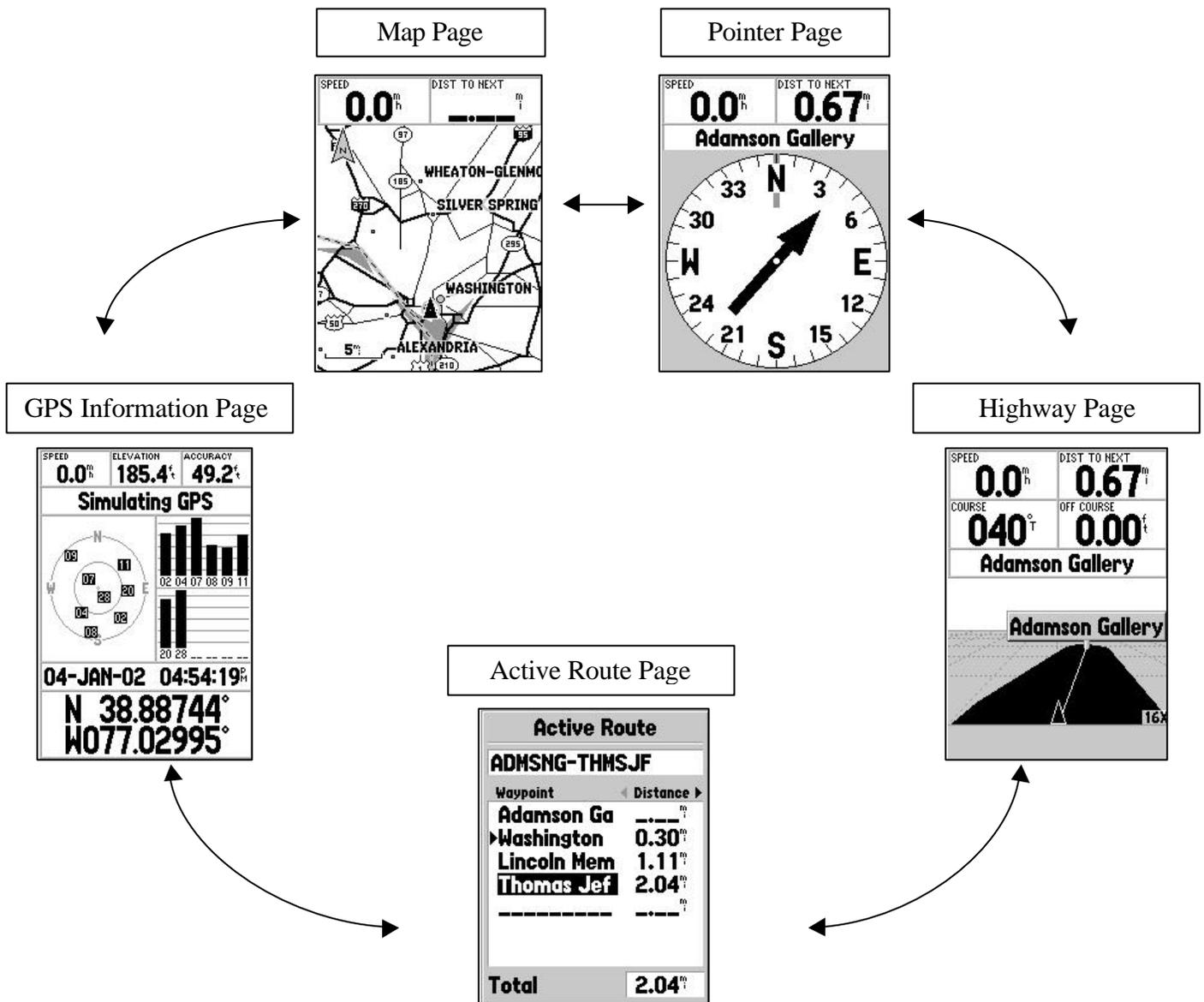
The **Pointer** Page

The **Highway** Page

The **Active Route** Page

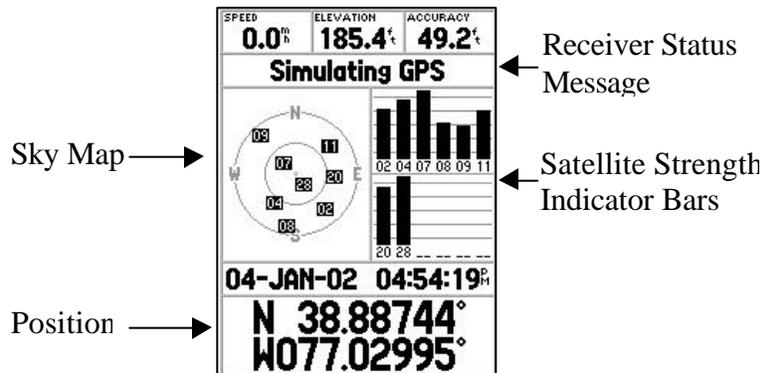
These pages are arranged sequentially on the unit, like on a Rolodex. The **Page** and **Quit** keys are used to navigate between the pages.

For example, if you are viewing the GPS Information Page and you want to see the Highway Page, you can get there by pressing the **Page** key three times or the **Quit** key twice.



GPS Information Page

The **GPS Information** page provides you with information about your position, the satellites that are being used to measure that position and an estimate of the accuracy of the location information that the GPS is giving you. All this information is displayed in the following fields:



- The *Sky Map* shows the location of the satellites in the sky overhead. The outside ring represents the horizon. The inner ring represents that portion of the sky that is midway between the horizon and directly overhead.
- The bars *Signal Strength* field show the status and strength of the signal being received from each GPS satellite in the sky. The bar will be light gray if the unit is receiving information from the satellite indicated by the number at the base of the bar, but the receiver is not yet locked on. The bar will be black if the unit is locked on to a satellite and using that signal to calculate a position. A “D” in the bar will indicate that a differential correction signal is being received for that satellite.
- The *Speed* and *Elevation* fields are self-explanatory. The units that are displayed can be altered in the settings of the unit.
- The *Accuracy* is an estimate of the quality of the position that you are receiving based on the geometry and signal strength of the satellites being used to calculate the current position.
- The *Date* and *Time* fields are self-explanatory. The time that the GPS receives is Universal or Greenwich Mean Time, which means that you need to set the correct time zone to get local time.
- The *Position* field is your location on the face of the Earth in the coordinate system that is set in the location settings of the unit.
