

OWNER'S MANUAL
AND REFERENCE



GPSMAP 235 Sounder™



Software Version 4.01 or above

Internal Database Version 3.00 © GARMIN Corporation

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INTRODUCTION Warning

Warning

The GPSMAP 235 Sounder should not be used as a navigational aid or depth sounder to prevent collision, grounding, or boat damage, any of which could result in personal injury. For reasons of safety, we also recommend that you operate your boat at very slow speed if you suspect shallow water or submerged objects.

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INTRODUCTION

Cautions

CAUTION!

The GARMIN GPSMAP 235 Sounder has no user-serviceable parts. Should you ever encounter a problem with your unit, please take it to an authorized GARMIN dealer for repairs. Any attempt to open the case to change or modify the unit in any way will void your warranty and may result in permanent damage to the equipment.

Caution

The GPS system is operated by the United States government, which is solely responsible for its accuracy and maintenance. The system is subject to changes which could affect the accuracy and performance of all GPS equipment. Although the GARMIN GPSMAP 235 Sounder is a precision electronic NAVigation AID (NAVAID), any NAVAID can be misused or misinterpreted and, therefore, become unsafe.

Use the GPSMAP 235 Sounder at your own risk. To reduce the risk of unsafe operation, carefully review and understand all aspects of this Owner's Manual—and thoroughly practice operation using the simulator mode prior to actual use. When in actual use, carefully compare indications from the GPSMAP 235 Sounder to all available navigation sources, including the information from other NAVAIDs, visual sightings, charts, etc. For safety, always resolve any discrepancies before continuing navigation.

NOTE: The GPSMAP 235 Sounder generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If the sounder does cause harmful interference, the user is encouraged to try to correct the interference by relocating the equipment or connecting the equipment to a different circuit. Consult an authorized dealer or other qualified technician for additional help if these remedies do not correct the problem.

The GPSMAP 235 Sounder complies with Part 15 of the FCC limits for class B digital devices. Operation is subject to the following conditions: (1) The sounder may not cause harmful interference, and (2) the sounder must accept any interference received, including interference that may cause undesired operation.



INTRODUCTION

Sounder Capabilities

Designed for detailed electronic charting and complete depth sounding capability, the GARMIN GPSMAP 235 Sounder is a powerful navigation device that also gives you the fishfinding information you need in fresh or saltwater.

Precision Performance:

- High-contrast, four-level gray, LCD screen
- 12 channel receiver tracks and uses up to 12 satellites simultaneously for fast, accurate positioning
- Differential-Ready— just add the optional GBR 21 beacon receiver for better than 5-meter accuracy

Advanced Navigating and Plotting:

- 250 alphanumeric waypoints with selectable icons and comments
- Built-in database usable from 4096 to 64 nm worldwide and to 32 nm in the continental United States.
- 20 reversible routes with up to 30 waypoints each
- G-chart™ electronic charting with inland and offshore coverage
- LORAN TD to GPS Lat/Lon Coordinate conversion

Superior Fishfinding Ability:

- Four zoom levels with a moving view window
- Underwater waypoint marking
- Map/Sounder split screen displays navigation and fishfinding information
- Fish and depth alarms
- Digital depth continuously displayed on all pages
- Dual frequency operation for maximum coverage with good bottom detail
- Efficient noise rejection circuitry for removing cross talk and noise



INTRODUCTION

Warranty

Limited Warranty

GARMIN warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. GARMIN will, at its sole option, repair or replace any components which fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor. The customer is, however, responsible for any transportation costs. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL GARMIN BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

To obtain warranty service, call the GARMIN Customer Service Department (913.397.8200) for a returned merchandise tracking number. The unit should be securely packaged with the tracking number clearly marked on the outside of the package and sent freight prepaid and insured to a GARMIN warranty service station. A copy of the original sales receipt is required as the proof of purchase for warranty repairs. GARMIN retains the exclusive right to repair or replace the unit or software at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

Preface

Congratulations on choosing one of the most advanced depth sounding and marine navigation systems available. The GARMIN GPSMAP 235 Sounder combines the proven performance of GARMIN GPS, powerful G-Chart electronic charting, and full featured depth sounding into one unit to create an unsurpassed marine navigation and fishfinding package.

To get the most out of your new navigation and sounding system, take the time to go through this operator's manual and learn the operating procedures for your unit. This manual is broken down into two parts for your convenience.

Part One introduces you to the GPSMAP 235 Sounder and provides a “getting started tour” so that you may become more familiar with the unit. This section will provide you with a basic working knowledge of the sounder.

Part Two is divided into sections that provide detailed references to the advanced features and operations of the GPSMAP 235 Sounder. Part two allows you to concentrate on a specific topic quickly, without reading through entire portions of text that you may not need. This section can be used to look up detailed information about the GPSMAP 235 Sounder.



INTRODUCTION

Preface

WARNING!

The electronic chart is an aid to navigation and is designed to augment the use of authorized government charts, not replace them. Only official government charts and notices to mariners contain all information needed for safe navigation— and, as always, the user is responsible for their prudent use.



INTRODUCTION

Packing List

Before installing and using with your sounder, please check to see that your package includes the following items. If any parts are missing, please contact your GARMIN dealer immediately.

***Standard Package:**

- GPSMAP 235 Sounder
- External GPS Antenna and 30' cable
- Power/Data Cable
- Mounting and Gimbal Bracket
- Owner's Manual
- Quick Reference Card

*For assembly part number 010-00119-01, a transom mount transducer is included.

Optional Accessories:

- G-chart Electronic Chart Cartridges
- PC Kit
- In-Hull and Transom-Mount Transducers with or without temperature and speed-through-water capability.
- Additional mounting brackets and cables.



GETTING STARTED

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INTRODUCTION

Keypad Usage

The GPSMAP 235 Sounder's advanced keypad system is designed to allow for fast, convenient selection of navigation options and data entry.

The getting started tour will introduce you to the keypad and provide a 'hands-on' lesson in using the sounder. We strongly encourage you to take the getting started tour before using your unit for actual navigation and fishing.

The Quick Reference Card contains helpful tips on using the unit and performing various navigation and sounder tasks. It's a good idea to keep the Quick Reference Card nearby whenever you're operating your new sounder.

	Turns the unit on and off and controls 3-level screen backlighting.
	Scrolls the main pages in sequence and returns display from a submenu page to a main page.
	Captures your present position and displays the mark position window.
	Displays the GOTO waypoint window, allowing you to select the destination waypoint. Press GOTO twice to select a destination waypoint from the map.
	Displays context-sensitive options window. Press MENU twice to display main menu page.
	Activates highlighted fields and confirms menu options and data entry.
	Returns display to a previous page or restores a data field's previous value.
	Decreases the scale of the moving map and highway pages.
	Increases the scale of the moving map and highway pages.
	Controls the movement of the cursor and is used to select options and positions, and to enter data.
	Marks your present GPS position and instantly sets a return course while providing steering guidance.

Initializing the Receiver

Before you use your GPSMAP 235 for the first time, you'll need to "initialize the receiver." Initialization is the process in which the receiver collects satellite data and establishes its (your) present position. Follow the initialization process described below, which will usually provide a position fix in about a minute.

Before you initialize, make sure the sounder and antenna have been correctly installed according to the instructions in Appendix A.


To turn the GPSMAP 235 Sounder on:

1. Press and hold the  key until the power tone sounds.




The welcome page will appear while the unit conducts a self test. Once the internal test is complete, the mariner's warning will appear, asking you to read and acknowledge important information regarding the proper use of electronic charts.

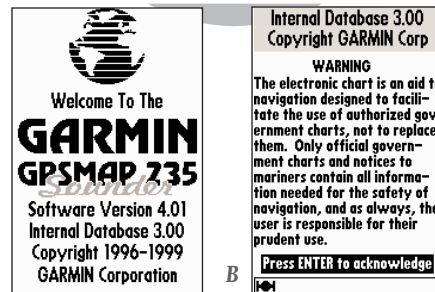
To acknowledge the mariner's warning:

1. Press the  key.

A flashing 'MESSAGE PRESS PAGE' prompt will appear at the bottom of the screen asking you to press the  key.

To view a system message:

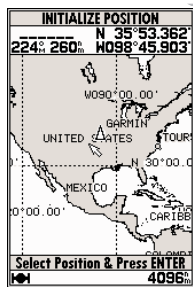
1. Press .
2. Press the  key again to return to the previous page. The 'select initialization' window will appear, with the 'select from map' option highlighted.
3. Press  to initialize the receiver from the built-in worldwide map.



- A. The Welcome Page will be displayed while the unit performs a self-test.
- B. Confirm the mariner's warning before starting navigation. Remember that the electronic chart is designed to supplement the local government charts, not replace them.

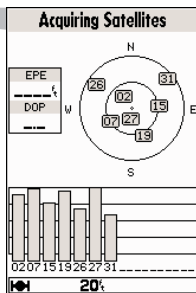
GETTING STARTED

Initialization



A

A. Use the arrow keypad to move the cursor to a location close to your present position.



B

B. Hollow signal strength bars will appear on the Status Page while the receiver collects satellite data.

Initializing the Receiver (con't.)

The Map Page will appear, prompting you to select your approximate present position with the map cursor.

1. Use the keypad to move the map cursor to a location close to your present position. If you have difficulty identifying your exact position, use the key to zoom to a lower map scale.
2. Press to confirm your selection.

The sounder will now begin searching for the appropriate satellites for your present position and should acquire a fix in approximately one minute. While the receiver searches for satellites, a flashing satellite symbol will appear at the left-hand side of the status bar located at the bottom of the screen. The status bar is used to monitor satellite signal reception and activated alarms, it also shows the digital depth on a continual basis.

A signal strength bar for each satellite in view will appear on the lower half of the page, with the appropriate satellite number under each bar. The progress of satellite acquisition is shown in three stages:

- *No signal strength bars:* The receiver is looking for satellites.
- *Hollow signal strength bars:* The receiver has found satellites and is collecting data.
- *Solid signal strength bars:* The receiver has collected the necessary satellite data and the sounder is ready to use.



Once the receiver has collected information from at least three satellites, the satellite symbol on the status bar will stop flashing.

Getting Started Tour

The GARMIN GPSMAP 235 Sounder is a powerful electronic navigation and depth sounding system that provides detailed chart coverage and convenient control of many advanced features right from the screen display. This tour is designed to take you through the basic pages and functions of the system using the simulator mode. Once you're familiar with the main pages and features of the unit, refer to the reference section for instructions on performing specific tasks and functions.




The Getting Started Tour assumes that the receiver has been properly installed and initialized, and you have not changed any of the default unit settings. If you have changed any settings (position formats, units of measure, etc.), the descriptions and pictures in the tour may not match your configuration.

To turn the sounder on:

1. Press and hold the  key until the power tone sounds. The welcome page will appear while the unit conducts a self test.
2. Once the self test is complete, press the  key to acknowledge the mariner's warning.

The satellite status page will appear as the receiver begins acquiring satellites. From the status page, you can adjust the screen contrast and backlighting.

To adjust the screen contrast:

1. To increase the screen contrast, press the right arrow of the  keypad.
2. To decrease the screen contrast, press the left arrow of the  keypad.
3. Press the  key to finish.

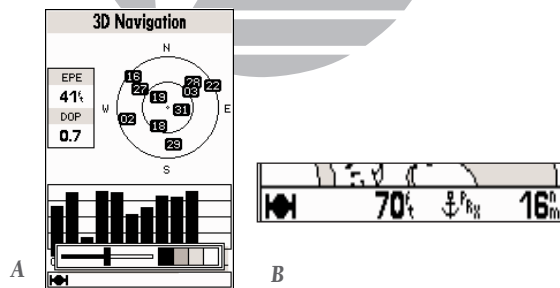
The sounder's three-level screen backlighting feature is controlled with  key, and can be adjusted at any time from any page.

To turn on and adjust the backlighting:

1. Press the  repeatedly until the backlighting is at the desired level (off, 1, 2, or 3).

GETTING STARTED

Power On/Screen Contrast



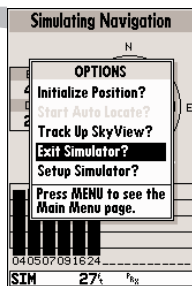
- A. The **screen contrast** may be adjusted from the Status Page by pressing the ARROW KEYPAD. Press EDIT/ENTER to confirm changes.
- B. The **status bar** at the bottom of the screen is displayed at all times. It continuously indicates current depth and displays symbols which identify what mode the unit is in, satellite signal presence, and which alarms (if any) have been triggered. The current scale will also be displayed if you are viewing the navigation or Map Page, or if you are using the sounder zoom feature. When you are viewing the Sounder Page, it will show the transducer frequency.

GETTING STARTED

Status Page/Simulator Mode



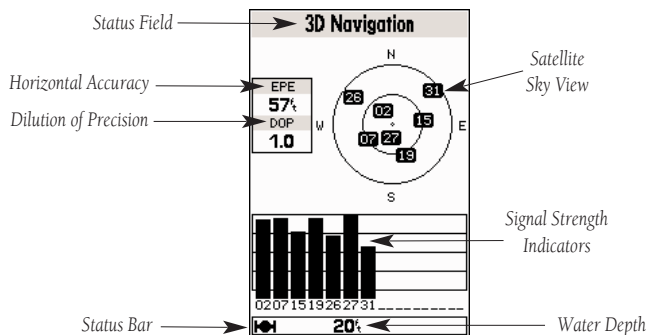
A



B

- A. To start the simulator, confirm the simulator warning. Do not use simulation for actual navigation or to determine actual water depth.
- B. Whenever the sounder is in simulator mode, a 'Setup Simulator?' option will appear on the options menu for each page. An 'Exit Simulator?' option will also appear on the Status Page options menu.

Status Page

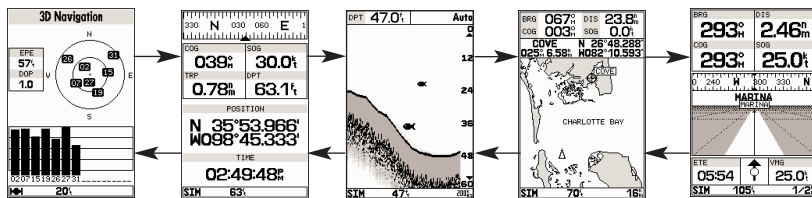


The **Status Page** provides a visual reference of satellite acquisition and receiver status, with a signal strength bar graph and a satellite sky view in the center of the page. Each page of the sounder features an options menu, which gives you access to other functions and features that relate to the specific page you are viewing. To get a feel for how this works, let's put the sounder into simulator mode.

To put the sounder in simulator mode:

1. From the Status Page, press the **MENU** key. The options menu will appear, displaying functions and features for the Status Page.
2. Use the UP or DOWN arrow of the **⬇** keypad to highlight the 'Start Simulator?' option and press **EDIT ENTER**.
3. Press the **EDIT ENTER** key to confirm the simulator warning. Once the simulator has been started, the status field at the top of the page will display 'Simulating Navigation.'

Now you're ready to continue the rest of the tour. All the waypoint and route planning done in simulator mode will still be retained in memory for future use.



The satellite Status Page is one of five main pages used in the sounder. All five pages are linked together in a simple chain, which allows you to scroll through the pages in either direction using the **PAGE** and **QUIT** keys. To continue the tour, let's move on to the next page, the position page.

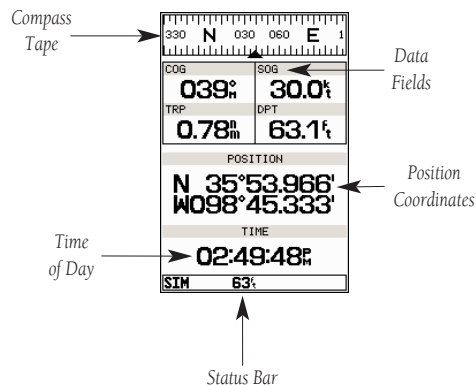
To scroll to the next page in sequence:

1. Press the **PAGE** key.

Position Page

The **Position Page** shows your position, direction of travel, and speed. The compass tape at the top of the page indicates the direction you're moving. The four user-selectable data fields below the compass tape show your current course and speed over ground, along with a resettable trip odometer and depth display. Your current latitude and longitude, along with a 12/24-hour clock, appear at the bottom of the page.

Now that you've seen how the status and position pages can be used to monitor satellite acquisition and your present position, let's take a minute to learn how to mark and store our present position as a waypoint. Since we're in simulator mode, the present position displayed will be the last position calculated by the receiver, which should be the spot where you initialized the unit. Marking a position will also give you an opportunity to see how the sounder's arrow keypad (**EDIT**) and **ENTER** keys are used for data entry.

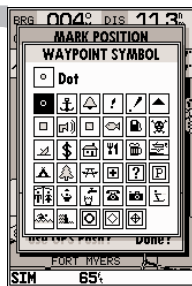
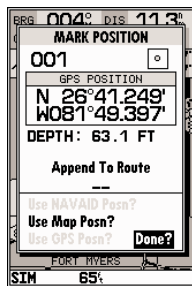


GETTING STARTED

Page Sequence/Position Page

GETTING STARTED

Marking a Position



A

B

- A. The mark position page will automatically assign a default, three-digit name for each waypoint, which can be changed at any time to an alphanumeric name containing up to six characters.
- B. A complete set of waypoint symbols allows you to mark inland and offshore waypoints with a custom symbol for fast waypoint recognition.

Marking a Position

To mark your present position:

1. Press the **MARK** key. The mark position page will appear, with a default three-digit waypoint name, symbol, position, and depth.
2. Use the **0** keypad to highlight the waypoint name field (001) and press **EDIT ENTER**.
3. Press the LEFT ARROW of the **0** keypad to clear the name field.

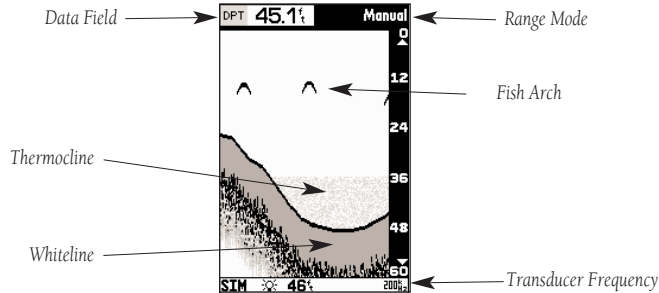


4. Use the **0** keypad to enter the name 'DOCK,' using the UP and DOWN arrows to select each letter, and the RIGHT arrow key to advance to the next character position. If you make a mistake and select an incorrect character, simply use the LEFT arrow key of the **0** keypad to backspace the cursor and correct the entry.
5. Press **EDIT ENTER** to confirm the name.
6. The field highlight will advance to the symbol field. Press **EDIT ENTER** to access the waypoint symbol page.
7. Use the **0** keypad to highlight the ANCHOR symbol.
8. Press **EDIT ENTER** to confirm the symbol.
9. Press **EDIT ENTER** again to confirm the 'DONE?' prompt and save the waypoint.

The DOCK waypoint is now stored in memory. Waypoints can also be created graphically from the map display, by manually entering position coordinates, or as underwater waypoints from the Sounder Page. Each of these techniques is described in the reference section of the manual or in the quick reference guide. To continue our tour, let's move on to the Sounder Page.

1. Press the **PAGE** key to access the Sounder Page.

Sounder Page

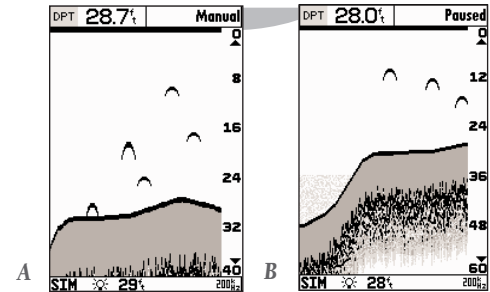


The **Sounder Page** lets you use the GPSMAP 235 as a fishfinder. The top of the screen contains any of seven selectable data field options, while the middle of the page contains a right-to-left moving sonar image of the water beneath your boat. (Note: Items appear on the screen as they pass under your transducer. Those objects appearing on the right side of the screen are closer to you than those on the left.) **Fish** are displayed as a darkened arch or a fish symbol in three different sizes. **Thermoclines** (layers of water separating warmer water from cooler water) are shown as shades of gray.

The area of strongest sonar return (or "**whiteline**") is displayed as a light gray band. Typically, the bottom will be the primary source of the whiteline. A thin whiteline indicates a softer bottom while a thick whiteline shows a harder bottom. A **black line** is used to show the point where water meets the whiteline. This black line will follow the bottom contour, along with any significant objects lying on the bottom. Along the right side of the screen is an **adjustable scale** which reflects the depth of the area being displayed. The **status bar** at the bottom of the page displays satellite signal status, digital depth, and any triggered alarms. More on the Sounder Page may be found on pages 24-38.

GETTING STARTED

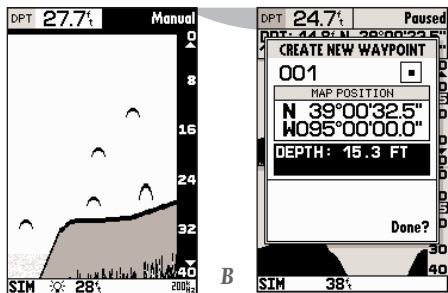
Sounder Page



- When adjusted correctly, the bottom is outlined by the whiteline. To adjust the whiteline, see page 30.
- Pause the screen by pressing the EDIT/ENTER key at any time. To continue screen movement, press EDIT/ENTER again. Pause the screen to allow more time to examine the screen display and when using the underwater waypoint feature.

GETTING STARTED

Range Modes



- A. When switching between auto and manual modes, the range scale will be highlighted.
- B. The depth of the waypoint is captured with the underwater waypoint feature.

Range Modes

The unit uses three range modes on the Sounder Page: auto, manual, and window. **Auto** mode displays the most information possible while continuously showing the bottom. **Manual** mode lets you select the displayed depth. **Window** mode allows you to define a starting depth and length of the range window, but must be started from the sounder options menu (see page 31).

To switch from auto to manual mode:

1. Press the keypad up or down until the desired depth range is displayed on the depth scale at the right side of the page. Press to confirm the selected range.