- The *Receiver Status* message will indicate the type of position that the receiver is able to calculate.

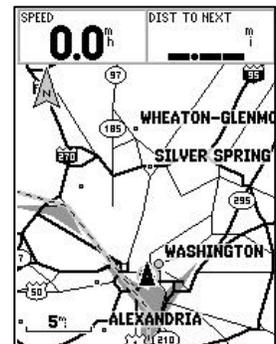
The *Receiver Status* Messages are as follows:

- Autolocate – Directs the receiver to individually locate each satellite
- Acquiring Satellites – Receiver is looking for satellites and will display this message until it acquires at least three
- 2D GPS Location – The receiver is using only 3 satellites and can only calculate horizontal position
- 3D GPS Location – The receiver is using at least 4 satellites and can calculate altitude as well as horizontal position
- 2D Differential Location – The receiver is using 3 satellites and a form of differential correction to calculate horizontal position only
- 3D Differential Location – The receiver is using at least 4 satellites and a form of differential correction to calculate horizontal position and altitude
- Lost Satellite Reception – The receiver is not able to receive satellite signals
- Simulating GPS – The unit is running in simulation mode and the actual GPS receiver is turned off

Map Page

The Map76 comes with a built in basemap that will be displayed on the map page along with your current position and any waypoint or track data stored on the GPS.

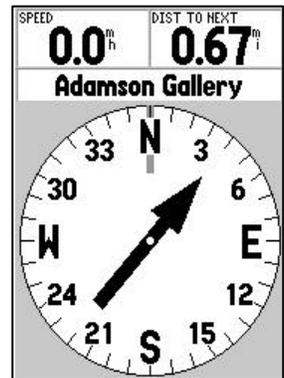
- A black arrowhead surrounded by a circle indicates your current position on the map.
- The direction that the arrow is pointed indicates the direction of your travel. The arrow will point north if the receiver is not moving or in simulator mode.
- The circle shows the extent of the estimated accuracy. For example, if the estimated accuracy is 25 feet, the circle will have a radius of 25 feet.
- There are many settings that can be chosen for the map page.
 - The map orientation can be changed so that the direction of travel, magnetic north, or true north will always be on top.
 - The number of fields at the top of the screen as well as the type of data displayed in them can be changed.
 - Press the menu button once to display the options for this, or any other, page.