To switch from manual to auto mode:

1. Press the up or down and hold it until you hear a repeated beep. 'Auto' will be displayed in the function field at the top-right corner of the page. Press .

Underwater Waypoints

The **underwater waypoint** feature marks a waypoint's position and its depth. Marking an underwater waypoint makes it easier to find and use an object for a future fishing location reference point.

To mark an underwater waypoint:

1. Press to pause the screen movement.
2. Use the keypad to move the cursor onto the target you want to mark. A data field will appear with the cursor's depth and bearing and distance from your current position.
3. Press . A waypoint page will appear with the waypoint's coordinates, default three-digit name, and depth.
4. Enter any waypoint information such as name, comment, etc., and press . When finished, press or .

Zoom Feature

The zoom feature allows you to view a smaller portion of the complete range in greater detail.

The zoom feature operates in auto or manual mode. Auto zoom will follow the bottom contour while manual zoom will display the selected depth. For more on the zoom feature, see pages 26-27.

To use the zoom feature:

1. While viewing the Sounder Page, press **IN**. The zoomed part of the display (always the bottom part) shows you twice the detail of the original display at half the depth.
2. Pressing **IN** a second time shows you twice the detail of the original at half the depth in one screen.
3. Pressing **IN** a third time shows you four times the detail in the zoomed part of the screen at a quarter of the original depth.
4. Pressing **IN** a fourth time shows you four times the detail in the zoomed part of the screen at a quarter of the original depth in one screen.

Note: When dual frequency is selected, there is no split zoom with a full range over a zoomed window. Both the 50 kHz and the 200 kHz will zoom together, regardless of which is on top or bottom.

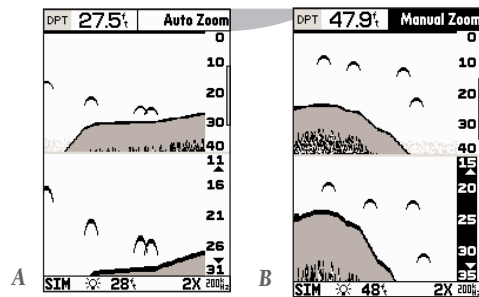
To turn the zoom feature off, press **OUT** until the original scale picture appears and a triple beep sounds.

Let's continue the Getting Started Tour with the Map Page.

1. Press **PAGE**.

GETTING STARTED

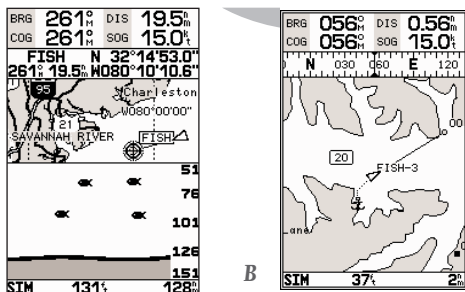
Zoom Feature



- A. Use the zoom window to view a smaller portion of the complete range in greater detail.
- B. Moving the zoom window allows you to quickly view any spot between the surface and the bottom. See page 27 for directions on moving the zoom window.

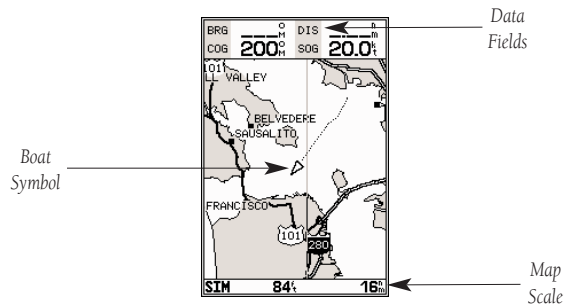
GETTING STARTED

Map Page



- A. The map/sounder split screen displays cartography and sonar information at the same time. The split screen only functions as a map page, and any changes to the sonar display must be made from the Sounder Page. Use the **QUIT** or **PAGE** key to quickly switch between the map split-screen and the Sounder Page. See page 28 for split screen operation information.
- B. The Map Page can also be configured to display additional data fields and a graphic course deviation scale or compass. See page 46 for more on map options.

Map Page



The **Map Page** combines digital chartplotting with a user-selectable display of navigation data, and a built-in worldwide database. It will also be the page you use most to create and edit waypoints and routes. Before we take off on a practice route, let's take a brief look at its various features and displays.

The **map display**, located in the middle of the Map Page, shows your boat as a triangular marker. Geographic names, markers and buoys that are provided by the G-chart cartridge you're using are also shown. It also displays your track, routes and nearby waypoints. An on screen **cursor** lets you pan to other map areas, determine the range and bearing to a position, and perform various waypoint and route functions.

The **data window**, located at the top of the page, provides a user-selectable display of various navigation data, including course, speed over ground, and bearing and distance to the cursor or a particular waypoint. The status bar, located at the bottom of the page, displays the current map scale setting, as well as the status information described on page 3.

Using the Map Cursor

The cursor is an important tool that can be used to pan to other map locations, mark and edit waypoints and routes, and review position data of on-screen nav aids and waypoints. To get a feel for using the Map Page and cursor, try the following exercise:

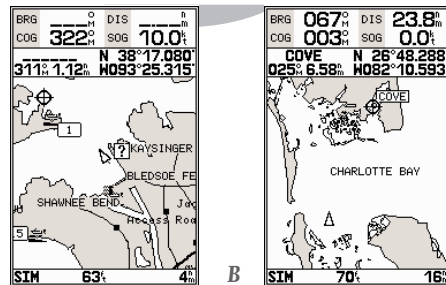
1. Use the **OUT** key to set the map scale to the 64 nm setting. Your boat should be near the center of the map.
2. Use the DOWN arrow of the **☉** keypad to move the cursor down to the first lat/lon grid south of your boat's position.
3. Using the **☉** keypad to move the cursor, try following the outline of the lat/lon grid closest to your boat. Notice how another data field appears at the top of the page, showing the bearing and distance from your boat to the cursor, along with the lat/lon of the cursor.
4. Press the **QUIT** key to remove the cursor and recenter your boat on the map display.

As you become more familiar with the cursor, you'll see that the map display actively scrolls or 'pans,' letting you explore areas in and outside of your current G-chart coverage, and create waypoints and routes. Wherever you move the cursor, you'll always be just one keystroke away from returning the map to your present position by pressing **QUIT**.

Now that you have a feel for how the cursor works, let's move on and see how the sounder works on the water. To help you practice using the Map Page and other features, we've stored a practice route in the receiver's memory so that you can see exactly what you'll experience when you're navigating with your new GPS chartplotter.

GETTING STARTED

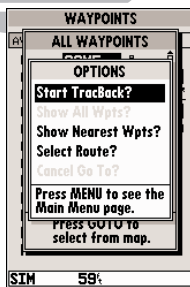
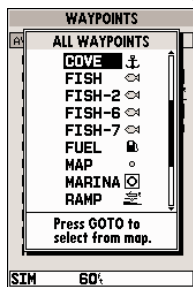
Map Cursor



- A. Whenever the cursor is active, the bearing and distance of the cursor from your present position will appear in a pop-up data window. To remove the cursor and re-center your vessel on the map, press the QUIT key.*
- B. To select an on-screen waypoint, simply move the cursor over the desired waypoint. The waypoint/navaid name and position, along with the bearing and distance from your present position, will be displayed. Underwater waypoints are also shown on the map.*

GETTING STARTED

Using the GOTO Feature



- A. Pressing GOTO once displays a list of all waypoints stored in memory. To pick a destination, select the desired waypoint and press EDIT/ENTER.
- B. The GOTO options menu allows you to start a TracBack route back home, select a destination from the nearest waypoints list, or select a route to navigate.

Going to a Destination

GPS is all about marking positions as waypoints and navigating to them using the receiver's steering guidance and map displays. We've already seen how to use the **MARK** key to store our present position, so it's time to move on to the fun part—going to a destination. The **GOTO** key, located on the left side of the keypad above the **QUIT** key, is the primary tool used to select a destination waypoint or a route to navigate. The **GOTO** key can be used in three primary ways:

- Pressing **GOTO** once displays a list of all waypoints in memory, from which you can select a single destination waypoint.
- Pressing **GOTO** followed by the **MENU** key provides a list of GOTO options that lets you start a TracBack route, select a destination waypoint from the nearest waypoints list, select a stored route to navigate, or cancel the current GOTO destination.
- Pressing **GOTO** twice allows you to graphically select an on-screen waypoint, navaid or cursor position as a destination directly from the map display.

For our simulated trip, we're going to select the pre-programmed tour route. (Don't delete the tour route. Once it's deleted, it can't be retrieved for further practice.) The tour route will automatically place our vessel at the first route waypoint. Navigating the tour route will also give us an idea of how the **MENU** key is used to provide context-sensitive options and functions. Let's try it by activating the practice tour route stored in memory for navigation:

1. Press **GOTO**. The waypoint list page will appear. (If we were selecting a single waypoint to navigate to rather than a route, we would highlight the waypoint and press **EDIT ENTER**.)
2. Press **MENU** to display the options menu available for the GOTO function.
3. Use the **◀** keypad to highlight the 'Select Route?' option. Press **EDIT ENTER** to confirm.
4. The select route page will appear, with the 'GPSMAP TOUR' route highlighted.
5. Press **EDIT ENTER**. The Map Page will reappear and display five waypoints chained together in a simple route, with your boat at the first route waypoint.

Going to a Destination (con't.)

A **data field** at the top of the page will now display the bearing and distance to the second route waypoint. To get started, let's enter a speed for our vessel, which we can do from the 'Setup Simulator?' listing on the map options menu. The **setup simulator page** is available from any page in the main page sequence.

To enter a boat speed:

1. Press the **MENU** key to display the map options menu.
2. Use the **⬇️** keypad to select the 'Setup Simulator?' option and press **EDIT/ENTER**.
3. Once the setup simulator page appears, press **EDIT/ENTER** to access the SOG field.
4. Use the **⬇️** keypad to enter a speed of 60 knots.
5. Press **EDIT/ENTER** to finish, and **PAGE** to return to the map display.

Once a speed has been entered, you'll notice that the map will begin to move slowly, keeping your boat centered on the display. To get a better view of what's going on, zoom in to a closer map scale.

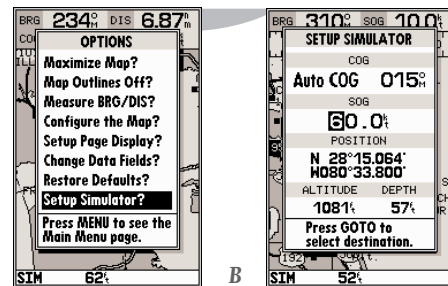
1. Press the **OUT** key to select the 16 nm scale.

You'll now have a clearer picture of the route we are navigating, along with an outline-only presentation of the surrounding shoreline. Because the usable range of the built-in database is only valid to 64 nm scale (32nm in the U.S.), we no longer have full cartography available.

Keep in mind that whenever you do exceed the usable range of the built-in database or the G-chart cartridge in use, the range field will display 'OVR ZM' or 'NO MAP' to indicate that you should exercise extreme caution using the cartography data. See pages 42 and 85 for more information on map scales and using G-chart detailed cartography.

GETTING STARTED

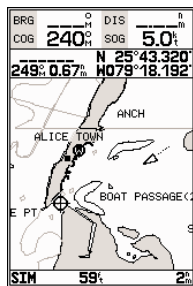
Simulator Setup



- A. To enter a boat speed or define the simulated course, highlight the 'Setup Simulator?' option and press EDIT/ENTER.
- B. Enter a boat speed of 60 knots to begin the tour. Sixty knots will allow you to complete the Getting Started tour in approximately 10-15 minutes.

GETTING STARTED

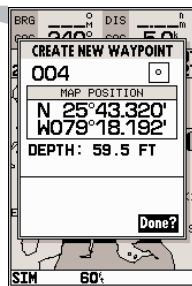
Reviewing and Creating Waypoints on the Map



A

A. Waypoints can be created from the map display by moving the cursor to the desired position and pressing the EDIT/ENTER key.

B. The create new waypoint page will automatically assign the next available three-digit number as the default waypoint name. If you are creating a waypoint at an on-screen navaid, the navaid icon and name will be used as the default symbol and comment.



B

Going to a Destination (con't.)

Now that we've zoomed in a little closer to our route, we can pan ahead of our vessel with the cursor to review and create on-screen waypoints and nav aids. Try moving the cursor to select the 'TOUR3' waypoint— just use the keypad to move the cursor as close as possible to the waypoint. (To move the cursor in small increments, try a series of short key presses.)

Once the cursor is over the TOUR3 waypoint, you'll notice that the waypoint symbol and name will become highlighted. The data field at the top of the page will display the waypoint name, the range and bearing from your present position, and the coordinates for the waypoint.

To review the waypoint page for a selected waypoint:

1. Press the key.
2. To return to the Map Page, press again.

The cursor can also be used to create new waypoints right from the map display.

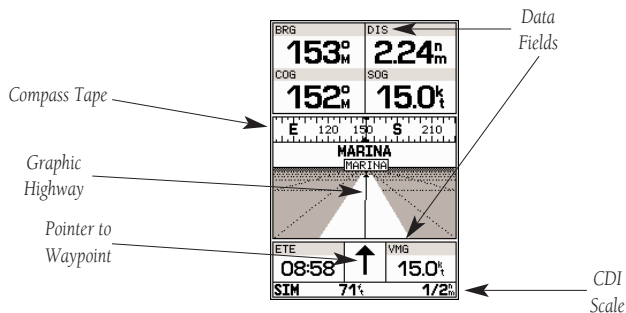
To create a new waypoint using the cursor:

1. Use the keypad to move the cursor as close as possible to the following position: N 35° 02.129'; W 076° 26.106' (Use the data window to verify the cursor position.)
2. Press the key to capture the cursor position.
3. Use the key to highlight the waypoint symbol field.
4. Press to access the symbol page.
5. Press the DOWN arrow of the keypad twice to select the wreck symbol.
6. Press to confirm, and again to finish.

Now that we're navigating to an actual destination, let's move on to the next page of the sounder, the **Navigation Page**:

1. Press the key.

Navigation Page



The Navigation Page provides graphic steering guidance to your destination. The **bearing (BRG)** and **distance (DIS)** to the destination, with your current **course (COG)** and **speed over ground (SOG)**, are displayed at the top of the page, along with a compass tape to indicate your cardinal heading. The **estimated time enroute (ETE)** and **velocity made good (VMG)**, or the rate you are closing in on your destination) are displayed at the bottom of the page.

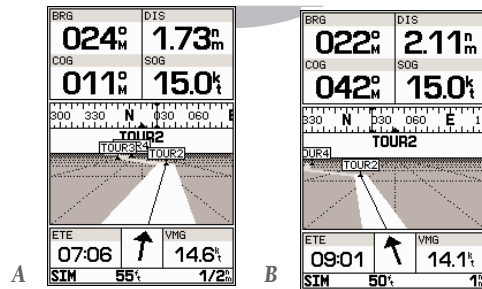
As you head toward the destination, the middle section of the page gives you visual guidance to your waypoint on a **graphic highway**, which displays the route and nearby waypoints on screen. The moving arrow below the highway always points to the destination waypoint relative to the direction you're moving.

The line down the center of the highway represents your desired track, while the bottom of the page provides a graphic indication of your **crosstrack error** (the distance and direction you are off course) according to the scale at the bottom right of the page.

In simulator mode, you can adjust your speed and course from the Navigation Page using the **0** keypad. As you head toward each waypoint in the tour route, try adjusting your boat speed and course to get a feel for how the highway works.

GETTING STARTED

Overview



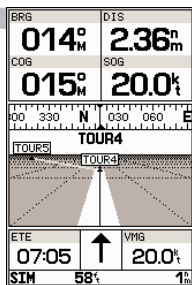
- A. In this example, our boat is off course to the left by about 1/8th of a mile (the base of the highway map is equal to the scale selected at the bottom right of the page). To get back on course, steer right.
- B. In this example, our boat is off course to the right. To get back on course, steer left. A digital readout of your exact cross-track error can be displayed in any of the six data fields (see page 47).

GETTING STARTED

Using the Navigation Page



A



B

- A. To reset the simulator to steer the desired course automatically, select the 'Auto COG' setting from the options menu.
- B. The highway scale can be set to a 1/4-, 1/2-, 1-, 2-, or 4-nm/mi/km range with the ZOOM keys.

Navigation Page (con't.)

To adjust the simulated boat speed:

1. Press the UP arrow of the keypad to increase the speed in 5 knot/kph/mph increments. Press the DOWN arrow to decrease the speed in the same increments.

To steer the boat:

1. Press the LEFT or RIGHT arrows of the keypad.

Notice that as you get off course, the highway and waypoint pointer move to give you graphic guidance to get back on course. The scale in the lower right corner of the page represents the total distance (or the width) of the base of the highway display. The default graphic highway setting is 1/4 nm, but can be set for a 1/2-, 1-, 2- or 4-nm range.

To change the highway scale display:

1. Press the or key in either direction (up to increase, down to decrease the scale).

The Navigation Page data fields can also be configured to display any of eight different navigation information categories. Let's change the ETE field to ETA (estimated time of arrival).

To change a data field:

1. Press the key to display the position page options.
2. Highlight the 'Change Data Fields?' option and press . The field highlight will now appear in the top-left data field (the COG field).
3. Use the keypad to move the field highlight to the ETE field and press . Highlight the 'ETA' option and press , and press to finish.

Now that you've seen the five main pages, let's look at the **active route page**, which appears in the main page sequence whenever you are navigating a route:

1. Press .

Active Route Page

The active route page shows each waypoint of the active route in sequence, with the waypoint name, distance and estimated time enroute to each waypoint displayed. As you navigate the route, the active route list will be automatically updated, indicating the next destination waypoint. The active route page also provides quick access to many route activation, editing and copying functions you'll use most often, like inverting and deactivating the active route. Let's go ahead and deactivate the active route.

To deactivate the active route and stop navigation:

1. Press the **MENU** key.
2. Highlight the 'Deactivate Route?' option.
3. Press **EDIT/ENTER** to confirm.

To reset the boat speed to zero:

1. Press the **MENU** key.
2. Highlight the 'Setup Simulator?' option.
3. Press **EDIT**.
4. Press **EDIT/ENTER** to access the SOG field.
5. Press the LEFT arrow of the **0** keypad to clear the speed entry.
6. Press **EDIT/ENTER**.

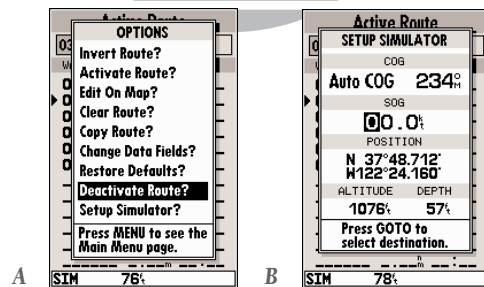
As you've seen, the primary pages provide status, position, fishfinding, navigation and map information. The tour's last page is the **main menu** page, which allows access to the sounder's waypoint, route and planning functions, as well as various operational and navigation setup features. The main menu is available from any page, and is accessed through the **MENU** key.

To access the main menu page:

1. Press the **MENU** key twice.

GETTING STARTED

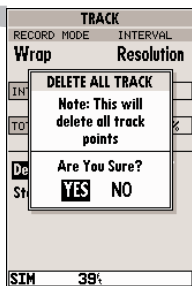
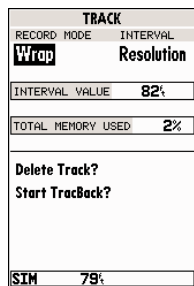
Active Route Page



- A. To stop navigating the active route, select the 'Deactivate Route?' option and press EDIT/ENTER.
- B. Use the left arrow key to clear the SOG field and press EDIT/ENTER to confirm.

GETTING STARTED

Main Menu and Power Off



A

B

- A. The sounder's track page lets you clear the track log and start a TracBack route.
- B. To delete the track log, confirm the warning page by highlighting the 'YES' prompt and pressing EDIT/ENTER.

Main Menu Page

The main menu page's eleven submenus are divided into categories by function. You can select a particular submenu by simply highlighting the desired option and pressing **EDIT/ENTER**. To get a feel for how the main menu page works, let's clear out the track log we've created during our simulated tour. Clearing the track log will ensure that you have a clean slate once you start navigating in your home waters.

To select the track submenu:

1. Highlight the 'Track' menu option and press **EDIT/ENTER**.

The track log page allows you to specify whether to record a track plot and define how it is recorded. It also provides both an indicator of the total memory used and the individual functions to clear the track log and start a TracBack route.

To delete the track log:

1. Highlight the 'Delete Track' option and press **EDIT/ENTER**. A confirmation page will appear.
2. Highlight the 'Yes' prompt and press **EDIT/ENTER** to confirm.
3. Press **PAGE** to return to the main page sequence.

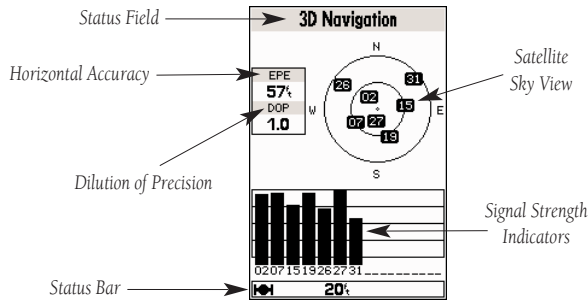
Congratulations! You've now gone through the basic operation of the GARMIN GPSMAP 235 Sounder. Your new digital chartplotter is a powerful tool with many advanced features not covered in the Getting Started tour. For detailed instructions on using these features or performing a specific task, please refer to the quick reference guide or the appropriate reference section of this manual.

To turn the sounder off:

1. Press the **⏻** key.

The next section of the manual describes the pages and features of the GPSMAP 235 Sounder in detail. If you are unable to locate a specific option or feature, please refer to the index on pages 106-108.

Status Page



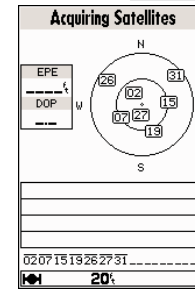
The **Status Page** provides a visual reference of various receiver functions, including current satellite coverage, receiver operating mode and current receiver accuracy. The status information will give you an idea of what the receiver is doing at any given moment.

The **sky view** and **signal strength bars** give you an indication of what satellites are visible to the receiver and whether or not they are being tracked. The signal strength is shown on a bar graph for each satellite, with the satellite number below. When a satellite is visible but not being tracked, the strength bar will not be shown and the sky view indicator will not be highlighted.

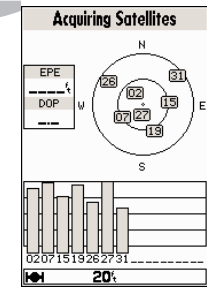
The sky view shows a bird's-eye view of the position of each satellite relative to the receiver's last known position. The outer circle represents the horizon (track up), the inner circle 45° above the horizon, and the center point a position directly overhead. Use the sky view to determine if there are obstructions shading your reception of GPS signals.

STATUS PAGE Overview

SECTION 1



A



B

A. Whenever the sounder is searching for satellites, no signal strength bars will appear.

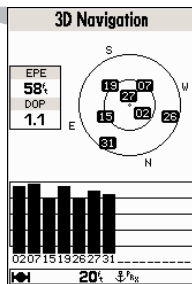
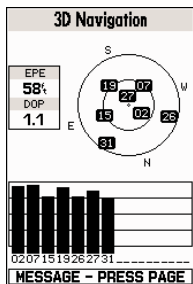
B. Once the receiver has found the satellite(s) indicated, a hollow signal strength bar will appear. After satellite data has been collected, the signal strength bars will become solid.

SECTION

1

STATUS PAGE

Receiver Status



A. The status bar at the bottom of the page displays important status, alarm and map scale information. It also provides on-screen user and message prompts.

B. The status bar will display an anchor symbol or 'PRX' icon whenever the anchor drag alarm or proximity alarm has been triggered.

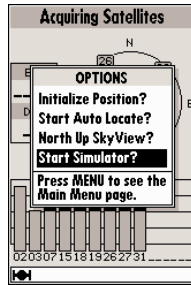
Receiver Status, EPE and DOP

Receiver status is displayed at the top of the page, with the current **estimated position error** (EPE) and **dilution of precision** (DOP) to the left of the sky view. DOP is an indication of satellite geometry quality measured on a scale of one to ten (lowest numbers the best, highest numbers the poorest). EPE uses DOP and other factors to calculate a horizontal position error in feet or meters. The status field will show one of the following conditions:

- **Searching the Sky:** The receiver is looking for satellites.
- **AutoLocate:** The receiver is looking for any satellite whose almanac has been collected. The autolocate process can take up to five minutes.
- **Acquiring Satellites:** The receiver is looking for and collecting data from satellites visible at its last known or initialized position, but has not collected enough data to calculate a fix.
- **2D Navigation:** At least three satellites with good geometry have been acquired and a two dimensional position fix (latitude and longitude) is being calculated. '2D Differential Navigation' will appear when you are receiving DGPS corrections in 2D mode.
- **3D Navigation:** At least four satellites with good geometry have been acquired and your position is now being calculated in latitude, longitude and altitude. '3D Differential Navigation' will appear when you are receiving DGPS corrections in 3D mode.
- **Poor GPS Coverage:** The receiver is no longer tracking enough satellites for a 2D or 3D fix.
- **Receiver Not Usable:** The receiver is unusable, possibly due to incorrect initialization or abnormal satellite conditions. Turn the unit off and back on to reset.
- **Simulating Navigation:** The receiver is in simulator mode.

Satellite Status Page Options

The satellite Status Page features an options menu that provides access to functions and features relating to the Status Page.



To display the Status Page options menu:

1. From the Status Page, press **MENU**.

There are four options:

- **Initialize Position?:** Allows you to initialize the receiver graphically or by text. See page 1 for instructions on initialization.
- **Start AutoLocate?:** Allows the receiver to locate your position automatically.
- **North Up SkyView?:** Allows you to select between a north up or track up sky view display.
- **Setup Simulator?:** Allows you to define speed, course and position values while in simulator mode. See the getting started tour for more on using the simulator mode.

To select a menu option:

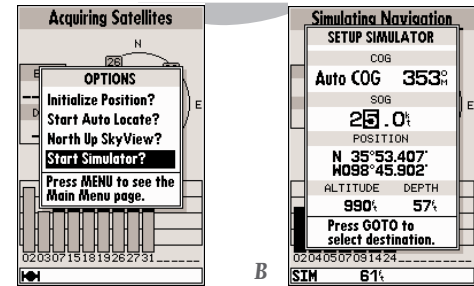
1. Highlight the desired option and press **EDIT/ENTER**.

STATUS PAGE

SECTION

1

Initialize Position,
AutoLocate, North Up,
and Setup Simulator

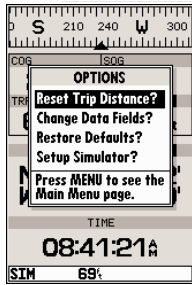


- A. Whenever the sounder is in simulator mode, the 'Setup Simulator?' option will appear on the option menu for each of the main pages.
- B. The setup simulator page allows you to define your speed and course over ground, as well as your position, altitude, and depth. The 'Auto COG' option will automatically steer the desired course to your destination. Your speed and course can also be selected from the Navigation Page using the rocker keypad (see page 13).

SECTION 2

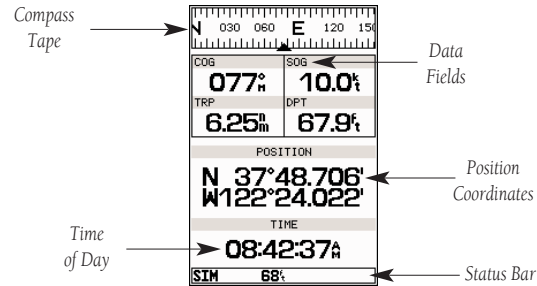
POSITION PAGE

Overview



The trip odometer can be reset from the Position Page options menu. To reset the odometer, select the 'Reset Trip Distance?' option and press EDIT/ENTER.

Position Page



The position page shows your position, direction, and speed. There is a graphic compass tape at the top of the page that shows the direction you're heading (you have to be moving), and four selectable data fields: course over ground (COG), speed over ground (SOG), distance traveled (TRP) and altitude (ALT). The bottom half of the page displays your present position's coordinates, along with the time of day (calculated using GPS satellites). The status bar at the bottom of the page displays important status, alarm and map scale information. It also provides on-screen user and message prompts.

The units of measure for speed, distance, position and altitude are all user-selectable through the navigation setup option on the main menu page (page 79). The time of day is shown in UTC (Universal Time Coordinated, or Greenwich Mean Time) and can be set to a 12- or 24-hour time format (with a local offset) through the system setup option on the main menu page.

Position Page Options

The position page features an options menu that provides access to functions and features relating to the position page.

To display the position page options menu:

1. Press **MENU**.

There are four options:

- **Reset Trip Distance?:** Resets the trip odometer (TRP) field to zero.
- **Change Data Fields?:** Allows you to choose the data displayed in the four user-selectable data fields. There are eight data types:
 - SOG: Speed over ground
 - VDC: DC voltage
 - TRP: Distance traveled
 - STW: Speed through water
 - ALT: Altitude
 - COG: Course over ground
 - DPT: Depth
 - TMP: Temperature
- **Restore Defaults?:** Resets all data fields to the factory settings.
- **Setup Simulator?:** Allows you to define speed, course and position values while in simulator mode. See the getting started tour for more on using simulator mode.

To select a menu option:

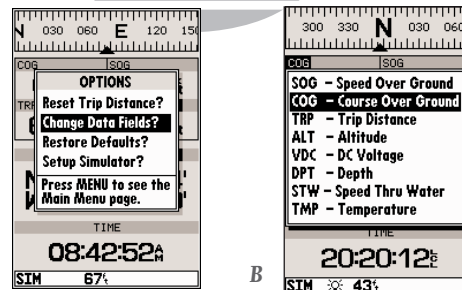
1. Highlight the desired option and press **EDIT/ENTER**.

To change a data field:

1. Highlight the 'Change Data Fields?' option and press **EDIT/ENTER**.
2. Move the field highlight to the field you want to change and press **EDIT/ENTER**.
3. Select the desired data field option and press **EDIT/ENTER**.

POSITION PAGE SECTION 2

Trip Distance, Date Fields, Restore Defaults, and Simulator Setup

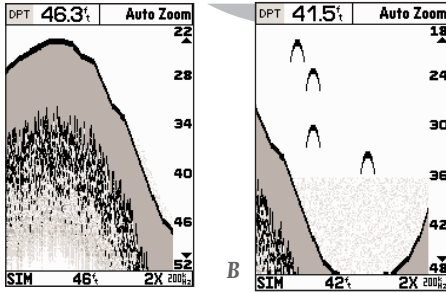


- A. The four data fields at the top of the Position Page can be changed by selecting the 'Change Data Fields?' option.
- B. Each data field can be set to display speed over ground, course over ground, distance traveled, altitude, DC voltage, and depth. Speed thru water and temperature display are available if you are using a properly equipped transducer.

SECTION 3

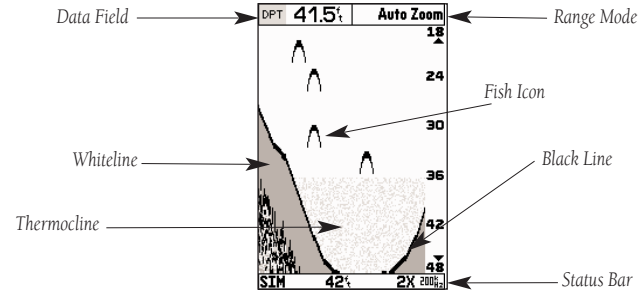
SOUNDER PAGE

Overview



- The right side of the screen represents the transducer's location on your boat. Items appearing on the right side of the screen were passed by more recently than those on the left.
- The four-level gray LCD screen makes it possible to easily separate sonar targets from their surroundings.


Sounder Page




The **Sounder Page** is where your GPSMAP 235 becomes a powerful fishfinder. The top of the screen can display a maximum of seven selectable data field options, while the middle of the page displays a right-to-left moving sonar image of the water beneath your boat. (Note: Items appear as they pass under your transducer.) **Fish** are displayed as a darkened arch or a fish symbol in three different sizes. **Thermoclines** are shown as shades of gray.

The area of strongest sonar return (or “**whiteline**”) is displayed as a light gray band below the black line. Typically, the bottom will be the primary whiteline. A thin whiteline indicates a soft bottom while a thick whiteline shows a harder bottom. A **black line** is used to show the point where the water meets the whiteline. The black line follows the contour of the bottom and shows objects of reasonable size. Along the right side of the screen is an **adjustable scale** which reflects the depth of the area being displayed. The **status bar** at the bottom of the page displays satellite signal status, digital depth, operating frequencies (single or dual mode), and any triggered alarms. It also shows the zoom level when the sounder is in the zoom mode.




Range Modes

The sounder features three depth range modes: auto, manual, and window. **Auto** is the default setting and continually adjusts the screen display to show the maximum amount of detail possible, while always showing the bottom; **manual** allows you to adjust the sonar display's depth using the  keypad; **window** lets you establish a starting depth (top) and length (span) for the sonar display.





Switching Between Ranges and Modes

The  keypad is used to switch between manual and auto modes. Window mode, however, can only be turned on from the sounder options menu (see page 31).




To switch from auto to manual mode:

1. Press the  keypad up or down until the desired depth range is displayed on the scale at the right side of the page.
2. Press  to confirm the selected range or  to return to auto mode.

To adjust manual range or switch from manual to auto mode:

1. Press the  keypad up or down until the desired depth range is displayed, then press  to confirm the selected depth.
2. You can easily switch to auto mode if you press and hold the  up or down until you hear a repeated beep. 'Auto' will be displayed in the function field at the top right corner of the page. Press  to confirm.

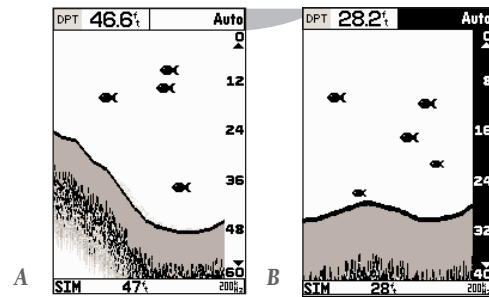
To adjust the window range any time after the unit has been put in window mode:

1. Press  once in any direction. The window range submenu will appear.
2. Enter values for the 'top' and 'span' fields and press . When finished, press .

SOUNDER PAGE

Range Modes

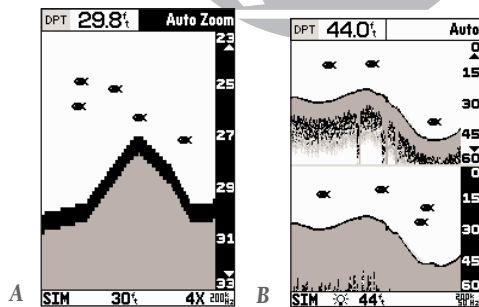
SECTION 3



- A. Auto mode will show the most information available while always keeping the bottom in view.
- B. The range scale will be highlighted when using the arrow keypad to adjust manual range mode or when switching between auto and manual mode.

SECTION 3

SOUNDER PAGE Zoom Feature



- A. The 4X full display screen shows the original picture at four times the detail.
- B. For dual frequency operation (in this example 200 kHz/50 kHz), the bottom half of the screen shows the original picture at the original viewing depth, at the bottom frequency (50 kHz).

Zoom Feature

The zoom feature allows you to view a smaller portion of the complete range in greater detail.

The zoom feature operates in auto or manual mode. Auto zoom will follow the bottom contour while manual zoom will display the selected depth. For more on the zoom feature, see pages 26-27.

To use the zoom feature:

1. While viewing the Sounder Page, press **IN**. The zoomed part of the display (always the bottom part) shows you twice the detail of the original display at half the depth.
2. Pressing **IN** a second time shows you twice the detail of the original at half the depth in one screen.
3. Pressing **IN** a third time shows you four times the detail in the zoomed part of the screen at a quarter of the original depth.
4. Pressing **IN** a fourth time shows you four times the detail in the zoomed part of the screen at a quarter of the original depth in one screen.

Note: When dual frequency is selected, there is no split zoom with a full range over a zoomed window. Both the 50 kHz and the 200 kHz will zoom together, regardless of which is on top or bottom.

To turn the zoom feature off, press **OUT** until the original scale picture appears and a triple beep sounds.

Zoom Window Depth Scale

Once a zoom window is displayed, its depth scale can be adjusted. A hollow indicator bar is displayed to the left of the depth scale on the original picture (top half of the screen). The depth scale of the zoom window corresponds to the range set by the indicator bar. To adjust the depth scale of the zoom window, simply use the arrow keypad and move the indicator bar up or down setting it to the desired range. The depth scale of the zoom window now corresponds to the range set by the indicator bar. Press **EDIT/ENTER** to accept or press **QUIT** to return to the previous window position. The indicator bar is only visible when zoom is split but you can always adjust the zoom window, even in full screen mode.

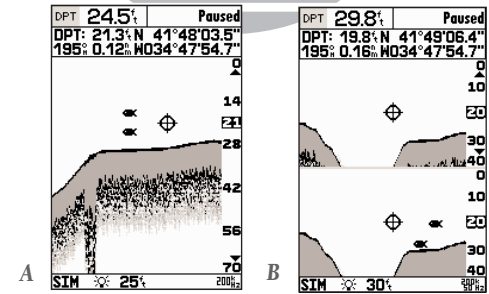
Underwater Waypoints

The underwater waypoint feature marks the position and depth of an object which you might want to return to, such as a stump, underwater ledge, etc.

To mark an underwater waypoint:

1. Press **EDIT/ENTER** to pause the moving screen.
2. Press the **⬆** keypad in any direction to turn on the on-screen cursor. A data field will appear showing the cursor's depth, bearing and distance from your current position, and the waypoint's coordinates. The depth will also be highlighted in the scale bar. Since the distance and bearing shown are measured from the boat to the waypoint, they will change as your boat moves, even if the cursor is stationary.
3. Use the **⬆** keypad to move the cursor onto the target (stump, etc.) to be marked.
4. Press **EDIT/ENTER**. A 'Create New Waypoint' page will appear listing the waypoint's coordinates, default three digit name, and depth.
5. Enter any information for the waypoint such as name, etc., and press **EDIT/ENTER**.
6. To resume display movement, press **QUIT** or **EDIT/ENTER**.

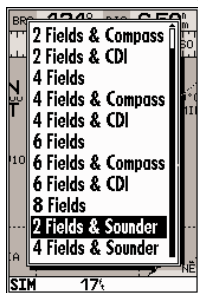
Note: If you only want to see the depth of an object and not mark it as a waypoint, once the depth is displayed, press **QUIT** and return to normal operation.



- A. Use the target cursor to mark an underwater waypoint and press **ENTER**.
- B. Underwater waypoints can be marked while using the zoom feature by following the same steps used for a non-zoomed screen.

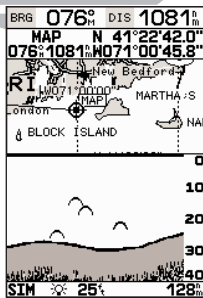
SECTION 3 SOUNDER PAGE

Map/Sounder Split Screen



A

A. The split screen display is activated from the Map Page.

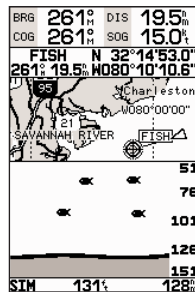


B

B. In the split screen mode, the Map Page is fully functional but the Sounder Page is for viewing purposes only.

Map/Sounder Page Split Screen

The sounder can display a split screen view of the sounder window and Map Page. The split screen feature is turned on from the **Map Page**.



To view the split screen:

1. Press **PAGE** until the Map Page appears.
2. Press **MENU** to display the Map Page options menu.
3. Highlight the 'Setup Page Display?' option and press **EDIT/ENTER**.
4. Select either of the entries for 'Fields and Sounder' and press **EDIT/ENTER**.

In the split screen mode, the Map Page is fully functional but the Sounder Page is for viewing purposes only. To modify the Sounder Page, you must press **QUIT** (to access the Sounder Page), make any desired changes, and then press **PAGE** to return to the split screen (in dual frequency mode, the bottom transducer frequency is always shown). Note: For best results, it is recommended that you maximize the map portion of the split screen (see page 43).

Sounder Page Options

The Sounder Page options menu lets you customize the sounder's features to suit your needs.

To display the Sounder Page options menu:

1. From the Sounder Page, press **MENU**.

The following options are available:

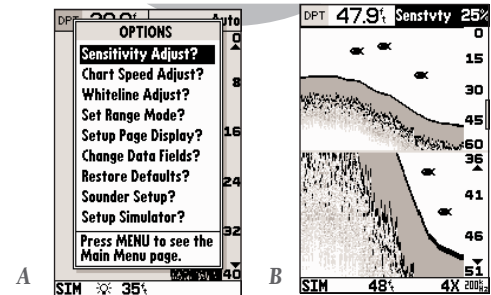
- **Sensitivity Adjust?:** Sensitivity controls the sounder's ability to show echoes without introducing interference. With Garmin's technology called Depth Controlled Gain, you will rarely have to manually adjust the sensitivity. Under actual operating conditions, DCG automatically adjusts the sensitivity for the best setting. Under unusual conditions (such as shooting the transducer through fiberglass) you can adjust the sensitivity described in the following steps:

To change the sensitivity setting:

1. From the Sounder Page press **MENU** to access the options list. Highlight 'Sensitivity Adjust?' and press **EDIT/ENTER**.
2. The sensitivity value display field in the upper-right corner of the screen will be highlighted. Use the **▲** keypad to select the desired percentage and press **EDIT/ENTER**.

SOUNDER PAGE Sensitivity

SECTION 3



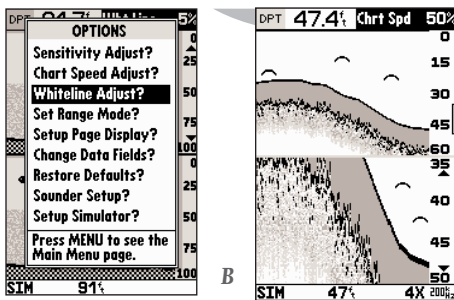
A

B

- A. Use the sounder options page to change the Sounder Page display to fit your needs.
- B. For greater control, the sensitivity amount can be adjusted from the default setting of 50% to a greater or lesser value (0%-100%).

SECTION 3 SOUNDER PAGE

Whiteline, Chart Speed, Range Mode



A. The whiteline value is changed from the options menu which is accessed from the Sounder Page.

B. Chart speed is adjustable from 10% to 100% in increments of ten.

Sounder Page Options (con't.)

- **Whiteline Adjust:** Whiteline indicates the relative hardness or softness of the bottom. The bottom itself is shown as a continuous black line, while the whiteline shows up as a light gray band just below. The whiteline becomes thicker or thinner depending on bottom hardness. A thin or absent whiteline indicates a soft bottom (muddy or weedy), while a thick whiteline shows a hard bottom.

Adjusting the whiteline lets you distinguish between strong and weak echoes which will allow you to tell the difference between a hard and soft bottom. Since whiteline shows the difference between strong and weak signals, adjusting the sensitivity may require a different whiteline level. The default whiteline setting is 5%. Five percent typically provides the best picture under current conditions. For more control, you can add or subtract the amount of whiteline as described in the steps below. As with sensitivity, experiment with whiteline to find the setting that's best for your conditions.

To change the whiteline setting:

1. From the Sounder Page press **MENU** to access the options list. Highlight 'Whiteline Adjust?' and press **EDIT/ENTER**.
2. The whiteline value display field in the upper right-corner of the screen will be highlighted. Use the **0-9** keypad to select the desired percentage and press **EDIT/ENTER**.

- **Chart Speed Adjust:** Chart speed is the rate at which echoes scroll across the screen.

To change the chart speed:

1. From the Sounder Page, press **MENU** to access the options list. Highlight Chart Speed Adjust? and press **EDIT/ENTER**.
2. The chart speed display field in the upper-right corner of the screen will be highlighted. Use the **0-9** keypad to select the desired value and press **EDIT/ENTER**.

- **Set Range Mode:** Allows you to select auto, manual, or window range modes.