Pointer Page

The **Pointer** page is used in navigation.

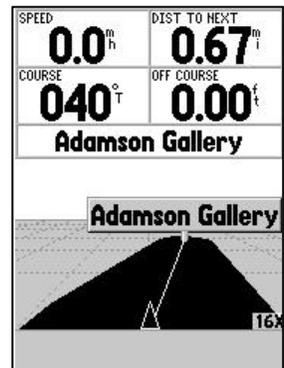
- The compass ring is used for reference.
- The Vertical line shows the direction of your travel.
- The pointer shows the direction to the point to which you are navigating.
- The compass directions are based on your changing position, not a true compass, so the unit must be moving to get a true reading.



Highway Page

The **Highway** page is also used for navigation.

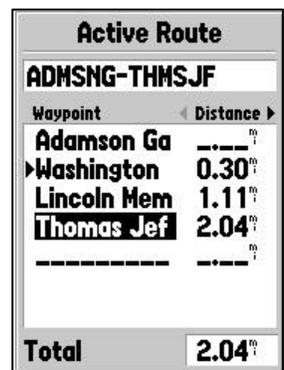
To use this navigation mode, the user follows the road on the screen, keeping the position icon (black arrowhead) on the white line. Waypoints and other features can be displayed on the screen. The properties of this page can be accessed and changed the same way as on other pages, by pressing the menu key once.



Active Route

The **Active Route** page assists the user with navigation. The information on this page will vary depending on the type of navigation you are doing.

- If you are navigating a route the active route will display the points of the route.
- If you are navigating a track, the page will show the turning points of the track.
- If you are navigating to a point, the name and distance to your destination will be displayed on this page.



Setting up the Garmin Map76

The Map76 has a number of settings may be specified to make it's display more useful to you. Additional values for other settings need to be specified in order to allow the unit to work with other hardware, such as your office PC or the DGPS beacon receiver.

All of the unit settings are accessed from the **Setup** page.

To open the **Setup** page:

- Press the **Menu** key twice from any screen to bring up the **Main Menu**. Use the **Rocker** key to highlight the "Setup" option and press the **Enter** key to open the **Setup** page
- The **Setup** page has a number of tabs, each one relating to a different subject area. The tabs are General, Time, Units, Location, Alarms, and Interface.
- Once the proper settings have been entered into the **Setup** page, return to normal operation by pressing the **Quit** key once to reach the **Main Menu** and once again to return to the main pages of the unit.



Setting the Time Format

The Map76 unit will acquire a very accurate time reading from the GPS satellites, but that time is set to Universal or Greenwich Mean Time.

To set the proper time zone:

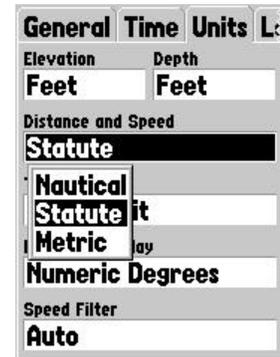
- Navigate to the Time tab of the **Setup** page
- Use the **Rocker** key to highlight the field you need to change, *Time Zone* for example, and press the **Enter** key to bring up a dialog with a list of choices for the field.
- Use the **Rocker** key to select one of these choices and press the **Enter** key to accept the new setting.



Setting the Unit Format

The Map76 can display distance and speed using different units of measure. In the USDA we will most often want to know distance and speed in feet and miles. These are referred to as statute as opposed to metric or nautical units.