Sounder Page Options (con't.)

Auto is the default setting and continually adjusts the screen display to show the maximum amount of detail possible, while always showing the bottom. **Manual** allows you to adjust the sonar display's depth using the **▲** keypad. **Window** lets you establish a starting depth (top) and length (span) for the sonar display.

To set the range mode:

1. From the Sounder Page, press **MENU** to access the options list. Highlight the 'Set Range Mode?' option and press **EDIT ENTER**.
2. Choose the desired mode and press **EDIT ENTER**. Nothing further is required to activate auto or manual modes. Window range mode, however, will require setup for first-time use or to change the existing window values.
3. Press the **▲** keypad once in any direction to display a window range definition field. Enter a value for the TOP (depth at which the window will start) and the SPAN (length it will cover).
4. To finish, press **QUIT**. Note: Previous window range values will be used whenever the window range is turned on unless changed from the window range definition field.

• **Setup Page Display?:** Allows you to select the fields displayed in the data section of the Sounder Page. There are seven options:

- 1 Field
- 1 Field & Compass
- 1 Field & CDI
- 3 Fields
- 3 Fields & Compass
- 3 Fields & CDI
- 5 Fields

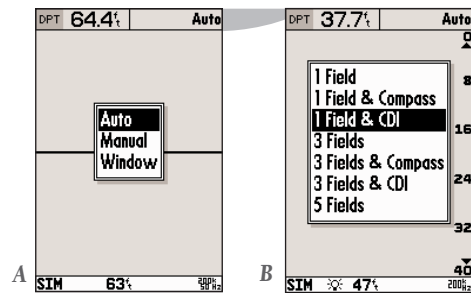
To change the page display:

1. Highlight the 'Setup Page Display?' option and press **EDIT ENTER**.
2. Highlight the desired field and press **EDIT ENTER**.
3. Select a page display option and press **EDIT ENTER**.

SOUNDER PAGE

Range Mode and Page Display

SECTION 3

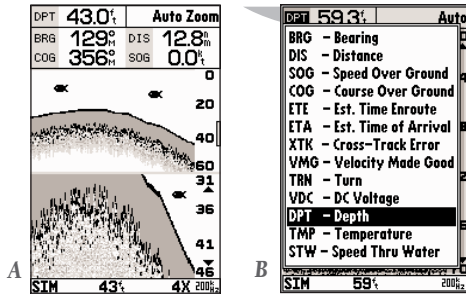


A. You can select from three range modes.

B. There are seven Sounder Page data display options.

SECTION 3 SOUNDER PAGE

Data Fields and Restore Defaults



- A. The Sounder Page can be configured to display up to five data fields simultaneously.
- B. Any of thirteen information options may be shown in a designated data field.

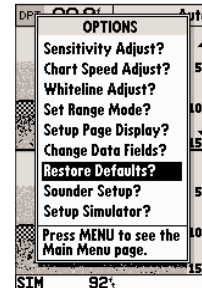
Sounder Page Options (con't.)

- **Change Data Fields?:** Allows you to specify the data displayed in each data field on the Sounder Page. There are thirteen options:
 - **BRG:** Bearing to active wpt
 - **DIS:** Distance to active wpt
 - **SOG:** Speed over ground
 - **COG:** Course over ground
 - **ETE:** Estimated time enroute
 - **ETA:** Estimated time of arrival
 - **XTK:** Crosstrack error
 - **VMG:** Velocity made good
 - **TRN:** Turn angle to wpt
 - **VDC:** DC voltage
 - **DPT:** Depth
 - **TMP:** Temperature
 - **STW:** Speed through water

To change a data field:

1. Highlight the 'Change Data Fields?' option and press **EDIT ENTER**.
2. Move the field highlight to the desired field and press **EDIT ENTER**.
3. Select a data field option and press **EDIT ENTER**.
4. When finished, press **QUIT**.

- **Restore Defaults?:** Resets all Sounder Page options except sounder setup to the factory settings. See page 38 for restoring defaults on the sounder setup page.



Sounder Setup Page

The next Sounder Page menu option is ‘Sounder Setup?’ which accesses the sounder setup page. There are eight fields on the sounder setup page which allow you to customize the sounder’s features: Fish ID, Target Depth, Water Temperature, Water Type, Noise Rejection, Keel Offset, Frequency, and Speed Calibration.

To access the sounder setup page:

1. From the Sounder Page, press **MENU** to access the options list. Highlight the ‘Sounder Setup?’ option and press **EDIT/ENTER**.

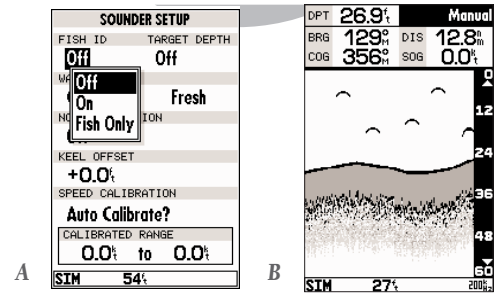
- **Fish ID:** The Fish ID determines how the GPSMAP 235 Sounder identifies and labels sonar targets on the viewing screen.

The ‘On’ and ‘Fish Only’ settings display fish symbols on the screen in place of actual target echoes. There are three fish symbol sizes: small, medium, and large. These are used to point out the relative size between targets. In other words, the sounder displays a small fish symbol when it thinks a target is a small fish, a medium fish symbol on a larger target, etc.

Sometimes you see fish symbols on the screen when actually there are no fish because, at times, the sounder may not be able to distinguish between fish and certain other suspended objects. Practice using the sounder with and without Fish ID to become more familiar with it.

There are three Fish ID settings:

- **Off:** Is the default setting and displays all sonar target information in an unprocessed form.
- **On:** Shows small, medium, or large fish symbols in place of arches and displays other echo information (thermoclines, thin stumps, etc.) as shades of gray.
- **Fish Only:** Shows fish symbols.

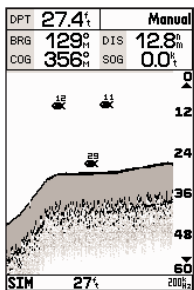


A. When ‘FISH ID’ is turned off, all sonar target information is displayed in an unprocessed form.

B. The range scale will be highlighted when using the arrow keypad to adjust manual range mode or when switching between auto and manual mode.

SECTION 3 SOUNDER PAGE

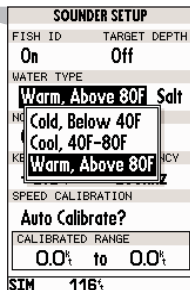
Fish ID and Water Temperature Setup



A

A. The digital depth of each fish symbol will be displayed when target depth is turned on.

B. There are three water temperature options.



B

Sounder Setup Page (con't.)

To select Fish ID:

1. Highlight the 'FISH ID' option and press **EDIT ENTER**. The 'FISH ID' submenu will appear.
2. Highlight the desired setting and press **EDIT ENTER**.

• **Target Depth:** Displays the digital depth of each fish symbol.

- **On:** Shows fish symbols with corresponding digital depth.
- **Off:** Does not display depth.

To select target depth:

1. Use the **0** keypad to highlight the target depth field and press **EDIT ENTER**. A corresponding submenu will appear.
2. Highlight your submenu selection and press **EDIT ENTER**.

• **Water Type:** Maximizes the sounder's operation in cold, cool, or warm water, salt or fresh. One field is for water temperature and one is for water composition. Set the water temperature option to 'Cold' if the water is below 40°F, 'Cool' if it is between 40°- 80°F, and 'Warm' if it is above 80°F. Set the water composition field to salt or freshwater depending on where you are fishing.

To select water temperature or composition:

1. Use the **0** keypad to select the temperature or water composition field and press **EDIT ENTER**. A corresponding submenu will appear.
2. Highlight your submenu selection and press **EDIT ENTER**.

Sounder Setup Page (con't.)

- **Noise Rejection:** Removes cross talk from other sounders or ignition noise from poor boat motor installations (non-shielded plugs, etc.).

There are three options:

- **Off:** The unit will not remove anything it thinks is cross talk noise. The noise will be displayed on the screen.
- **On:** The unit will always remove anything it thinks is cross talk noise, and attempt to 'repair' the damage done by suspected interference with real echoes.
- **Auto:** Auto is the default setting. Auto identifies the presence of cross talk noise, and turns the rejection on when it needs to. When the noise disappears, it turns the rejection off.

To set Noise Rejection:

1. Highlight the 'Noise Rejection' field and press **EDIT ENTER**. A submenu will appear.
2. Select the Noise Rejection setting and press **EDIT ENTER**.

- **Keel Offset:** Allows you to set the point from which the sounder will measure depth. Keel offset makes it possible to measure depth from the bottom of your keel instead of from the transducer's location. A positive number will measure depth from a deeper point while a negative number reflects a shallower point.

To set Keel Offset:

1. Highlight the 'Keel Offset' field and press **EDIT ENTER**. Use the **▲** to enter the keel offset value and press **EDIT ENTER**.

- **Frequency:** Allows you to select a transducer frequency. Frequency refers to the "pitch" of the sound that the transducer sends and receives. Typically, low frequencies (50 kHz) provide the deepest readings. High frequencies (200 kHz) provide better resolution and detail. The dual frequency modes of the GPSMAP 235 combine low-and high-frequency operation which gives you the advantages of both.

SOUNDER PAGE

Noise Rejection and Keel Offset Setup

SECTION 3

SOUNDER SETUP		
FISH ID	TARGET DEPTH	
On	Off	
WATER TYPE		
Warm, Above 80F Salt		
NOISE REJECTION		
On		
KEEL OFFSET	SET	FREQUENCY
Auto		200kHz
SPEED CALIBRATION	LIBERATION	
On	Calibrate?	
CALIBRATED RANGE		
0.0'	to	0.0'
SIM	118'	

SOUNDER SETUP		
FISH ID	TARGET DEPTH	
On	Off	
WATER TYPE		
Warm, Above 80F Salt		
NOISE REJECTION		
On		
KEEL OFFSET	SET	FREQUENCY
+0.1	0'	200kHz
SPEED CALIBRATION	LIBERATION	
Auto	Calibrate?	
CALIBRATED RANGE		
0.0'	to	0.0'
SIM	122'	

- A. Auto is the noise rejection default setting. Auto identifies the presence of cross talk noise and turns the noise rejection on when it needs to. When the noise disappears, turns the rejection off.
- B. Keel offset allows you to precisely set the point from which the sounder will measure depth.

SECTION 3 SOUNDER PAGE

3

Transducer Frequency and Speed Calibration Setup

SOUNDER SETUP	
FISH ID	TARGET DEPTH
On	Off
WATER TYPE	200kHz
Warm, Above	50kHz
NOISE REJECTION	200/50kHz
On	50/200kHz
KEEL OFFSET	
+0.0'	200kHz
SPEED CALIBRATION	
Auto Calibrate?	
CALIBRATED RANGE	
0.0' to 0.0'	
SIM	119'

A

A. The 200 kHz/50 kHz selection gives you maximum depth readings with good bottom detail and resolution.

SOUNDER SETUP	
FISH ID	TARGET DEPTH
On	Off
WATER TYPE	Warm, Above 80F Salt
NOISE REJECTION	
On	
KEEL OFFSET	FREQUENCY
+0.0'	200kHz
SPEED CALIBRATION	
Auto Calibrate?	
CALIBRATED RANGE	
0.0' to 0.0'	
SIM	119'

B

B. Calibration is required if you are using a transducer capable of displaying speed through the water.

Sounder Setup Page (con't.)

There are four options:

- **200 kHz:** Best suited for shallow, inland waters where deep water performance is not critical and bottom detail and resolution is the highest priority.
- **50 kHz:** For maximum deepest readings. Note: Maximum readable depths in saltwater will be 25% - 50% less than freshwater depths, because of saltwater attenuation of the sonar signal.
- **200/50 kHz:** Allows you to operate with two frequencies for maximum depth readings with good bottom detail and resolution. When the split screen is displayed, the bottom frequency (in this case, 50 kHz) is always shown on the bottom screen.
- **50/200 kHz:** For viewing versatility, select 50/200 kHz which will allow you to view the 200 kHz setting in the bottom screen.

To select a transducer frequency:

1. Highlight the 'Frequency' field and press **EDIT ENTER**. Use the **⬅** to select a frequency and press **EDIT ENTER**.

- **Speed Calibration:** If you are using a transducer capable of displaying speed through water (STW), calibration is required to ensure that the STW displayed by the sounder will be accurate. The unit can be calibrated automatically or manually, but auto calibration is recommended (the default setting).

To calibrate the unit:

1. Press **MENU** to display the sounder options page.
2. Using the **⬅** keypad, highlight 'Sounder Setup?' and press **EDIT ENTER**.
3. Choose between auto and manual calibration (COG field).

Sounder Setup Page (con't.)

To use Auto Calibration:

1. Ensure 'Auto Calibrate?' is displayed in the speed calibration field. If it is not, press **MENU** to display the calibration menu.
2. Highlight 'Auto Calibrate' and press **EDIT/ENTER**.
3. Press **EDIT/ENTER** again and an instruction message will appear.
4. Read the instructions and press **EDIT/ENTER** when you are ready to begin calibration.
5. Slowly accelerate your boat to a maximum safe cruising speed and then back down to a stop and press **EDIT/ENTER**. The minimum and maximum speed which the unit is now calibrated for will be displayed in the 'calibrated range' field.
6. Auto calibration is complete.

When **manual calibration** mode is selected, the speed calibration bar will appear as a white horizontal strip with a black slider bar.

Before entering the calibration, you will need to compare the value shown on the speed calibration field's STW display, with your boat's actual speed as determined by the speedometer or by using a stop watch. Accelerate to a safe speed and compare the two speed readings.

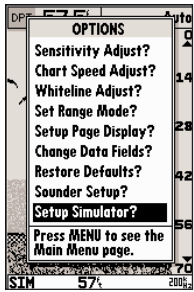


AUTO CALIBRATION		SOUNDER SETUP	
INSTRUCTIONS Speed over water will be calibrated using GPS speed over ground as the basis. Therefore calibration should take place in water having little or no current.		FISH ID	TARGET DEPTH
		On	Off
		WATER TYPE	
		Warm, Above 80F Salt	
		NOISE REJECTION	
		On	
		KEEL OFFSET	FREQUENCY
		+0.0%	200kHz
		SPEED CALIBRATION	
		STW	CAL
		0.0%	0%
		Press ENTER to Start	
STW	117%	STW	131%

- A.** When you are ready to begin calibration, read the instructions and press **EDIT/ENTER**.
- B.** When manual calibration mode is selected, the speed calibration bar will appear as a white horizontal strip, with a black slider bar positioned in the middle.

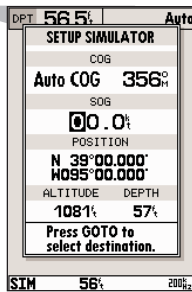
SECTION 3 SOUNDER PAGE

Speed Calibration and Simulator Setup



A. The 'Setup Simulator?' option is included in the options menu for each of the five main pages when in simulator mode.

B. Each simulator data field may be modified to display user-selected values and navigational information.



Sounder Setup Page (con't.)

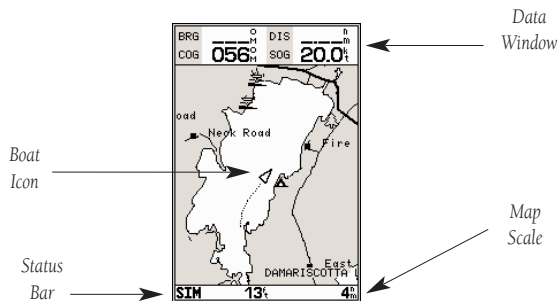
To use manual calibration:

1. Ensure manual calibration mode is selected in the speed calibration field. If not, press **MENU**, highlight 'Manual Calibrate?', and press **MENU**.
2. Press **EDIT ENTER**. The slider bar will turn black and the calibration range bar will turn white.
3. Use the **0** keypad to move the selector bar until the speed displayed in the 'STW' field matches the speed of your boat. Move the bar to the left for negative values and right for positive values.
4. When the desired speed is displayed, press **EDIT ENTER**.
5. Press **QUIT** to return to the Sounder Page.

Two options can be accessed from the sounder setup options menu: 'Manual or Auto Calibration' (whichever one currently is not selected) and 'Restore Defaults.' Access the options menu by pressing **MENU**, select an option, and press **EDIT ENTER**.

- **Setup Simulator:** The setup simulator option will appear only when the unit is in simulator mode. It allows you to define simulator speed, course, altitude, depth, and position values. See the getting started tour for more details on using the simulator.

Map Page

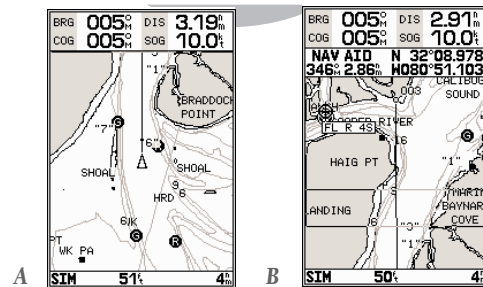


The **Map Page** provides a comprehensive display of electronic cartography, plotting and navigational data. The **map display** shows your boat on a digital chart, complete with geographic names, nav aids, depth contours and other chart features. It also plots your track and displays any routes and waypoints you create. An on-screen cursor lets you pan and scroll to other map areas, determine the distance and bearing to a position, and perform various route and waypoint functions.

The **data window**, located at the top of the page, provides a user-selectable display of your current course and speed over ground, along with the bearing and distance to a destination waypoint. Whenever the cursor is active, an additional data window will appear below to indicate the position, range and bearing to the cursor or a selected waypoint or nav aid. Each data field may be configured to display any one of thirteen data options. The data window can also be changed to display additional data fields, a compass tape, or a CDI scale. The **status bar** at the bottom of the page displays the map scale currently in use.

MAP PAGE Overview

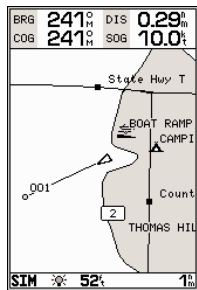
SECTION 4



- Use the cursor to pan ahead to other map areas. The map display will automatically scroll forward when you reach the edge of the map.
- To select or 'highlight' an on-screen nav aid or waypoint, simply move the cursor over the waypoint symbol. The cursor will 'snap' to the waypoint, and display its name and position in the data field.

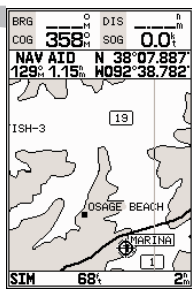
SECTION 4

MAP PAGE Map Modes



A

A. Position mode on inland water cartography.




B


B. Cursor mode on inland water cartography.

Map Modes

There are two map operating modes: the position mode and the cursor mode. When the map is in the position mode, the position marker pans the cartography to keep itself within the display area. When the map is in the cursor mode, the cursor pans the cartography to keep the itself within the display area. The sounder will always power up in the position mode, with your vessel centered on the map display. Here are some points to keep in mind when using the position mode:

- Whenever sufficient map coverage is not available to keep the boat centered, the boat symbol will move toward the edge of the display.
- If the boat symbol attempts to go off the display, adjust the zoom level to keep the cartography on the screen.

Whenever the  keypad is pressed, the sounder will enter cursor mode. In the cursor mode:


- The cursor can be moved around the map display using the  keypad.
- Whenever the cursor reaches the edge of the display, the map will scroll forward under the cursor. Keep in mind that the boat symbol will move with the map scrolling and may go off the display screen (you may not be able to see your present position).
- When the cursor is stationary, a fixed coordinate position will appear in the position field. Note that the distance and bearing will change as the boat's position changes.
- Whenever you zoom in cursor mode, the cursor will be centered on screen.

To return to position mode, press the  key.

Using the Cursor


The cursor allows you to pan away from your present position and scroll to other map areas (even outside of your current G-chart coverage). As you pan past the edge of the current map display, the screen will actively scroll forward to provide continuous map coverage.

To move the cursor:

1. Press the  keypad to move the cursor up, down, left or right.

As you move the cursor, the distance and bearing from your present position to the cursor will be displayed in the data window, along with the cursor's position coordinates. Keep in mind that when the cursor is stationary, the distance and bearing from your present position will change as your boat moves. The cursor can also be used to 'snap' to on-screen waypoints and nav aids, allowing you to review a selected position directly from the map display.

To select an on-screen waypoint or nav aid with the cursor:




1. Use the  keypad to move the cursor to the desired waypoint or nav aid (if there are several waypoints grouped closely together, zoom in closer for a better view).
2. When a waypoint or nav aid is selected, it will become highlighted on-screen, with the name and position displayed.

To eliminate the cursor and re-center your position on-screen:

1. Press the  key.

The cursor can also be used to create new waypoints directly from the map.

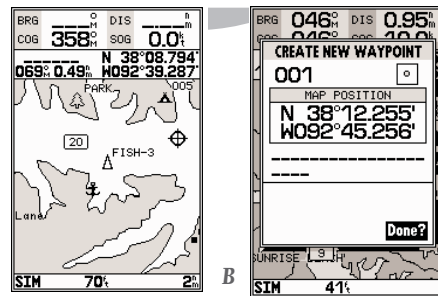
To create a waypoint with the cursor:

1. Use the  keypad to move the cursor to the desired map position.
2. Press .
3. Press  to confirm the new waypoint using the default three-digit name.

SECTION 4

MAP PAGE

Using the Cursor

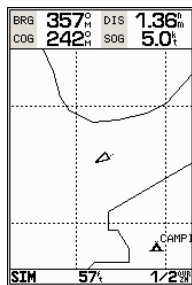


A. To create a new waypoint at the cursor, move the cursor to the desired position and press EDIT/ENTER.

B. The create new waypoint page will appear, where you may change the waypoint name, symbol and comment before saving the waypoint.

SECTION 4

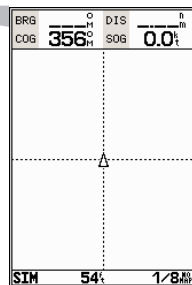
MAP PAGE Map Scales



A

A. Whenever the selected map scale exceeds the resolution of the chart by up to two settings, an 'Ovr Zm' warning will appear in the scale field.