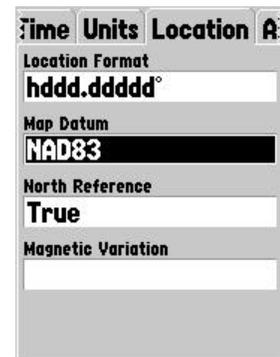
- Navigate to the **Units** tab of the **Setup** page and then down to the “Distance and Speed” field.
- Press the **Enter** key to open a dialog box with the choices for this field. Select the “Statute” choice and press **Enter** to accept the choice.



Setting the Location Format

The location obtained by the Map76 can be displayed in a number of different format and datums. Location settings affect only the display of the position on the GPS. The data that is collected on the GPS can be exported in any format, regardless of display settings. The location format and the proper datum are set on the Location tab of the **Setup** page.

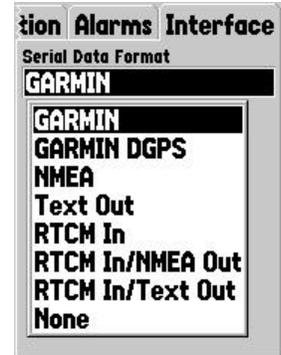
- Most USDA applications will call for the NAD83 datum
- The *Location Format* field should be set to either:
 - o “hddd.ddddd°” Decimal Degrees Seconds of Latitude and Longitude
 - o “ddd° mm.mmm” Degrees and Minutes Seconds of Latitude and Longitude
 - o “hddd° mm’ss.s” Degrees Minutes Seconds of Latitude and Longitude
 - o “UTM UPS” UTM coordinates. **CAUTION:** This setting will always use the geographic boundaries of the UTM zone to determine what coordinates to display. In counties that are split by a UTM zone boundary, USDA will choose to use the UTM zone that holds the majority of the county to do mapping of the entire county. This could cause a disagreement between your USDA maps and the coordinates displayed on the GPS receiver.



Setting the Interface Mode

The Interface setting on the Map76 specifies the type of communication messages that the GPS is sending out and receiving through the **Power/Data** port in the back of the unit. The GPS uses these messages to communicate with the office PC or the DGPS beacon receiver. Each of these devices requires a different communication protocol.

- Navigate to the Interface tab of the **Setup** page
- The *Serial Data Format* field on Interface tab has Eight settings to choose from. USDA will be using one of the two following settings: “GARMIN” and “RTCM In/NMEA Out”.
 - The “GARMIN” setting will be used to communicate with the PC and if the GPS is being used in Stand Alone mode.
 - The “RTCM In/NMEA Out” setting is used to communicate with the beacon receiver.



The “RTCM In/NMEA Out” interface setting has a number of parameters that need to be set in order to communicate with the DGPS beacon receiver.

- The *Beacon* field can be set to the values “User” or “Scan”. The “User” setting allows the user to manually enter the parameters for beacon reception. These settings will be discussed in the next section. The “Scan” setting tells the unit to conduct an automatic search for available beacons. The “Scan” setting does not always produce the best results, so the “User” setting is often preferable
- The frequencies and bit rates for the operating DGPS stations in the US can be looked up by name on the Coast Guard’s website at:

<http://www.navcen.uscg.gov/ADO/DgpsSelectStatus.asp>

The location of the nearest beacon to you can be determined from the map included in this user guide or from the website.

- The *Freq* field is used to set the beacon frequency. Enter the proper frequency by using the **Rocker** key to highlight the *Freq* field and the pressing the **Enter** key. Set the each of the four digits of the frequency by using the **Rocker** key up and down to select the digits and left and right to move between the digits.
- The value for the *Bit Rate* field is chosen from a list in a dialog box, similarly to the other fields on the **Setup** page.



- When a DGPS signal is being received the *Status* field will display the value “Receiving” and the *SNR* field will show a value for the signal to noise ratio of the signal that you are receiving. The *Distance* field may be populated as well to show how far you are from the beacon signal that you are receiving. That will depend on the individual beacon and your timing in tuning in to the beacon.
- If a DGPS signal is not being received, the *Status* field will display the value “Check Wiring”. While this message could indicate that the wiring to your beacon receiver is not connected, you will get the same message if there is no beacon coverage at your location.

Setting the unit to receive WAAS

If you want to use the WAAS signal for differential correction, you must enable the Map76 to use that signal. This setting is located on the General tab of the **Setup** page.