B. Whenever the selected map scale exceeds the resolution of the chart by more than two settings, a 'No Map' warning will appear in the scale field.



B

Selecting Map Scales

The map display has 16 available range scales from 1/8th to 4096 nautical miles (1/4 to 7500 kilometers). The map scale is controlled by the **IN** and **OUT** keys, with the current scale displayed at the bottom of the data window.

To select a map scale:

1. Press **OUT** to zoom out and **IN** to zoom in.

The sounder has a built-in worldwide database to 64 (32 in U.S.) nautical miles (see Appendix D for a built-in coverage map), with more detailed coverage available through the use of G-chart™ data cartridges (see pages 84-85 for installing and using G-chart™ cartridges). The sounder will display cartography as long as there is chart information available for the range you've selected. Map coverage will conform to the following conditions:

- When the selected zoom range is covered by either the internal database or a G-chart data cartridge, cartography will be displayed.
- When the selected zoom range is covered by both the internal database and a G-chart cartridge, cartography will be displayed using the data with the best resolution.
- When the selected zoom range exceeds the resolution of the chart in use by up to two settings, overzoom cartography will be displayed. The display will not show any filled landmass areas, and an 'Ovr Zm' warning will appear in the scale field. The lat/lon grid will also be turned on regardless of the map configuration setting.
- When the selected zoom range exceeds the resolution of the chart in use by more than two settings, all cartography will be replaced by a track plot display, and a 'No Map' warning will appear in the scale field. The lat/lon grid will be displayed regardless of the map configuration setting. Additional caution should be used while navigating in track plot mode.

Map Page Options

The Map Page options menu provides access to many of the features and functions that will help you configure the Map Page to your own preferences.

To display the Map Page options menu:

1. From the Map Page, press **MENU**.

To select a menu option:

1. Highlight the desired option and press **EDIT/ENTER**.

There are eight options:

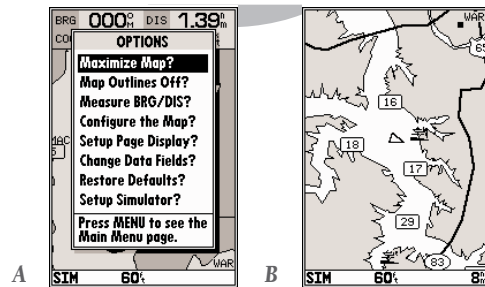
- **Maximize Map?:** Allows you to view the map display with or without a data window. Pressing **EDIT/ENTER** removes the data window from the Map Page. To display the data window once again, highlight 'Normal Map?' from the options menu and press **EDIT/ENTER**.
- **Map Outlines Off?:** Allows you to view the map display with or without G-chart cartography outlines. Pressing **EDIT/ENTER** removes the outlines from the map display. To display the map outlines once again, highlight Map Outlines Off? from the options menu and press **EDIT/ENTER**.
- **Measure BRG/DIS?:** Allows you to measure the bearing and distance between any two points on the map display.

To measure the bearing and distance between two points:

1. Highlight the 'Measure BRG/DIS?' option and press **EDIT/ENTER**. An on-screen pointer will appear on the map display at your present position.
2. Move the cursor to the desired reference point (the point that you want to measure from) and press **EDIT/ENTER**.
3. Move the cursor to the point that you want to measure to. The bearing and distance from the reference point will be displayed at the bottom left of the data window. Press **QUIT** to finish.

MAP PAGE SECTION 4

Maximize Map, Outlines, and Measure Bearing and Distance



- A. The map options menu provides access to all map configuration, page display and data field options.
- B. The 'Maximize Map?' option will eliminate the data fields and show full-screen cartography.

SECTION 4

MAP PAGE

Configure Map and Change Orientation

Map Item	64	Scale 1/8
Geo Names	0000000000	
Navaid Text	0000000000	
Depth, Shallow	0000000000	
Depth, Deep	0000000000	
Lat/Lon Grid	0000000000	
Waypoints	0000000000	
Waypt Names	0000000000	
Active Rte/Trk	0000000000	
National Hwy	0000000000	
Local Hwy	0000000000	
Local Road	0000000000	
Road Labels	0000000000	
Orientation	North Up	
SIM	51%	

Map Item	64	Scale 1/8
Geo Names	0000000000	
Navaid Text	0000000000	
Depth, Shallow	0000000000	
Depth, Deep	0000000000	
Lat/Lon Grid	0000000000	
Waypoints	0000000000	
Waypt Names	0000000000	
Active Rte/Trk	0000000000	
National Hwy	0000000000	
Local Hwy	0000000000	
Local Road	0000000000	
Road Labels	0000000000	
Orientation	North Up	
SIM	52%	

A

B

- A. The map configuration grid allows you to define what items appear on the display at each map scale.
- B. To turn an entire row on for the selected map item, highlight the 'Enable Row?' option and press **EDIT ENTER**.

Map Page Options (con't.)

- **Configure the Map?:** Allows you to determine what map items are displayed on a particular map scale which will help prevent excessive clutter. The map configuration page shows a list of twelve map items with corresponding zoom scale selection boxes.

- GEO Names
- Navaid Text
- Depth, Shallow
- Depth, Deep
- Lat/Lon Grid
- Waypoints
- Waypt Names
- Active Rte/Trk
- National Hwy
- Local Hwy
- Local Road
- Road Labels

To configure the map:

1. Highlight 'Configure the Map?' and press **EDIT ENTER**. The map configuration page will appear.
2. Use the **0** keypad to select the desired map item and press **EDIT ENTER**. A pop-up window will appear with the current settings displayed.
3. Use the **0** keypad to highlight the scale you want to change.
4. Press **EDIT ENTER** to turn the setting on or off.
5. Press **QUIT** to finish.

The map configuration page also allows you to set the map display to a North Up, Track Up or Desired Track Up orientation.

To change the map orientation:

1. Use the **0** keypad to highlight the 'Orientation' field and press **EDIT ENTER**.
2. Select the desired setting and press **EDIT ENTER**.

Map Page Options (con't.)

From the map configuration page, you can also access another options menu by highlighting any of the items and pressing **MENU**. There are five options:

- **Enable or Disable a Row?:** Allows you to turn an entire row on or off.

To turn an entire row on or off:

1. Use the **0** keypad to select the desired map item.
2. Press the **MENU** key.
3. Select the 'Enable Row?' or 'Disable Row?' option and press **EDIT/ENTER**.

• **Calibrate the Map?:** The map configuration options page also features a map calibration feature that allows you to calibrate the map display using your exact physical surroundings or correct data from older charts. Before using the map calibration feature, check to make sure that your map datum selected on the GPS matches the datum on the chart you are using (see page 80). To calibrate the map display, you must know exactly where you are, and understand that the correction is generally valid only in a limited range from the point of correction.

Map calibration should only be performed while the vessel is still, and should never be used to attempt SA corrections, which can degrade accuracy up to 330' (100 meters). The maximum correction is 16,400 feet (5000m).

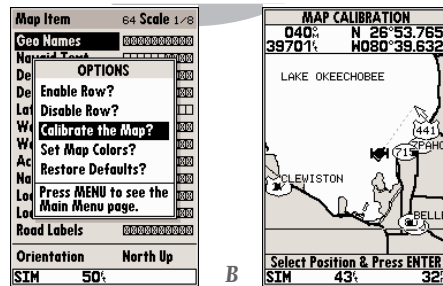
To calibrate the map:

1. Select the 'Calibrate the Map?' option and press **EDIT/ENTER**.
2. Use the **0** keypad to move the arrow cursor from the satellite position (indicated by the satellite symbol) to your exact position. The bearing, distance and position will be indicated in the data window.
3. Press **EDIT/ENTER** to confirm the calibration offset.

MAP PAGE

Enable/Disable Rows
and Map Calibration

SECTION 4



- A. To calibrate the map, highlight the 'Calibrate the Map?' option and press **EDIT/ENTER**.
- B. A satellite icon will remain on the map to indicate the GPS position, while the boat marker will reflect the calibration changes.

CAUTION!

The map calibration feature should never be used to attempt to correct Selective Availability errors.

SECTION 4

MAP PAGE

Map Colors, Restore Defaults, Page Display



- A. The color option allows you to define the fill color (grayscale) of the land and water used on the map display. Three options are available: no color (no fills for land or water), gray land/white water (the default setting), and white land/gray water.
- B. The default option resets all map configuration options to their factory settings.

Map Page Options (con't.)

• **Set Map Colors?:** The next option available from the map configuration page is the set map colors option, which allows you to define the fill color (grayscale) of the land and water used on the map display. Three options are available: no color (no fills for land or water), gray land/white water (the default setting), and white land/gray water.

To select a map colors option:

1. Select the 'Set Map Colors?' option and press **EDIT ENTER**.
2. Highlight the desired map color option and press **EDIT ENTER**.

• **Restore Defaults?:** Resets all map configuration options to their factory settings.

To restore the map configuration options to the factory defaults:

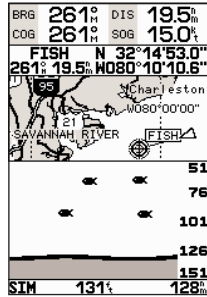
1. Highlight the 'Restore Defaults?' settings and press **EDIT ENTER**.

Press **QUIT** twice to exit the map configuration page and access the map display. Press **MENU** on the map display to once again access the main options menu. The next main menu option after Configure the Map is Setup Page Display.

• **Setup Page Display?:** Allows you to specify what fields are displayed in the data window section of the Map Page by selecting one of the following display options:

- 2 Fields & Compass
- 2 Fields & CDI
- 4 Fields
- 4 Fields & Compass
- 4 Fields & CDI
- 6 Fields
- 6 Fields & Compass
- 6 Fields & CDI
- 8 Fields
- 2 Fields & Sounder
- 4 Fields & Sounder

Map Page Options (con't.)



The last two display options make it possible to display both the Map Page and Sounder Page simultaneously in a split screen arrangement. The top half of the page will show a reduced-size Map Page while the Sounder Page is displayed in the lower half of the screen. Note: When the dual frequency 200 kHz/50 kHz is selected on the Sounder Page, 50 kHz only is shown in the lower half of the split screen Map Page, when 50 kHz/200 kHz is selected, 200 kHz only is always shown in the lower half of the split screen.

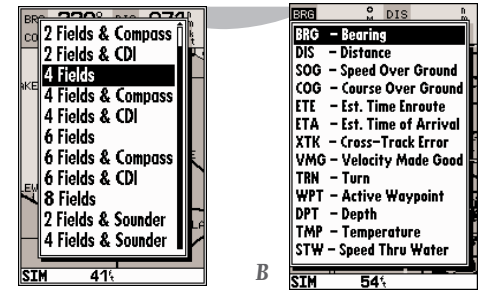
To modify or access the Sounder Page display, press **QUIT** or **EDIT/ENTER** until the actual Sounder Page appears, make any desired changes, and then return to the split screen Map Page.

To select a page display option:

1. Highlight the 'Setup Page Display?' option and press **EDIT/ENTER**.
2. Select the desired option and press **EDIT/ENTER**.

MAP PAGE SECTION 4

Split Screen Option

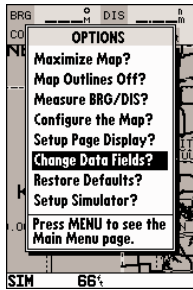


- A. The Map Page can be configured to display a variety of navigation data.
- B. Each data field can be set to display one of thirteen data options.

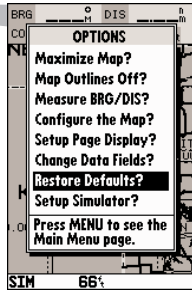
SECTION 4

MAP PAGE

Data Fields, Restore
Defaults, Setup
Simulator



A



B




- A. The *Change Data Fields?* option allows you to define what type of data is displayed in each data field of the Map Page.
- B. The default option resets all Map Page options to the factory settings.

Map Page Options (con't.)

• **Change Data Fields?**: Allows you to specify the type of data that is displayed in each data field on the map display. There are thirteen options:

- BRG: Bearing to active wpt
- SOG: Speed over ground
- ETE: Estimated time enroute
- XTK: Crosstrack error
- TRN: Turn angle to wpt
- DPT: Depth
- STW: Speed through water
- DIS: Distance to active wpt
- COG: Course over ground
- ETA: Estimated time of arrival
- VMG: Velocity made good
- WPT: Active wpt name
- TMP: Temperature

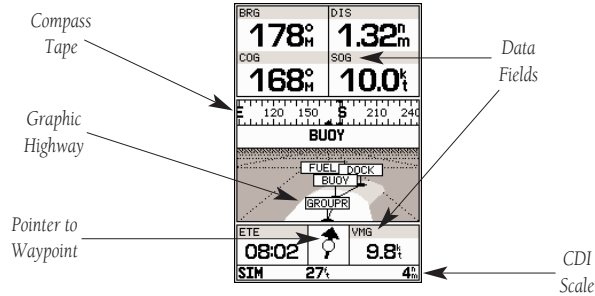
To change a data field:

1. Highlight the 'Change Data Fields?' option and press .
2. Move the field highlight to the desired field and press .
3. Select a data field option and press .

- **Restore Defaults?**: Resets all Map Page options (except map configuration options, see page 46) to the factory settings.
- **Setup Simulator?**: Allows you to define simulator speed, course, altitude, depth, and position values. See the getting started tour for details on using the simulator mode.

This completes the eight map display options. Next we'll talk about the Navigation Page.

Navigation Page

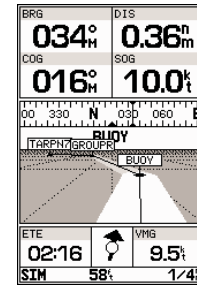


Whenever a GOTO, MOB, TracBack or route has been turned on, the sounder will provide digital and graphic steering guidance to the destination with the Navigation Page. The top half of the Navigation Page features four user-selectable **data fields** that display the bearing (BRG) and distance (DIS) to waypoint, along with your current course (COG) and speed over ground (SOG). In addition, there is a moving compass tape to indicate your direction. Two additional data fields at the bottom of the page show the estimated time enroute (ETE) and velocity made good (VMG) to your destination.

The middle section of the screen provides visual guidance to the waypoint on a **graphic highway** display. The line down the center of the highway represents your desired track, while a graphic indication of the distance and direction you are off course is shown on a scale at the bottom-right of the page (the selected scale represents the distance from side to side). The **arrow pointer** below the highway always points to the destination waypoint relative to the direction you are moving.

NAVIGATION PAGE Overview

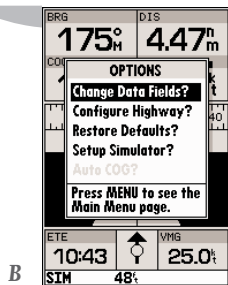
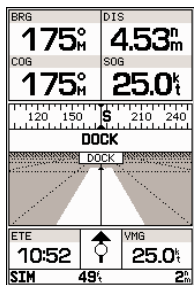
SECTION 5



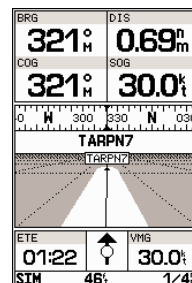
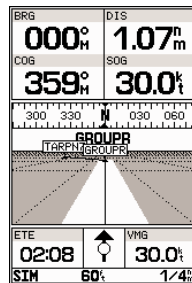
The Navigation Page can be configured to show the active waypoint, all route waypoints and or nearby waypoints on the graphic highway.

SECTION 5 NAVIGATION PAGE

Overview and Options



- A. To change the highway scale perspective, press the IN and OUT zoom keys.
- B. The Navigation Page options menu lets you configure the Navigation Page to your own preferences.



As you head toward your destination, the highway perspective will move to indicate your progress to the waypoint and which direction you should steer to stay on course. If you are navigating a route, the Navigation Page will show each route waypoint in sequence, with the active leg indicated by the white portion of the highway. Nearby waypoints not in the active route will also be displayed. The highway perspective scale can also be zoomed in or out to display a larger or smaller view of the highway. Five settings are available from 1/4 to 4 nautical miles, with a default setting of 1/4.

To change the highway scale:

1. Press the **IN** and **OUT** zoom keys to select the desired setting.

Navigation Page Options

The Navigation Page options menu allows you to define the navigation data fields and select what waypoints are displayed on the screen.

To display the Navigation Page options menu:

1. Press **MENU**.

To select a menu option:

1. Highlight the desired option and press **EDIT/ENTER**.

Navigation Page Options (con't.)

The following options are available:

- **Change Data Fields?:** Allows you to define the type of data that is displayed in any of the six user-selectable data fields. Thirteen options are available:

- | | | |
|-------|-------|-------|
| • BRG | • DIS | • DPT |
| • SOG | • COG | • STW |
| • ETE | • ETA | • TMP |
| • XTK | • VMG | • TRN |
| • CTS | | |

To change a data field:

1. Highlight the 'Change Data Fields?' option and press **EDIT/ENTER**.
2. Highlight the field you want to change and press **EDIT/ENTER**. Select the desired data field option and press **EDIT/ENTER**.

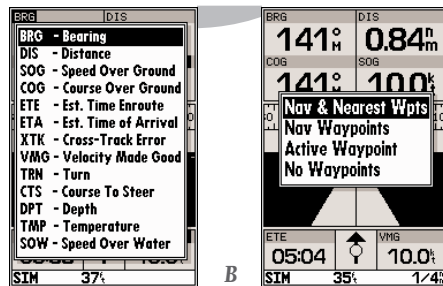
- **Configure Highway?:** Allows you to select what waypoints are shown on the highway page. Four options are available:

- *Nav & Nearest Waypoints:* All route and nearest waypoints will be displayed.
- *Nav Waypoints:* Only waypoints in the active route will be displayed.
- *Active Waypoint:* Only the active waypoint will be displayed.
- *No Waypoints:* No waypoints will be displayed.

To configure the highway display:

1. Highlight the 'Configure Highway?' option and press **EDIT/ENTER**. Select the desired option and press **EDIT/ENTER**.

- **Restore Defaults?:** Resets all Navigation Page options to their factory settings.
- **Setup Simulator?:** Allows you to define simulator speed, course, altitude, depth, and position values. See page 13 for more details on using the simulator mode.
- **Auto COG?:** Allows you to reset automatic steering while simulating navigation and cancels any course adjustments made with the **⏏** keypad.



A. Thirteen data options are available for each data field on the Navigation Page. The digital crosstrack error option is especially useful to display the exact distance you are off course in feet/miles or meters.

B. To select what waypoints appear on the graphic highway, highlight the desired setting and press **EDIT/ENTER**.

SECTION 6

MAIN MENU PAGE

Overview

MAIN MENU	
Nearest Waypoints	
Proximity Waypoints	
Create Waypoint	
Waypoints	
Routes	
Track	
Trip & Fuel Planning	
System Setup	
Navigation Setup	
Timers & Alarms	
Input/Output	
SIM	25%

A

A. The waypoint category options on the main menu page are described in the waypoints section on pages 59-62.

MAIN MENU	
Nearest Waypoints	
Proximity Waypoints	
Create Waypoint	
Waypoints	
Routes	
Track	
Trip & Fuel Planning	
System Setup	
Navigation Setup	
Timers & Alarms	
Input/Output	
SIM	23%

B

B. The routes category options are described on pages 66-69.

Main Menu Page

The main menu page provides access to various waypoint, system, navigation and interface management and setup menus.

MAIN MENU	
Nearest Waypoints	
Proximity Waypoints	
Create Waypoint	
Waypoints	
Routes	
Track	
Trip & Fuel Planning	
System Setup	
Navigation Setup	
Timers & Alarms	
Input/Output	
SIM	18%

To access the main menu page from any page in the sounder:

1. Press **MENU** twice.

The 11 submenus are divided into categories by function.

To select a submenu from the main menu page:

1. Highlight the submenu you want to view and press **EDIT/ENTER**.

For specific instructions on using a submenu, see the waypoints, route or setup sections of this manual.

Creating and Using Waypoints

The sounder stores up to 250 alphanumeric waypoints with user-defined symbols and comments available for each waypoint. Waypoints can be created using one of the following methods:

- **Mark Key:** Although used primarily for marking your present position, the **MARK** key also provides options that allow you to select a map or navaid position from the map display.
- **Graphically:** Allows you to define a new waypoint position from the map or Sounder Page using the cursor.
- **Text Entry:** Allows you to enter a new waypoint's position coordinates manually (from a chart, etc.) or by referencing it's bearing and distance from a stored waypoint or your present position.

Mark Key

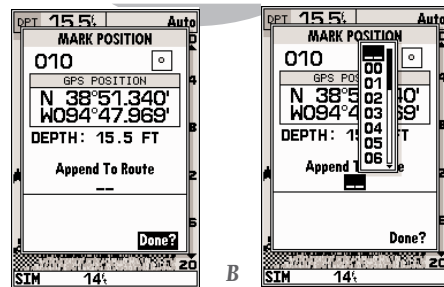
The **MARK** key lets you quickly capture your present position, cursor or navaid position in order to create a new waypoint. You must have a valid position fix to mark your present position.

To mark your present position:

1. Press the **MARK** key. The mark position page will appear, with a default three-digit name for the new waypoint.
2. To accept the waypoint with the default name, symbol and comment (the depth at the waypoint's position), press **EDIT/ENTER** to confirm the 'Done?' prompt.
3. To enter a different name, symbol or comment, highlight the appropriate field and press the **EDIT/ENTER** key.
4. After entering and confirming your changes, move the field highlight back to the 'Done?' prompt and press **EDIT/ENTER**.

WAYPOINTS SECTION 7

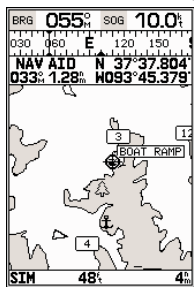
Creating Waypoints and the MARK Key



- A. The mark key is used primarily to mark your present position, but it can also be used to mark the cursor or a navaid position on the Map Page.
- B. The mark Position Page also allows you to add a new waypoint to the end of any route. If you're heading out without a planned route, you can create a series of waypoints along the way with the mark key and save them to an open storage route. When you're ready to head back, simply invert the route to get back (see page 70).