The WAAS field has two settings “Enabled” and “Disabled”

DGPS Beacon Location

The locations of DGPS beacons in the United States are illustrated in the map below. A complete list of the locations and operating parameters of all NDGPS beacons can be viewed and downloaded from:

<http://www.navcen.uscg.gov/dgps/DgpsCompleteConfiguration.htm>

Calendar Year 2002 DGPS Coverage



DGPS coverage depicted in gray shade.
Black triangles represent DGPS broadcast station locations.
Coverage based on USCG published information.
Coverage representation is an estimate only and does not reflect actual broadcast signal strengths, atmospheric conditions, and terrain variability that can affect DGPS reception.
Albers Equal Area Conic Projection, NAD83



Map prepared by USDA-NRCS, National Cartography & Geospatial Center
Fort Worth, Texas to support USDA Real-Time DGPS activities.
March 2002

MapSource Software

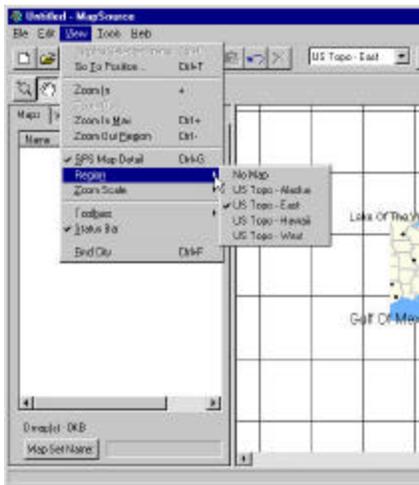
The USDA GPS units will be shipped with a program called MapSource. MapSource can be used to upload and download data to the GPS as well as doing some basic map making. The program ships with data CDs that contain road, feature and topo maps for the whole country. Though the program has a number of capabilities, we will be using it primarily to load background maps into the Map76.

Connecting the GPS to the Computer:

- The GPS needs to be connected with a cable to your PC in order to upload background maps.
- The cable that you will use has a round 4-pin connector that attaches to the round port on the back of the GPS and a 9-pin serial cable that attaches to a COM port on your PC.
- Turn on the GPS and put it in Simulator mode (Page 5 of this Guide).
- Set the Interface on the Map76 to “Garmin”.



Selecting a map in MapSource:



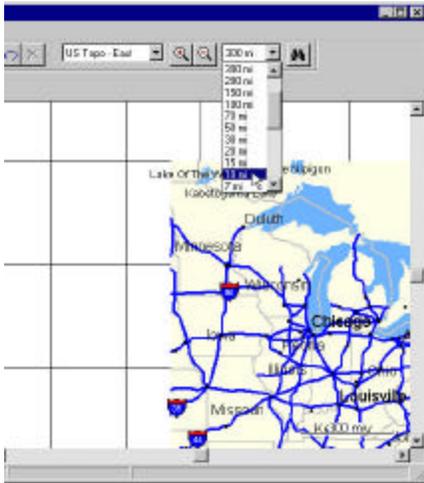
There are three MapSource CDs, one for the Eastern US, one for the Western US and one for Alaska and Hawaii. The program will prompt you for the correct disk when you need it. Find the location that you need with the Find City tool or by using the Zoom tool on the base map.

To use the Find City tool:

- Select the region of the country that you are interested in using the menu **View > Region** and then selecting from one of the 4 regions displayed
- Open the **Find City** dialog by clicking on **View > Find City**. The dialog box will show a list of the cities that MapSource has in its database. You can locate one of the cities by scrolling through the list or by starting to type the city name into the input field of the dialog box. Select the city by clicking on the city name on the list.