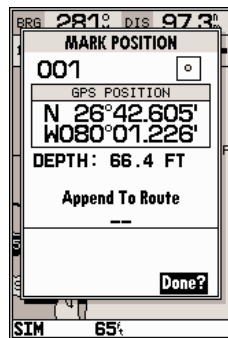
SECTION 7 WAYPOINTS

Using the MARK Key



- A. To create a waypoint at an on-screen navaid, move the cursor over the desired navaid.
- B. Press the MARK key and select the 'Use Navaid Posn?' option. Press EDIT/ENTER to finish.

Mark Key (con't.)



The mark key can also be used on the Map Page to mark the cursor position or an on-screen navaid. To mark a navaid, select it with the cursor. The sounder will use the navaid text shown on the cartography as the default comment.






To mark the cursor or navaid position with the **MARK** key:

1. Use the **⬇** keypad to move the cursor to the desired position or navaid.
2. Press the **MARK** key.
3. Highlight the 'Use Map Posn?' or the 'Use NAVAID Posn?' option and press **EDIT/ENTER**.
4. To accept the waypoint with the default name, symbol and comment (the depth at that position), press **EDIT/ENTER**.
5. To enter a different name, symbol or comment, highlight the appropriate field and press the **EDIT/ENTER** key.
6. After entering and confirming your changes, move the field highlight back to the 'Done?' prompt and press **EDIT/ENTER**.

Creating Waypoints Graphically

Waypoints may also be quickly created from the map display, which allows you to 'point and shoot' at any map position and create a new waypoint.







To create a new waypoint graphically:

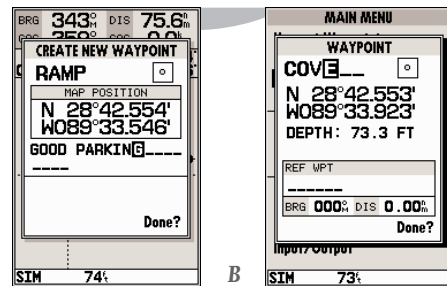
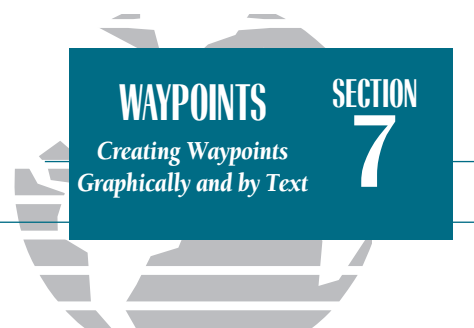
1. Use the  keypad to move the cursor to the desired map position. If you want to create the new waypoint at an on-screen navaid, highlight the navaid on the map display.
2. Press .
3. To accept the waypoint with the default name, symbol and comment, press . If you are creating a waypoint at an on-screen navaid, the default symbol and comment will automatically reflect the selected navaid's name and symbol.
4. To change the name, symbol or comment, highlight the appropriate field and press .
5. After entering and confirming your changes, move the field highlight back to the 'Done?' prompt and press .

Creating Waypoints by Text Entry

Waypoints can also be created by manually entering a position's coordinates or referencing a stored waypoint through the 'Create Waypoint' submenu option on the main menu page.

To create a new waypoint by manually entering its coordinates:

1. Press  twice to display the main menu page.
2. Highlight the 'Create Waypoint' option and press . The waypoint definition page will appear, with the next available waypoint number and the receiver's last known position as the default name and position.
3. Use the  keypad to enter the new waypoint name, symbol, position, and comment. Press  after the last character in each section.
4. When you have finished entering all your waypoint data, use the  keypad to highlight the 'Done?' prompt and press .

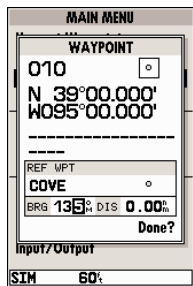


- A. Once a position has been selected graphically, the create new waypoint page will appear, where you can change the waypoint name, symbol or comment before saving the waypoint.
- B. To create a waypoint by text entry, start by entering the new waypoint's name.

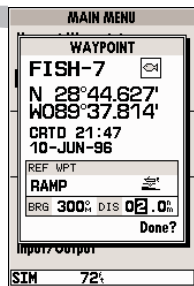
SECTION 7

WAYPOINTS

Reference Waypoints



A

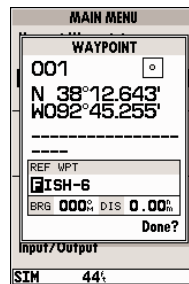


B

- A. Enter the bearing from the reference waypoint to the new waypoint in the 'BRG' field.
- B. Enter the distance from the reference waypoint to the new waypoint in the 'DIS' field.

Reference Waypoints

A new waypoint can also be created by entering an existing waypoint's range and bearing or the range and bearing from your present position. The sounder will then calculate the position coordinates for you, using the reference selected.



To create a new waypoint using a reference waypoint:

1. Select the 'Create Waypoint' option from the main menu page and press **EDIT ENTER**.
2. Enter the name, symbol, and comment, for the new waypoint.
3. Highlight the reference waypoint field and press **EDIT ENTER**.
4. Enter the name of the reference waypoint using the **NUM** keypad, or press **MENU** to select the waypoint from the nearest list, waypoint list, or map display. Leave the reference field blank to use your present position.
5. Press **EDIT ENTER** to begin entry of the bearing from your reference waypoint to the new waypoint position. Enter the bearing and press **EDIT ENTER**.
6. Press **EDIT ENTER** to begin entry of the distance from your reference waypoint to the new waypoint position. Enter the distance and press **EDIT ENTER**. The position for the new waypoint will automatically be calculated.
7. Highlight the 'Done' prompt and press **EDIT ENTER** to finish.

Reviewing and Editing Waypoints

Once you have created and stored a waypoint, it may be modified, reviewed, renamed or deleted at any time using the waypoint definition page. The waypoint definition page is accessed by highlighting the desired waypoint from the map display or selecting it from waypoint or nearest waypoint list and pressing the **EDIT** key. The waypoint definition page can also be accessed from the proximity waypoint page by highlighting the desired waypoint and pressing **EDIT** twice.

To access the waypoint definition page:

1. Use the **ENTER** keypad to highlight the desired waypoint on the map display (or any waypoint list).
2. Press **EDIT** to display the waypoint definition page.

From the waypoint definition page, you can change the waypoint symbol, position coordinates, waypoint comment, or depth for the selected waypoint.

To change the waypoint symbol:

1. Highlight the waypoint symbol field and press **EDIT**.
2. Use the **ENTER** keypad to select the desired symbol and press **EDIT** to confirm.

To change the position coordinates:

1. Highlight the coordinates field and press **EDIT**.
2. Use the **ENTER** keypad to edit the coordinates and press **EDIT** to confirm.

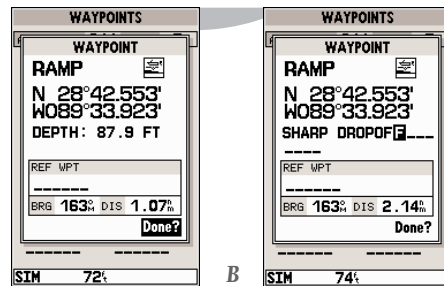
To change the waypoint comment:

1. Highlight the comment field and press **EDIT**.
2. Use the LEFT arrow of the **ENTER** keypad to clear the comment field.
3. Use the **ENTER** keypad to enter a comment (up to 16 characters).
4. Press **EDIT** to confirm.

WAYPOINTS

Reviewing and Editing
Waypoints

SECTION 7



A

B

- A. The waypoint definition page will appear whenever a waypoint is selected from the map or a waypoint list.
- B. A twenty-character custom comment may be assigned to every waypoint. The default comment is the depth at the waypoint's position for waypoints marked with the MARK key and underwater waypoints. For all other waypoints (those created with the ENTER button), the current date will be the default comment.

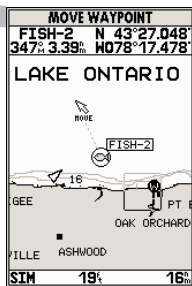
SECTION 7

WAYPOINTS

Waypoint Definition Page Options



A



B

- A. To review or edit a waypoint on the map display, select the 'Edit Wpt On Map?' option.
- B. To move the selected waypoint, press **EDIT/ENTER**. Use the arrow keypad to select the new position, and press **EDIT/ENTER** to finish.

Waypoint Definition Page Options

The waypoint definition page also features an options menu that allows you to edit the selected waypoint on the map display, rename the selected waypoint or delete the waypoint from memory.

To display the waypoint definition page options menu:

1. Press the **MENU** key.

To review or edit the selected waypoint from the map display:

1. Highlight the 'Edit Wpt On Map?' option and press **EDIT/ENTER**.
2. The selected waypoint will appear on the map display, with the waypoint name and coordinates shown at the top of the map, along with the distance and bearing to the waypoint from your present position.
3. To move the selected waypoint's position, press **EDIT/ENTER**. A 'Move' label will now appear under the cursor arrow.
4. Use the **▲** keypad to move the cursor arrow to the desired position. The cursor's coordinates, along with the distance and bearing from the waypoint's position, will be displayed at the top of the map display.
5. Press **EDIT/ENTER** to set the waypoint's new position, and **QUIT** to return to the waypoint definition page.

To rename the selected waypoint:

1. Highlight the 'Rename Waypoint?' option and press **EDIT/ENTER**.
2. Enter the new waypoint name and press **EDIT/ENTER**.
3. Press **EDIT/ENTER** to confirm the 'Yes' prompt.

To delete the selected waypoint:

1. Highlight the 'Delete Waypoint?' option and press **EDIT/ENTER**.
2. Press **EDIT/ENTER** to confirm.

Waypoint Submenus

The sounder's main menu page features four waypoint submenus that let you manage a large number of waypoints quickly and efficiently. The submenus also provide a continuously updated nearest waypoints list and a proximity waypoint alarm function that can be used to define an alarm circle around submerged hazards, shallow waters, etc.

To access the main menu page/waypoint submenus:

1. Press **MENU** twice.

The first waypoint submenu is the **nearest waypoints list**, which shows the nine nearest waypoints that are within 100 miles of your present position. The nearest waypoints are continuously updated to your present position, and provide quick access to the closest points of safety in emergency situations.

To scroll through and review the nearest waypoint list:

1. Highlight the 'Nearest Waypoints' option and press **EDIT/ENTER**.
2. Use the **⬇** keypad to scroll through the list in either direction.
3. Press **EDIT/ENTER** to review the highlighted waypoint.
4. To return to the waypoint list, highlight the 'Done?' prompt and press **EDIT/ENTER**.
5. The field highlight will automatically scroll to the next waypoint. If you want to review each waypoint, you can scroll through any waypoint list by pressing the **EDIT/ENTER** key repeatedly.

To select a nearest waypoint as a GOTO destination:

1. Use the **⬇** key to select the desired GOTO waypoint.
2. Press **GOTO**, followed by **EDIT/ENTER**.

WAYPOINTS

Nearest Waypoints and GOTO Navigation

SECTION 7

MAIN MENU	
Nearest Waypoints	
Proximity Waypoints	
Create Waypoint	
Waypoints	
Routes	
Track	
Trip & Fuel Planning	
System Setup	
Navigation Setup	
Timers & Alarms	
Input/Output	
SIM	35%

A

NEAREST WAYPOINTS			
WAYPOINT	BRG	DIS	
BUDY	!	179°	2.15%
STUMP4	☒	179°	2.91%
TOUR-3	◦	179°	3.62%
TOUR2	◦	179°	3.83%
TOUR1	◦	179°	4.22%
FUEL	📍	179°	4.50%
FISH-6	☒	179°	8.48%
FISH-2	☒	179°	9.00%
006	◦	179°	9.17%
SIM			57%

B

A. The main menu page features four waypoint submenus.

B. The nearest waypoint list continuously updates to show the nine nearest waypoints to your present position.

SECTION 7

WAYPOINTS

Proximity Waypoints

PROXIMITY WAYPOINTS

WAYPOINT	DIS
COVE	1.00 ⁿ
FISH-2	0.40 ⁿ
STUMP4	0.20 ⁿ
BUOY	2.00 ⁿ
-----	----- ⁿ
-----	----- ⁿ
-----	----- ⁿ
-----	----- ⁿ
-----	----- ⁿ
-----	----- ⁿ

ALARMS

On

SIM 49%

A

PROXIMITY WAYPOINTS

WAYPOINT	DIS
COVE	1.00 ⁿ

CLEAR ALL ALARMS

Note: This will clear all proximity alarms

Are You Sure?

YES **NO**

ALARMS

On

SIM 55%

B

- A. Whenever you enter a proximity waypoint's alarm circle, a 'PRX' indicator will appear in the status bar (the alarms option must be set to the 'On' position). Once you've left the alarm circle, the proximity indicator will automatically reset.
- B. To clear all proximity waypoints, select the 'Clear All?' option from the proximity options page. Finish the deletion by confirming the 'Yes' prompt.

Proximity Waypoints

The **proximity waypoints list** lets you define an alarm circle around a stored waypoint position, and can be used to help you avoid reefs, rocks or restricted waters. Up to nine waypoints may be listed, with a maximum alarm radius of 99.99 nautical or statute miles or kilometers. If a proximity alarm circle overlaps with an existing alarm circle, a 'Proximity Overlap' message will appear each time the unit is turned on. If you enter an alarm circle overlap, you will only be alerted to the closest proximity waypoint.

To enter a proximity waypoint:

1. Highlight the Proximity Waypoint option and press
2. Use the key to highlight the first blank waypoint field and press .
3. Enter the name of the proximity waypoint using the keypad, or press to select the waypoint from the nearest waypoint list, waypoint list, or map display.
4. Press to confirm. The distance field will now be highlighted.
5. Press to begin entry of the proximity radius.
6. Use the keypad to enter a distance value (to 99.99 units) and press .

To turn proximity alarms on or off:

1. Use the keypad to highlight the alarms on/off field and press .
2. Select the desired setting and press .

To remove a proximity waypoint from the list:

1. Use the keypad to highlight the waypoint to be removed.
2. Press .
3. Highlight the 'Clear Alarm?' field and press .
4. To clear all proximity waypoints, select the 'Clear All' option and press .





Create Waypoint Submenu

The third waypoint submenu accessible from the main menu page is the 'Create Waypoint' submenu, which allows you to create a new waypoint by manually entering coordinates. Instructions for using the 'Create Waypoint' submenu are provided on page 55.





Waypoint List

The last waypoint category available from the main menu is the **waypoints list**, which displays a master list of all waypoints currently stored in memory. From the waypoints list, you may review, edit, rename or delete individual waypoints; or delete all user waypoints. The total number of stored and available waypoints is displayed at the top of the waypoints page, with the stored waypoints arranged in numerical/alphabetical order and listed in two columns in the center of the page.





To scroll through and review the waypoint list:

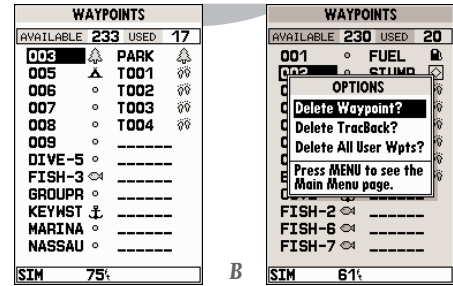
1. Highlight the 'Waypoints' option from the main menu page and press .
2. Use the  keypad to scroll through the list in the desired direction.
3. Press  to review the highlighted waypoint.
4. Press  to return to the list.

To delete an individual waypoint from the list:

1. Use the  keypad to highlight the waypoint to be deleted and press .
2. Press .
3. Press the  key to confirm the deletion warning.

To delete all TracBack waypoints or the entire waypoint list:

1. Press the  key to select the options window.
2. Highlight the 'Delete TracBack' or 'Delete All User Wpts?' option and press .
3. Use the  keypad to highlight the 'YES' prompt and press  to confirm.

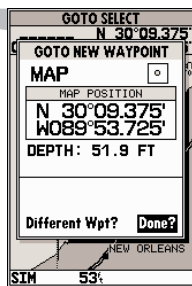
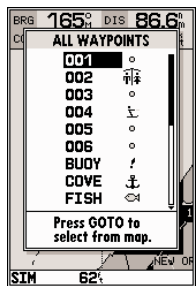


- A. The waypoints list displays all waypoints stored in memory in a two-column format. Temporary waypoints created by the TracBack feature are assigned a 'T___' name and a footprint symbol.
- B. The waypoints list options page lets you delete individual waypoints, TracBack waypoints or the entire waypoint list.

SECTION 8

GOTO/MOB

Selecting a GOTO Destination



- A. To select a destination from a list of waypoints, press **GOTO** once.
- B. Press **GOTO** twice to select a destination waypoint using the map cursor. If you are not selecting an existing waypoint as your destination, a new waypoint named 'MAP' will be created. Keep in mind that the MAP waypoint will be overwritten for each MAP GOTO. Overwriting allows you to navigate to on-screen nav aids without permanently storing the nav aid as a waypoint. If you want to save the MAP waypoint, rename it following the steps on page 58.

Navigation Methods

The sounder provides four methods of navigation: **GOTO**, **MOB**, **TracBack** and **Route**.

GOTO

The sounder allows you to create a simple route consisting of your current position and selection of a single destination (waypoint) from the waypoint list. Any waypoint on the list can be selected as the destination. Pressing the **GOTO** key once shows a list of all waypoints in memory from which to choose.

To turn on GOTO navigation from the waypoint list:

1. Press the **GOTO** key. Select a waypoint and press **EDIT ENTER**. The sounder sets a direct line course from your present position to the selected destination.

Selecting a GOTO Graphically

Pressing the **GOTO** key twice allows you to graphically select an on-screen waypoint, nav aid or cursor position as the destination. If you are selecting a nav aid or a new position as the GOTO destination, the sounder will automatically create or move the waypoint named 'MAP' at the nav aid or map position.

To turn on a GOTO from the map display:

1. Press the **GOTO** key twice.
2. To select an existing user waypoint, highlight the waypoint on screen and press **EDIT ENTER**.
3. To select a nav aid, highlight the nav aid on screen and press **EDIT ENTER**. The GOTO new waypoint page will appear, displaying the nav aid position as a 'MAP' waypoint, with the nav aid symbol and text as the default symbol and waypoint comment. Press **EDIT ENTER** to save the waypoint and begin navigation.
4. To select a cursor position as your destination, move the arrow cursor to the desired position and press **EDIT ENTER**. The GOTO new waypoint page will appear and display the position as the 'MAP' waypoint. Press **EDIT ENTER** to save the waypoint and begin navigation.

GOTO Options

The GOTO options menu provides a list of additional GOTO options that let you start a TracBack route, select a destination waypoint from the nearest waypoints list, select a route to navigate, or cancel the current GOTO destination.

To display the GOTO options menu from any page:

1. Press **GOTO** followed by **MENU**.

To select a menu option:

1. Highlight the desired option and press **EDIT/ENTER**.

The following options are available:

- **Start TracBack?:** Allows you to create and start navigation of a TracBack route back to the oldest track log point in memory (see pages 64-65 for more on using the TracBack feature.)
- **Show All Wpts?:** Displays the GOTO waypoint list.
- **Show Nearest Waypoints?:** Allows you to select the GOTO destination from a list of the nine nearest waypoints to your present position.

To select a nearest waypoint as a GOTO destination:

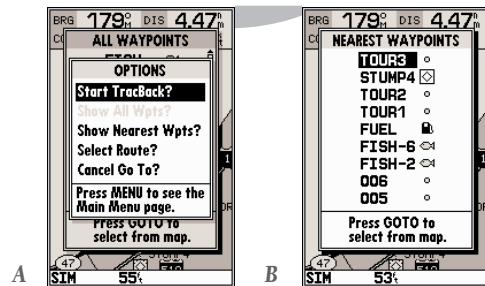
1. Highlight the 'Show Nearest Waypoints' option and press **EDIT/ENTER**.
2. Select the desired waypoint and press **EDIT/ENTER**.

- **Select Route?:** Allows you to quickly select a stored route for navigation.

To select a route to navigate:

1. Highlight the 'Select Route' option and press **EDIT/ENTER**.
2. Select the desired route and press **EDIT/ENTER**.

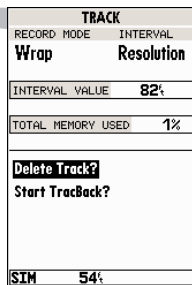
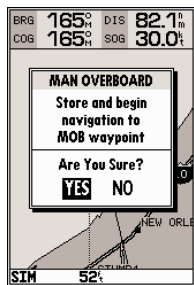
- **Cancel GOTO?:** Cancels the current GOTO destination and resumes navigation of any previously selected route.



- A. The GOTO options page lets you start a TracBack route, select a destination from the nearest list, select a route to activate, or cancel the current GOTO destination.
- B. The nearest waypoints list limits the list to provide quick access to nearby anchorages, facilities, etc. which are stored as waypoints.

SECTION 8

GOTO/MOB MOB and TracBack Navigation



- A. The sounder's MOB feature can be used to set a course to a passing spot when a quick response to emergency situations, fish strikes, etc. is needed.
- B. To define a starting point for a TracBack route, first clear the track log.

MOB

The **man overboard feature** (MOB) is used in emergency situations, such as man overboard, or to quickly mark a spot.

To turn on the MOB feature:

1. Press the **MOB** key.
2. Press the **EDIT ENTER** key to confirm and begin navigating to the MOB position.

Once a MOB has been turned on, the MOB symbol will appear on the map display, and the destination field on the Map Page will display the bearing, distance, and ETE to the MOB position based on your present speed and course.

To stop navigating to the MOB position:

1. Press the **GOTO** key, followed by **MENU**, to display the GOTO options page.
2. Select the 'Cancel GOTO' option and press **EDIT ENTER**.

TracBack Navigation

The third method of navigating to a destination is by **TracBack**. TracBack allows you to retrace your path by using the track log automatically stored in the receiver's memory, which will eliminate the need to store waypoints along the way. TracBack routes are created by reducing your track log into a route of up to 30 waypoints and activating an inverted route along those points.

To clear the track log and define a starting point for a TracBack route:

1. Press the **MENU** key twice to display the main menu page.
2. Highlight the 'Track' option and press **EDIT ENTER**.
3. Select the 'Delete Track?' option and press **EDIT ENTER**.
4. Highlight the 'Yes' field and press **EDIT ENTER**.