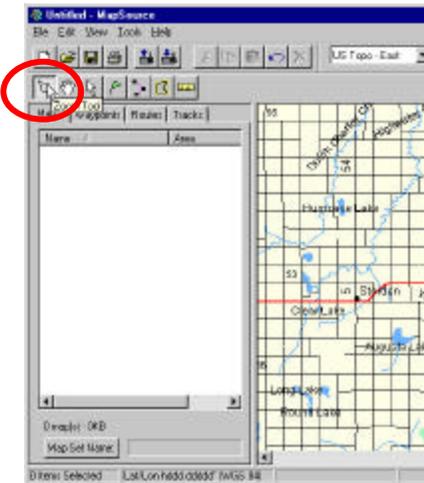
Map Scale



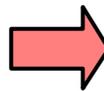
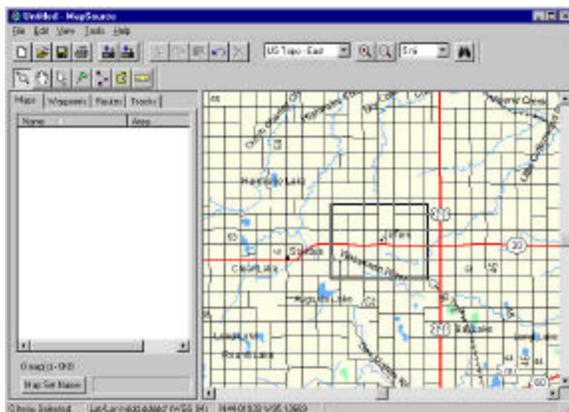
- Center the map display on by clicking on the “Center On City” button on the **Find City** dialog box. The map will remain in the same scale that it opened in.
- To zoom in or out, choose a different map scale from the drop down list in the scale tool on the tool bar. The program will give you a “Disk not in Drive” message and prompt you for the proper CD if you do not have the correct CD in the drive
- Refine your search for a map by panning using the scroll bars or by zooming with the zoom tool described in the next section.

To use the Zoom tool:

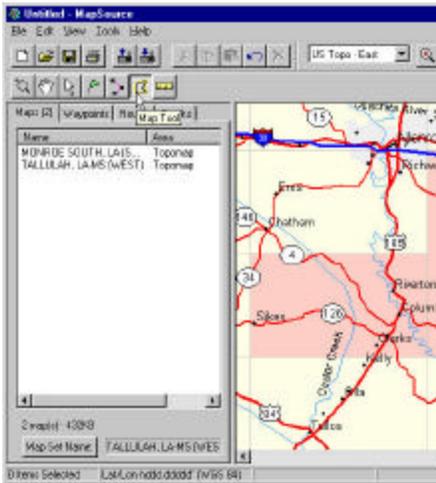
Zoom



- If you have not already, select the appropriate region of the country using the menu **View > Region** and then selecting from one of the 4 regions displayed.
- Select the Zoom Tool from the Tools Toolbar by clicking on it
- Use the Zoom Tool to draw a box around your area of interest and the map will zoom down to include only that area in the display



Uploading the map to the Map76:

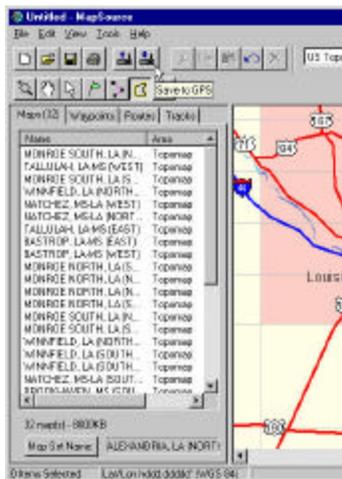


MapSource divides its basemap data into tiles that are generally between .5 to .25 degrees of longitude in width and the same range of degrees of latitude in height. The length of a degree of latitude is approximately 70 miles, longitude is the same at the equator but gets smaller as you travel toward the poles.

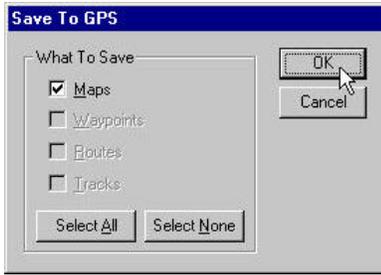
- Use the Map Tool from the Tool Toolbar to select the map or maps that you need to load into the GPS.



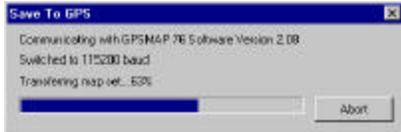
- Panning across the map display with the map tool will display the boundaries of the map tile in yellow. Clicking on a map tile will add it to the Maps Tab on the left side of the program window and turn the selected map background color to pink.



- All the maps that are listed in the Maps Tab can be loaded onto the Map76, up to its memory capacity of 8mb.



- Click on the Save to GPS button on the Tool Bar to open the “Save To GPS” dialog. Make sure that the Maps check box is checked and click on the **OK** button to start the upload to the GPS.



- A status dialog box will show the progress of the download.

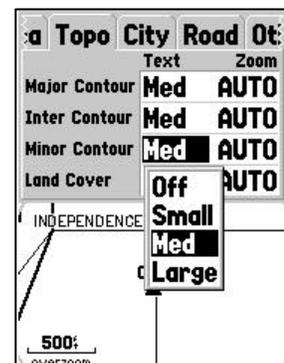
All of the detailed data on the maps, including topo lines, road detail and places will be available for use in the GPS.



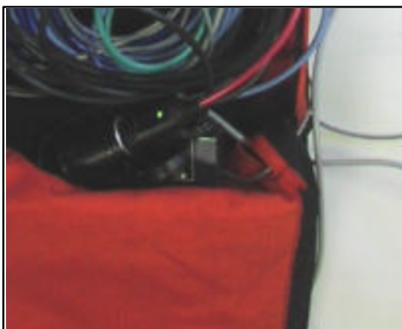
Map display on the Map76

The level of detail and type of features displayed on the base map can be chosen from the **Map** page of the Map76.

- Press the **Menu** key with the **Map** page open
- Use the **Rocker** key to highlight the “Setup Map” option and press the **Enter** key to open the **Map Setup** page
- The **Map Setup** page has 11 tabs to control the display of the basemap.
- Use the **Rocker** key to navigate among the tabs and the options on those tabs.
- Choose options in the same manner as on the **Setup** page and elsewhere on the GPS unit



Assembly of Configuration 1



- Route the screw end of the black antenna cable from the inside of the backpack out through the hole in the top right corner of the backpack.
- Slide the antenna mast into pocket on the same side of unit as the antenna wire. Secure the mast in place by threading the velcro strap through the slot in the mast.
- Screw the gray thread adapter into the antenna and then screw the antenna assembly onto the antenna mast
- Place the MBX receiver into the internal pocket in the backpack with the connections facing the bottom of the pack and the writing on the face of the MBX running from left to right as you face the open backpack.
- Connect the Quadcom cable to the MBX unit as is shown in the photo. The Quadcom cable has two cables that attach to the MBX
 - 1) a round, locking, two-pin female connector that connects to the “PWR” port on the MBX
 - 2) a female serial cable that connects to the “DATA” port on the MBX. Both of these cables are green in color.
- Connect the black antenna cable to the MBX port labeled “ANT IN”
- Connect the thin gray cable to the MBX port labeled “GPS OUT”
- Run about 3 feet of each of the Gray cables out one of the openings in the door of the backpack.



- Connect the gray, round, 4-pin connector to the port in the center back of the Map76.
- Connect the thin, gray cable to the small port located on the top right corner of the back of the Map76



- Connect the MBX to the battery by inserting the car-lighter type plug into the receptacle connected to the battery. The battery will power both the MBX and the Map76 when the whole system is wired together.



- The battery slides into one of the two thin internal pockets of the backpack and should be located toward the bottom of the backpack.



- The Map76 can use 2 AA internal batteries as well run on external power. Open the battery door on the back of the unit by turning the metal D-ring ¼ turn counter-clockwise then pulling straight away from the unit.

Assembly of Configuration 2



- Attach the magnetic mounting plate to the bottom of the external antenna using the two (2) screws included in the antenna package
- Screw the steel disk onto the threads on the top of the antenna mast
- Slide the antenna mast into one of the side pockets of the backpack, secure it in place by threading a velcro strap through the slot in the mast
- Place the antenna on to the steel disk on top of the antenna mast. The magnet on the antenna will hold it in place
- Thread the antenna wire through the slots in the door of the backpack. This will help to keep the antenna wire out of the way.
- Connect the antenna cable to the port located in the upper right corner on the back of the GPS unit.
- This GPS configuration is powered by the AA batteries in the Map76.