To turn on a TracBack route:

1. Press the **GOTO** key, followed by the **MENU** key. Highlight the 'Start TracBack?' option and press **EDIT ENTER**.

TracBack Navigation (con't.)

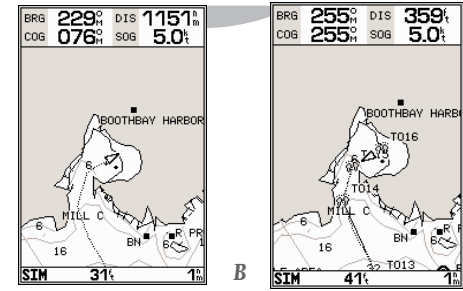
Once a TracBack has been turned on, the sounder will take the track log currently stored in memory and divide it into segments called 'legs'. Up to 30 temporary waypoints (e.g. T001) will be created to mark the most significant features of the track log in order to duplicate your exact path as closely as possible. To get the most out of the TracBack feature, remember the following tips:

- Once turned on, a TracBack route will lead you back to the oldest stored track log point, so it's a good idea to clear the existing track log at the start of your current trip before you start navigating.'
- The 'RECORD' option on the track log setup page must be set to 'Fill' or 'Wrap' and there must be at least two track log points stored in memory to create a TracBack route.
- If there are not enough available waypoints in memory to create a TracBack route, you will be alerted with a 'waypoint memory full' message, and the receiver will use available waypoints to create a route with an emphasis on the track log closest to the destination.
- If the track log interval is set to the 'Time' option, the route may not follow your exact path (keep the interval set to 'resolution' for best performance).
- If the receiver is turned off or satellite coverage is lost during your trip, the TracBack will draw a straight line between any point where coverage was lost and where it resumed.
- If your track log's changes in distance and direction are too complex, 30 waypoints may not mark your path accurately. The receiver then assigns the 30 waypoints to the most significant points of your track, and simplifies segments with fewer changes in direction.
- When a TracBack route is turned on, the receiver will automatically erase any temporary waypoints (e.g., 'T001') that are not contained in routes 1-20. If there are temporary waypoints stored in routes 1-20, the receiver will create any new temporary waypoints using the first three-digit number available.

ROUTES

TracBack Navigation

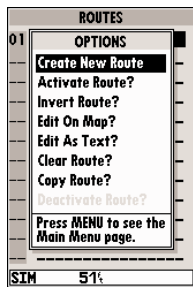
SECTION 9



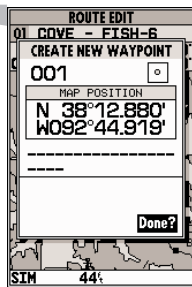
- A.** The TracBack feature uses your track log to create a route back to where you started.
- B.** Once a TracBack is activated, the track log is divided into segments using temporary waypoints, and an inverted route is activated back to the oldest track log point in memory.

SECTION 9

ROUTES Creating a Route Graphically



A



B

- A. The route options page provides access to the sounder's route functions.
- B. Use the arrow pointer and EDIT/ENTER to add waypoints to the route. The create waypoint page will appear whenever you have selected a position that is not already stored as a waypoint.

Routes

The last way to navigate to a destination is to create a user-defined route. The sounder lets you create and store up to 20 reversible routes (numbered 1-20), with up to 30 waypoints each. Routes can be created and modified right from the Map Page, allowing you to see each route graphically on-screen as you create, review, modify or navigate the route. All of the route features are accessed through the main menu.

To create a route graphically:

1. Press the **MENU** key twice to display the main menu page.
2. Highlight the 'Routes' field and press **EDIT/ENTER**. The routes page will appear, showing all the routes currently stored in memory.
3. Press the **MENU** key to display the route options page.
4. Press **EDIT/ENTER** to select the 'Create New Route' option.

The route edit page will appear, with the cursor displayed as an arrow pointer, and will allow you to select your route waypoints using one of two methods:

5. To add an existing waypoint or navaid to the route, use the arrow pointer to highlight the desired waypoint on screen and press **EDIT/ENTER**.
6. To add a new waypoint to the route, use the arrow pointer to select the desired map position and press **EDIT/ENTER**. Press **EDIT/ENTER** again to confirm the new waypoint.

As you add each new waypoint to the route, the data window at the top of the map display will show the route number you are creating, along with the first and last route waypoints of the route. A route line will appear on the map to indicate each completed leg, and a dotted line will appear to indicate the distance and bearing to the arrow pointer from the last route waypoint.

7. Repeat steps 5 and 6 until you have finished defining all route waypoints.
8. Press **QUIT** to finish and enter review mode, or **PAGE** to return to the main page sequence.

Routes (con't.)

Once a route has been created graphically (and the **QUIT** key has been pressed to finish), the map display will automatically enter the route review mode. The arrow pointer will be replaced by the map cursor, located at the last route waypoint. The route edit mode allows you to review and modify the route displayed through a pop-up window menu for each waypoint. You can also use the cursor to select an individual route leg and insert a new route waypoint.

To edit a route waypoint:

1. Use the cursor to highlight the desired route waypoint and press **EDIT/ENTER**.

A pop-up menu of editing choices will appear, with options for reviewing, removing, moving or inserting a route waypoint.

To review a route waypoint:

1. Highlight the 'Review?' option and press **EDIT/ENTER**.

To remove a route waypoint:

1. Highlight the 'Remove?' option and press **EDIT/ENTER**.

To move a route waypoint:

1. Highlight the 'Move?' option and press **EDIT/ENTER**. Move the cursor to the new map position and press **EDIT/ENTER**.

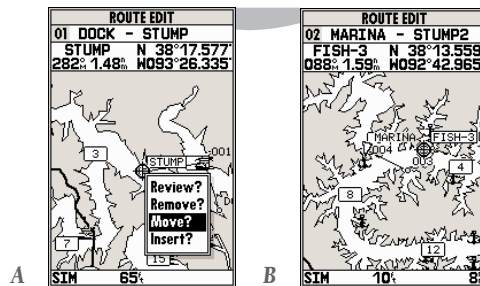
To insert new route waypoint(s) at the beginning or end of the route:

1. Select the first (to add waypoints to the beginning of the route) or last (to add waypoints to the end of the route) route waypoint with the map cursor, and press **EDIT/ENTER**.
2. Highlight the 'Insert?' option and press **EDIT/ENTER**.
3. Move the cursor to the new waypoint position and press **EDIT/ENTER**.
4. If you are not inserting an existing waypoint, press **EDIT/ENTER** to confirm the new waypoint.
5. Repeat steps 3 and 4 to insert additional waypoints, or press **QUIT** to finish.

ROUTES

Editing Routes
Graphically

SECTION 9

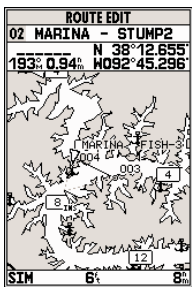


A. To move a route waypoint, select the 'Move?' option and press **EDIT/ENTER**.

B. Move the arrow cursor to the new waypoint position and press **EDIT/ENTER** to confirm.

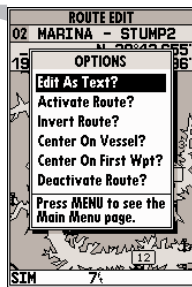
SECTION 9

ROUTES Route Edit Mode



A

A. A new route waypoint may be inserted into any route leg by pointing to the new waypoint or position and pressing EDIT/ENTER.



B

B. The 'Edit As Text?' option allows you to review and modify waypoints by text entry.

Routes (con't.)

The route edit mode also allows you to insert a new route waypoint in any route leg using the map cursor.

To insert a new waypoint between two existing route waypoints:

1. Use the cursor to select the leg you want to insert the new waypoint in (the route line will change to a dotted line when the leg is selected) and press **EDIT/ENTER**.
2. Move the cursor to the new map position and press **EDIT/ENTER**.
3. If you are not inserting an existing waypoint, press **EDIT/ENTER** to confirm the new waypoint.

The route edit options page provides access to a variety of features which can be used to review, activate, invert or edit the route as text and adjust the map view of the selected route.

To display the route edit options:

1. Press **MENU**.

To select a menu option:

1. Highlight the desired option and press **EDIT/ENTER**.

The following options are available:


- **Edit As Text?:** Allows you to modify a route by text entry.

To edit a route by text entry:

1. Highlight the 'Edit As Text?' option and press **EDIT/ENTER**. The text edit page will appear, showing a list of all route waypoints, with the desired track and distance of each leg displayed.
2. Select the route waypoint you want to review or change and press **EDIT/ENTER**. A pop-up menu with four route editing options will appear.

Routes (con't.)


To review the selected waypoint:

1. Highlight the 'Review?' option and press .




To insert a new waypoint before the selected route waypoint:


1. Highlight the 'Insert?' option and press .
2. Enter the name of the new waypoint using the  keypad, or press  to select the new waypoint from the nearest list, waypoint list, or map display.
3. Press  to finish.

To remove the selected route waypoint:

1. Highlight the 'Remove?' option and press .

To change the selected route waypoint:

1. Highlight the 'Change?' option and press .
2. Enter the name of the new waypoint using the  keypad, or press  to select the new waypoint from the nearest list, waypoint list, or map display.
3. Press  to finish.

The **route edit options page** features five more functions. These functions may be selected by highlighting the desired function and pressing .

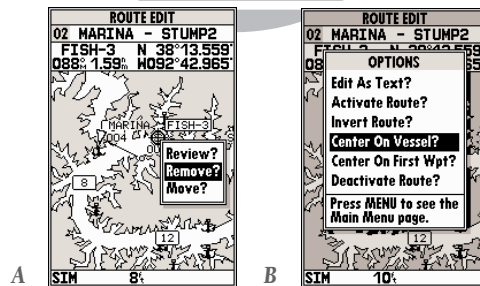
- **Activate Route?:** Activates the route you are editing and begins navigation.
- **Invert Route?:** Activates the route you are editing in reverse order and begins navigation.
- **Center On Vessel?:** Redraws route edit map with your vessel in the center of the display.
- **Center On First Wpt?:** Redraws route edit map with the first route waypoint in the center of the display.
- **Deactivate Route?:** Stops navigation of the route currently selected.


To exit the route edit mode and return to the route list page, press .

ROUTES

Editing Routes and
Route Edit Options

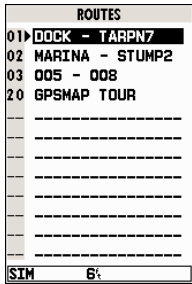
SECTION 9



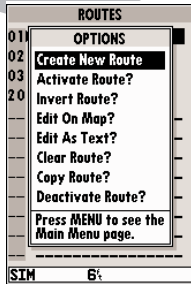
- A. To remove a route waypoint, highlight the waypoint on the map, press , and select the 'remove option' from the pop-up window.
- B. The route edit options page lets you activate, invert or deactivate the route you are editing. The 'Center On Vessel' and 'Center On First Wpt' options redraw the map to display the desired option.

SECTION 9

ROUTES Route List Page



A



B

- A. The route list page displays each route stored in memory, along with a 16-character user comment. The default comment is the name of the first and last route waypoint.
- B. The route list options page provides quick access to many route functions, including activating and deactivating a selected route.

Route List Page

The **route list page** numerically lists all the routes currently stored in memory, with the route number and comment displayed. Route 00 is always reserved for the TracBack route, while routes 1-20 serve as storage routes (route 20 is stored as the GPSMAP tour route, which may be deleted at any time). From the list, you may enter your own 16-character route comment and select a specific route for activation, editing or other route management functions.

To enter a custom route comment:

1. Highlight the desired route and press **EDIT ENTER**.
2. Press the left arrow key of the **0** keypad to clear the comment field.
3. Use the **0** keypad to enter the new route comment and press **EDIT ENTER**.

Once you have selected a route from the route page, additional functions for that route are available from the route options page.

To display the route options:

1. Press **MENU**.

To select a menu option:

1. Highlight the desired option and press **EDIT ENTER**.

The following options are available from the route list page:

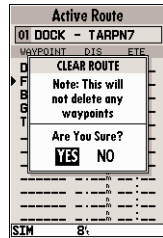
- **Create New Route?:** Allows you to create a new route (see page 66).
- **Activate Route?:** Activates the selected route and begins navigation.
- **Invert Route?:** Activates the selected route in reverse order and begins navigation.
- **Edit On Map?:** Allows you to edit the selected route graphically (see page 67 for specific instructions).
- **Edit As Text?:** Allows you to edit the selected route by text (see page 68 for specific instructions).

Route List Page Options (cont.)

- **Clear Route:** Allows you to clear all waypoints from the selected route.

To clear the selected route:

1. Highlight the 'Clear Route?' option and press **EDIT/ENTER**.
2. Press **EDIT/ENTER** to confirm the clear route warning.



- **Copy Route?:** Allows you to copy the waypoints of a selected route to another route. The route copy function can be used to copy a TracBack route (route 00) to another route in order to prevent losing the route the next time a TracBack route is activated, or to save a modified version of an existing route without losing the original.

To copy a route:

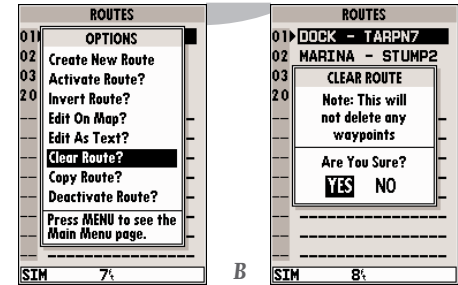
1. Highlight the 'Copy Route?' option and press **EDIT/ENTER**. The selected route will appear as the 'copy from' route, and the first open storage route will appear as the 'copy to' route.
2. Press **EDIT/ENTER** to confirm. (If you'd like to change the route number that is being copied or the open route which is being copied to, highlight the appropriate field and press **EDIT/ENTER**. Select the new route number and press **EDIT/ENTER**.)

- **Deactivate Route?:** Stops navigation of the current route.

ROUTES

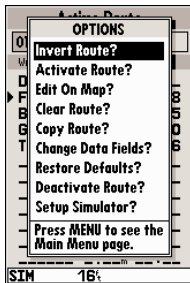
Route List Options

SECTION 9



- A. To delete all waypoints from a selected route, highlight the 'Clear Route?' option and press **EDIT/ENTER**.
- B. Once a route is cleared, all waypoints are removed from the route. They are still stored in memory, however.

Active Route Page Options



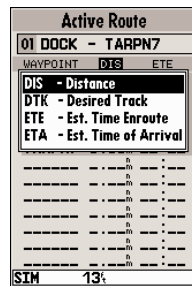
The following options are available from the active route page:

- **Invert Route?:** Activates the active route in reverse order and begins navigation.
- **Activate Route?:** Reactivates the active route and selects the route leg closest to your current position as the new active leg.
- **Edit On Map?:** Allows you to edit the selected route graphically (see page 67 for specific instructions).
- **Clear Route?:** Allows you to clear all waypoints from the selected route.
- **Copy Route?:** Allows you to copy the waypoints of the active route to another route.
- **Change Data Fields?:** Allows you to define the data displayed in the distance and ETE fields. Four data options are available:
 - *DIS*: distance to active wpt
 - *DTK*: desired track
 - *ETE*: estimated time enroute
 - *ETA*: estimated time of arrival
- **Restore Defaults?:** Resets all active route page options to the factory settings.
- **Deactivate Route?:** Stops navigation of the route you are currently navigating.
- **Setup Simulator?:** Allows you to define speed, course and position values while in simulator mode.

ROUTES

Active Route Page
Options

SECTION 9



The ‘Change Data Fields?’ option lets you specify what information is displayed for each route waypoint. Four data options are available: distance, desired track, and ETA or ETE to each route waypoint.

SECTION 9

ROUTES Track Log Setup

TRACK

RECORD MODE	INTERVAL
Wrap	Resolution
Off	VALUE 82%
Fill	
Wrap	MEMORY USED 1%

Delete Track?
Start TracBack?

SIM 58%

TRACK

RECORD MODE	INTERVAL
Wrap	Resolution
	Resolution
	Time
	Distance

Delete Track?
Start TracBack?

SIM 57%

- A. The 'Wrap' option will continuously record a track log, and replace the oldest track log point with new data. The 'Fill' option will record a track log until the memory is full.
- B. The track submenu's default settings may be quickly restored from the track options page.

Track Log Submenu

The **track log submenu** lets you specify whether to record a track plot (an electronic recording of your path), and define how it is recorded. It also provides an indicator of the amount of track memory used and selects functions to clear the track memory and start a TracBack route. The following functions are available:

- **Record Mode:** Lets you select one of three track recording options:
 - *Off:* No track log will be recorded. Selecting 'Off' will prevent you from using the TracBack feature.
 - *Fill:* A track log will be recorded until the track memory is full.
 - *Wrap:* A track log will be continuously recorded, wrapping through the available memory (replacing the oldest track data with new data).
- **Interval:** Defines the frequency with which the track plot is recorded. Three interval settings are available:
 - *Time:* Records track plot based on a user-defined time interval.
 - *Resolution:* Records track plot based upon a user-defined variance from your course over ground. The resolution option is the default setting and is recommended for the most efficient use of memory and TracBack performance. The distance value (entered in the interval field) is the maximum error allowed from the true course before recording a track point.
 - *Distance:* Records track based on a user-defined distance between points.
- **Interval Value?:** Defines the distance or time used to record the track log.
- **Delete Track?:** Allows you to clear the track log currently stored in memory.
- **Start TracBack?:** Converts the current track log into an inverted route and begins route navigation along the track log.

To reset all track options to the default settings:

1. Press **MENU**, followed by **EDIT ENTER**.

Trip and Fuel Planning

The **trip and fuel planning submenu** lets you plan and review distance, fuel, and ETE/ETA information between any two waypoints, your present position and a stored waypoint, or any part of a stored route. Sunrise and sunset information is also provided. Two planning modes are available: point-to-point and route planning.

To use the point-to-point planning mode:

1. Highlight the 'Trip & Fuel Planning' option from the main menu page and press **EDIT/ENTER**.
2. If the plan field is not set to 'Point-To-Point', press the **MENU** key and select it from the options page.
3. Highlight the first waypoint field and press **EDIT/ENTER**. Press the left arrow key to clear the field, and use the **0** keypad to enter the name of the starting waypoint. You may leave the waypoint field blank to use your present position, or press the **MENU** key to select the waypoint from the nearest list, the waypoint list, or the map display. Press **EDIT/ENTER** to confirm the waypoint.
4. Move the field highlight to the second waypoint field and follow the steps above to select the destination waypoint.
5. Enter a speed for your trip in the speed field, or press **MENU** to select your current SOG for the speed value.
6. Enter an hourly fuel flow (if desired) in the fuel field, and press **EDIT/ENTER**.
7. Enter the date and time of your departure (the default date and time will be the current date and time in UTC or local time, whichever you have selected) and press **EDIT/ENTER**.

The bottom of the page will now display the desired track and distance between the two points; the estimated time enroute and fuel required; the date and time of arrival; and the sunrise and sunset times at the destination for the date of arrival.

The **route planning mode** lets you calculate the same planning information for any route stored in memory, in leg, or cumulative leg or route totals.



A

TRIP & FUEL PLANNING	
PLAN	Point-To-Point
KEYWST to	NASSAU
SPEED	0.0
FUEL FLOW	0.0/hr
DEPART	18-JUN-96 12:25
DTK	086% FUEL
DIS	238.9% ETE
ETA	RISE
DATE	SET
SIM	55%

B

TRIP & FUEL PLANNING	
PLAN	Point-To-Point
KEYWST to	NASSAU
SPEED	35.0
FUEL FLOW	23.0/hr
DEPART	18-JUN-96 12:25
DTK	086% FUEL 157.0
DIS	238.9% ETE 06:49
ETA	07:14 RISE 05:20
DATE	18-JUN SET 07:02
SIM	57%

- A. To perform point-to-point planning, enter a 'TO' and 'FROM' waypoint, or leave the field blank if you want to use your present position.
- B. Enter a date and time for your departure. The sunrise/sunset and ETA at the 'TO' waypoint will be displayed at the bottom of the page.

SECTION 9

ROUTES Route and Trip Planning

TRIP & FUEL PLANNING		
PLAN	ROUTE	LEG
Route	04	ALL
BUOY05 to DIVE-4		
SPEED	35.0:	
FUEL FLOW	30.0/hr	
DEPART	11-JUN-96 07:16:	
DTK	FUEL	224.5
DIS	261.9%	ETE 07:29
ETA	RISE	06:36:
DATE	SET	08:15:
SIM	17:	

TRIP & FUEL PLANNING		
PLAN	ROUTE	LEG
Route	04	03
010 to DIVE-4		
SPEED	35.0:	
FUEL FLOW	30.0/hr	
DEPART	11-JUN-96 07:16:	
DTK	FUEL	43.6
DIS	50.9%	ETE 01:27
ETA	RISE	06:36:
DATE	SET	08:15:
SIM	23:	

- A. To plan cumulative totals for an entire route, select the 'All' option from the leg field.
- B. To plan cumulative totals through a particular leg, select the 'Hold First Waypoint?' option from the Trip and Fuel Planning options page. Then enter the last leg you want to plan in the leg field.

Trip and Fuel Planning (con't.)

To use the route planning mode:

1. Highlight the 'Trip & Fuel Planning' option from the main menu and press **EDIT ENTER**.
2. If the plan field is not set to 'Route', press **MENU** and select it from the options page.
3. Highlight the route number field and press **EDIT ENTER**.
4. Use the **0** keypad to select the route you want to plan and press **EDIT ENTER**.
5. Highlight the leg field and press **EDIT ENTER**.
6. To plan the cumulative totals for the all route legs, select the 'ALL' option—or use the **0** keypad to select a specific route leg to plan. Press **EDIT ENTER** to confirm.
7. Enter a speed for your trip, or press **MENU** to select your current SOG for the speed value.
8. Enter an hourly fuel flow (if desired) in the fuel field, and press **EDIT ENTER**.
9. Enter the date and time of your departure (the default date and time will be the current date and time in UTC or local time, whichever you have selected) and press **EDIT ENTER**.

The bottom of the page will now display the planning information for the route leg selected or the cumulative values for the entire route. The route planning mode will also let you plan cumulative totals for multiple route legs by using the 'Hold First Waypoint?' selection from the options window.

To plan multiple route legs:

1. Follow steps 1 through 6 above to select the last route leg you want to plan. For example, select leg 03 if you want to plan cumulative totals for the first three legs of the route (without including the rest of the route).
2. Enter the speed, fuel and date/time values as described in steps 7-9 above.
3. Press the **MENU** key to display the options page.
4. Select the 'Hold First Waypoint?' option and press **EDIT ENTER**. The cumulative totals from the first route waypoint to the end of the selective leg will appear at the bottom of the page.

The fuel and trip planning submenu also allows you to calculate the sunrise and sunset times for your present position or any waypoint for a selected date.

Trip and Fuel Planning (cont.)

To use the sunrise/sunset planner:

1. Highlight 'Trip & Fuel Planning' option from the main menu and press **EDIT/ENTER**.
2. Highlight the first waypoint field and press **EDIT/ENTER**. Press the left arrow key to clear the field, and use the **0** keypad to enter the name of the desired waypoint. You may leave the waypoint field blank to use your present position, or press the **MENU** key to select the waypoint from the nearest list, the waypoint list, or the map display. To calculate the sunrise/sunset for your present position, leave both waypoint fields blank.
3. Press **EDIT/ENTER** to confirm.
4. Highlight the date field and press **EDIT/ENTER**.
5. Enter the date you want sunrise/sunset information for (the current date and year will be used as the default setting) and press **EDIT/ENTER**. The sunrise and sunset times for the arrival date will be displayed at the bottom right of the planning page.

Setup Submenus

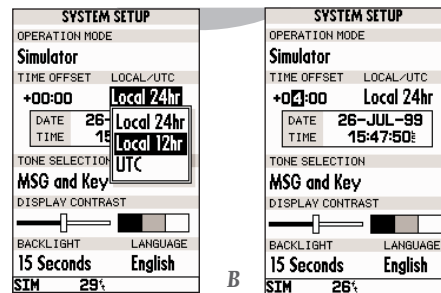
The last four options listed on the main menu page provide access to the various system, navigation, alarm and interface settings of the sounder. The **system setup submenu** is used to select the operating mode, date and time formats, tone preferences, backlight timeout and display contrast.

- **Operational Mode:** Lets you select between normal, simulator, sounder only, or GPS only mode. In the normal mode both GPS and sounder functions operate at the same time. In simulator mode, the sounder only pretends to track satellites to allow you to learn how the unit works. Waypoints and routes created in simulator mode are saved in memory and are available for use in normal mode.

The sounder only and GPS only modes allow you to determine what type of information the sounder will give you. GPS only mode is useful when using the unit for land navigation while enroute to the water. Sounder only mode is an option if you do not want GPS information (such as position, speed, heading, and map functions) while on the water.

SETUP MENUS SECTION 10

Sunrise/Sunset Planning System Setup



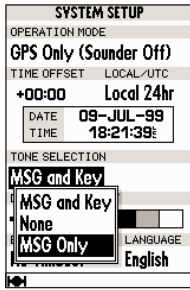
A. The system setup submenu provides access to the sounder's time formats and contrast/backlight controls.

B. When entering a time offset, be sure to select a positive or negative indicator to the left of the offset value.

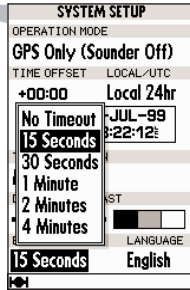
SECTION 10

SETUP MENUS

System Setup and System Setup Options



A



B

- A. The 'None' tone setting will prevent an audible tone from sounding for any key presses, messages, or alarms. Regardless of the tone setting, 'MESSAGE -PRESS PAGE' will continue to be flashed on the status bar for any system messages or alarms.
- B. Keeping the backlight timeout at the lowest acceptable setting will lengthen the useful life of the backlight.

Setup Submenus (con't.)

- **Time Offset:** Provides a data entry field to enter the time difference between UTC time and local time (see page 105 for a list of time offsets). When entering a time offset, be sure to select a positive or negative offset. Entering an offset will not automatically display local time. The *local* setting from the Date/Time Selection submenu must be selected.
- **Local/UTC:** Lets you choose to display the date and time in UTC (also Greenwich Mean Time) time or local time offset from UTC time. The default setting is local with a '0' offset. (If you are boating in the United States, be sure to enter a negative time indicator in front of the appropriate time offset for your location).
- **Tone Selection:** Lets you select an audible tone for messages and keystroke confirmation (the default setting), messages only, or no sound at all. **Caution:** Setting the tone selection for no sound will prevent an audible tone for all alarms, including shallow water and proximity waypoints.
- **Display Contrast:** Provides a slide bar to adjust the LCD screen contrast in order to compensate for changes in temperature or lighting conditions.
- **Backlight Timeout:** Provides an automatic shutoff for the sounder's screen backlighting. Six settings are available: No Timeout (the backlight will stay on until it is turned off), 15 seconds (default setting); 30 seconds; and 1, 2, or 4 minutes.
- **Language:** Allows you select from nine languages the unit can display. The available languages are English, Danish, Finnish, German, Italian, Portuguese, Spanish, and Swedish.

The system setup page also features an options menu that allows you to quickly reset all the system setup options to the factory default settings and define speed, course, and position values while in simulator mode.

To view the system setup page options:

1. Press the **MENU** key.

To restore the default settings:

1. Highlight the 'Restore Defaults?' option, and press **ENTER**.

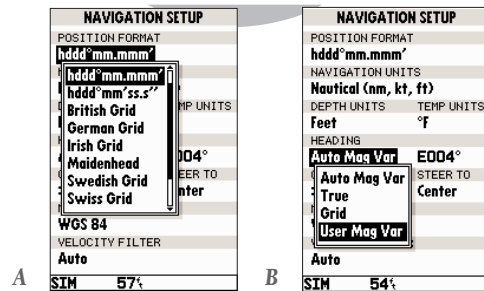
Navigation Setup

The navigation setup submenu is used to select a variety of navigation information including: position format, units of measure, and heading references. This submenu is also used to select map datums, set the CDI scale and adjust the built-in velocity filter. The following options are available:

- **Position Format:** Lets you select the coordinate system used to display position. The following formats are available:
 - hddd.ddddd° (degrees)
 - hddd°mm.mmm' (degrees and minutes)
 - hddd°mm'ss.s" (deg/min/sec)
 - British grid
 - German grid
 - Irish grid
 - Maidenhead
 - Swedish grid
 - Swiss grid
 - Taiwan grid
 - UTM/UPS grid
 - LORAN TDs
- **Navigation Units:** Selects the format for speed and distance measurements. You may select from nautical, statute or metric formats. (The default setting is nautical.)
- **Depth Units:** Selects the format for depth contour display on G-chart offshore chart cartridges and the sounder display. Depth contours and sounder depth units can be displayed in feet, meters or fathoms. (The default setting is feet.)
- **Temp Units:** Lets you select between Celsius and Fahrenheit.
- **Heading:** Lets you select what reference is used in calculating heading information. You can select to reference automatic magnetic variation, true north, grid heading or user magnetic variation. (The default setting is automatic.)

To enter a user magnetic variation:

1. Highlight the 'Heading' field and press **EDIT ENTER**. Select the 'User Mag Var' option and press **EDIT ENTER**.
2. Press **EDIT ENTER** to access the variation field, and use the **0** keypad to enter the desired variation. Press **EDIT ENTER** to confirm.



- A. The sounder will also display position coordinates in eight grid formats.
- B. To enter a user magnetic variation, select the 'User Mag Var' option and enter a direction and value in the variation field.

SECTION 10 SETUP MENUS

Navigation Setup

NAVIGATION SETUP

POSITION FORMAT
 hddd°mm.mmm'

Timbalai 1948
 Tokyo
 Tristan Astro 1968
 Viti Levu 1916
 Wake-Eniwetok '60
 WGS 72
 WGS 84
 Zanderij

WGS 84

VELOCITY FILTER
 Auto

SIM 57%

NAVIGATION SETUP

POSITION FORMAT
 hddd°mm.mmm'

NAVIGATION UNITS
 Nautical (nm, kt, ft)

DEPTH UNITS TEMP UNITS
 Feet °F

HEADING
 Auto Mag Var E004°

CDI SCALE STEER TO
 Off Center

Auto

VELOCITY FILTER
 Auto

SIM 56%

A

B

- A. **CAUTION!** Using the incorrect map datum can seriously effect the accuracy of your GPS receiver. The GPS datum should always match the datum of the local chart you are using. If no datum information is indicated on the charts you are using, contact the chart manufacturer.
- B. Keeping the velocity filter on the 'Auto' setting will allow the sounder to automatically monitor and adjust the response time for track and speed calculations.

Navigation Setup (con't.)

- **CDI Scale:** Provides a list of six CDI scale settings for the Map Page CDI: +/-0.10, 0.50, 1.0 (default), 5.0, 10.0 and 25.0 miles or kilometers. The scale represents the distance from the center of the scale to either end of the scale.
- **CDI Steer To:** Allows you select a steer-to-center or steer-to-D-Bar orientation for graphic steering guidance. The steer-to-center selection displays your position as the vertical line on the scale, and your desired track as the center of the scale. The steer to D-Bar option displays your position as the center of the scale, with the desired track as the vertical line. (The default setting is steer to center).
- **Map Datum:** Provides a list of the available map datums for use with the sounder. For a list of the available map datums, see Appendix D. (The default setting is WGS 84).
- **Velocity Filter:** Allows you to select the sounder's response time to changes in track or ground speed. Three settings are available: automatic, on, or off. The 'auto' (default) setting will monitor the changes in your current track and speed and adjust the receiver's response time automatically. The 'on' setting allows you to manually enter a response time up to 240 seconds. Selecting a higher setting may be desirable in slow-speed applications with frequent changes in track.

To enter a user defined velocity filter value:

1. Highlight the 'Velocity' field and press **EDIT ENTER**. Select the 'On' option and press **EDIT ENTER**.
2. Highlight the time value field.
3. Press **EDIT ENTER**.
4. Enter a value in seconds (up to 240) and press **EDIT ENTER** to confirm.

VELOCITY FILTER

On 240 secs

Timers and Alarms Setup

The timer and alarms submenu is used to control various alarm/timer settings.

- **Timer:** Sounds an alarm when an entered interval (up to 99:59:59) has expired, or provides a continuous running clock timer to 99:59:59.

To use the countdown timer:

1. Select the Count Down menu option. Enter the desired time interval in the interval field, and press **EDIT** **ENTER**.
2. Once the count down time has expired, an alarm message will appear, and the timer will automatically switch to the count up mode. To reset the timer, select the reset option and press **EDIT** **ENTER**.

- **Clock Alarm:** Provides an alarm for the system clock. To use the clock alarm, select the 'On' option and enter the desired time of day in the time field.
- **Arrival Alarm:** Lets you specify an alarm to sound when you're a specified distance away from a destination waypoint. There are three options: (1) *Off*: No arrival alarm will sound, (2) *Auto*: An arrival alarm will sound one minute before the destination, based upon your current speed and course over ground, and (3) *On*: An arrival alarm will sound at the alarm distance specified in the distance field for the destination waypoint.
- **Crosstrack Alarm:** Provides an alarm for crosstrack error (XTK) when your vessel is off course by more than a specified distance, up to 99.99 (units).
- **Anchor Drag Alarm:** Lets you specify an alarm to sound when you've exceeded a specified drift distance, up to 9999 (units). Whenever the anchor alarm is triggered, an anchor symbol will appear in the status bar.
- **Sounder Alarms:** Allows you to set shallow and deep depth alarms and an alarm for specific sized fish/targets. There are three options:
 - *Shallow On/Off*: Sounds if depth equals or is less than the selected value.
 - *Deep On/Off*: Sounds if depth equals or is more than the selected value.
 - *Fish On/Off*: Select from All Targets, Medium-Large Targets, or Large Targets.



A

TIMERS & ALARMS	
TIMER	
Stop	03:54:32
Count Down	
Count Up	14:00
Reset	
Stop	
ALARM	
Off	2.00
ANCHOR DRAG ALARM	
Off	10
SOUNDER ALARMS	
Shallow Off	10.0
Deep Off	200.0
Fish Off	Med-Lrg Targets
SIM	47%

B

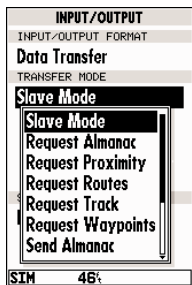
TIMERS & ALARMS	
TIMER	
Stop	03:54:32
CLOCK ALARM	
Off	14:00
ARRIVAL ALARM	
Off	
CROSS-TRACK ALARM	
Off	2.00
ALARM	
Shallow Off	10
Shallow On	
IS	
Shallow Off	10.0
Deep Off	200.0
Fish Off	Med-Lrg Targets
SIM	45%

- A. The timer field can be set to count down from a specified interval or provide a running count of elapsed time.
- B. The sounder alarms can be set to warn you of deep or shallow water and sounder targets of various sizes.

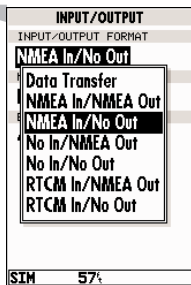
SECTION 10

SETUP MENUS

Input/Output Setup



A



B

- A. The 'data transfer' options allow you to send or receive almanac data, proximity waypoints, routes, track log data and waypoints to another GARMIN GPS or PC Kit.
- B. The NMEA In setting allows you to accept NMEA data from a Yeoman plotter or other compatible device.

Input/Output Submenu

The Input/Output submenu lets you control interface settings for connecting external NMEA devices, a DGPS receiver or a personal computer. The 'Input/Output Format' field, at the top of the page, lets you specify one of seven interface formats:

- **Data Transfer:** A proprietary interface that allows you to exchange data such as waypoints, routes and track logs between GPSMAP units or a GARMIN PC kit.
- **No In/NMEA Out:** Provides navigation information to a compatible NMEA device such as an autopilot or radar. NMEA 0180, 0182, 0183 v.1.5 and 0183 v.2.0 output options are available. See Appendix A for additional NMEA sentence information.
- **No In/No Out:** Provides no interfacing capabilities.
- **RTCM In/NMEA Out:** Allows DGPS beacon receiver input and also provides selectable NMEA output.
- **RTCM In/No Out:** Allows DGPS beacon receiver input, with no output capabilities.
- **NMEA In/No Out:** Allows input from a NMEA compatible external device, such as a Yeoman© Plotter, with no output capabilities.
- **NMEA In/NMEA Out:** Provides the same input capabilities as NMEA IN, with selectable NMEA output.

When the 'Data Transfer' option is selected, you'll need to specify what information to request or send to the remote unit through the Transfer Mode field. The 'slave' setting lets you control all data transfer from the 'external' GPS receiver, or PC, while the other settings request or send specific data from the primary unit.

Using NMEA and DGPS Interface Settings

If you are using an NMEA interface format, the NMEA format must be specified in the NMEA format field that will automatically appear when an NMEA option is selected. The appropriate baud rate will be set automatically. See page 96 for a list of NMEA supported sentences.

To select a NMEA format:

1. Select a NMEA IN/OUT format from the options page.
2. Highlight the NMEA Format field and press **EDIT/ENTER**.
3. Select a NMEA sentence format and press **EDIT/ENTER**.
4. The baud rate will automatically be set to the appropriate speed. If you have selected an NMEA IN/OUT setting, you must use the same NMEA format for both the input and output device.

Tuning DGPS Stations

If the I/O Format is set to accept RTCM input/NMEA Output for connecting a differential-ready GPS beacon receiver, you will need to tune a frequency in the tuning field and select a bit rate. The default frequency is 304.0 kHz, with a bit rate of 100 bps, or the last DGPS frequency/bit rate selected.

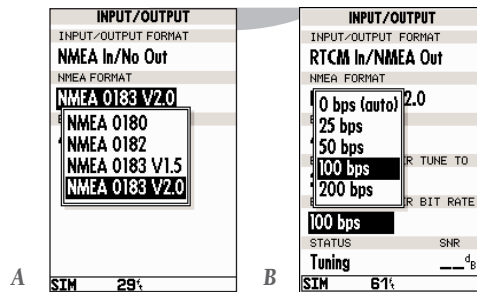
To tune a DGPS frequency:

1. Select the 'RTCM In/NMEA Out' format from the options page.
2. Highlight the beacon receiver frequency field and press **EDIT/ENTER**. Enter the desired frequency and press **EDIT/ENTER**. If you are using an automatically-tuned DGPS receiver, you can enter 000.0 for the frequency.
3. Press **EDIT/ENTER** to select a bit rate. Five bit rates are available: 0 (used for automatically-tuned DGPS receivers), 25, 50, 100 and 200 bps. Press **EDIT/ENTER** to confirm. The DGPS status, along with the signal-to-noise ratio of the tuned station, will be displayed at the bottom of the page.

SETUP MENUS

NMEA and DGPS Setup

SECTION 10

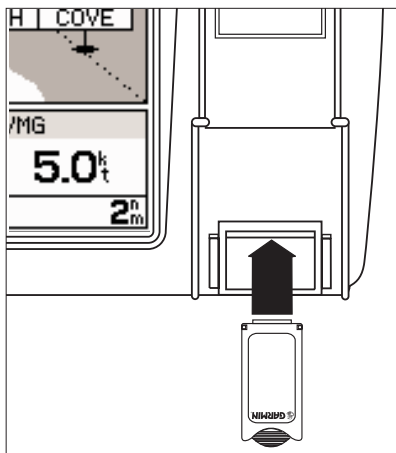


- A. Select the desired format from the NMEA field. The baud rate will automatically be set to the appropriate speed.
- B. After entering a DGPS frequency, set the bit rate to the speed indicated on the USCG station chart. DGPS coverage, frequencies and bit rates are available from the Coast Guard's automated FAX service (703-313-5920).

SECTION 11

G-CHARTS

Installing and Removing G-Charts



Installing and Removing G-Chart Cartridges

The unit uses G-chart offshore or inland cartography to display digital charts on-screen. G-chart cartridges are installed in the card slot located at the bottom right of the unit. G-chart cartridges may be installed or removed at any time, whether the unit is on or off.

To install a G-chart cartridge:

1. Open the chart door by pressing together the two handles at the bottom of the door and lifting up.
2. Insert the card (label facing front and G-chart logo at top) into the slot.
3. Use your thumb to firmly push the cartridge into the unit. If the sounder is on, a confirmation tone will sound when the cartridge has been properly installed and accepted.
4. Close the cover.



If you insert a G-chart cartridge and get a 'card format not recognized' message, try removing the card and reinserting it. If the card is still not recognized, contact the dealer you purchased it from for assistance. G-chart cartridges are not waterproof, should not be exposed to moisture or excessive static charges, and should be stored in the anti-static bag supplied with the cartridge.

To remove a G-chart cartridge:

1. Open the cartridge door.
2. Grasp the card at the bottom groove and pull firmly.
3. If the sounder is on, a confirmation tone will sound when the G-chart cartridge has been removed.

Using G-Chart Cartography

Once a G-chart cartridge has been inserted, the map coverage outlines for the cartridge will automatically appear on-screen. Keep in mind that the display will not automatically scroll to the map area or zoom to a level where you can see the coverage outlines. If you do not immediately see the outlines, scroll the cursor to the broad geographic area covered by the chart and zoom out to another map scale.

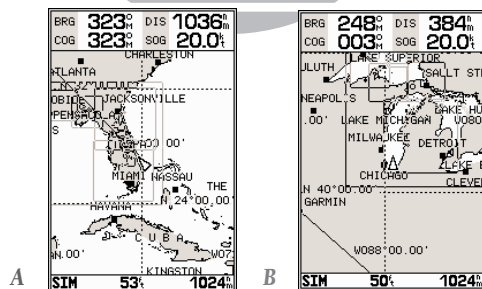
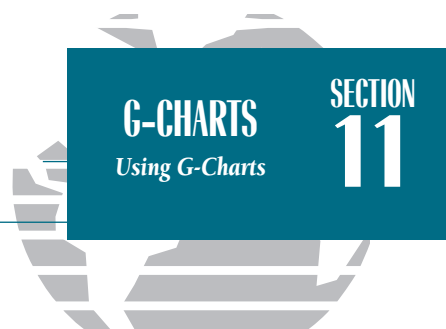
The large outlined box shown is the main chart, which serves as the boundary area for the entire cartridge. The small outlined boxes inside the main box are sub-charts, which provide more detailed coverage of the area indicated. To view the detailed cartography of any subchart, scroll the cursor to the subchart outline and use the **OUT** and **IN** keys to zoom to smaller range scales. If the map outlines still do not appear, check the 'Map Outlines' setting on the map options page to make sure they are set to appear (see page 43).



Whenever you zoom past the usable range of the current electronic chart, the range field will display 'Ovr Zm' or 'No Map'. These warnings indicate that although you may still have cartography, you should exercise extreme caution using the data. See page 42 for more information on Overzoom and No Map modes.

When a G-chart cartridge is installed, the sounder will automatically use the best available chart for display. As you enter and exit various subcharts, the system will automatically display the appropriate chart for the area you are in. When you leave the area covered by the main map of a cartridge, the sounder will default back to using the built-in 64 nm database (32 nm in U.S.) if it is available at the current scale.

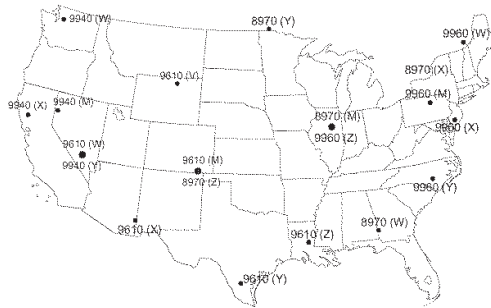
If you are not seeing certain map items (navaids, depth contours, etc. on offshore cartridges; highways, boat ramps, etc. on inland cartridges), check the map configuration settings available from the map options page.



- A. Map outlines for G-chart offshore cartography.
- B. Map outlines for G-chart inland cartography.

SECTION 12

LORAN TDs LORAN C Basics



LORAN Chains located across the continental U.S.

LORAN C Basics

LORAN C is a radio navigation aid operated and maintained in the United States by the United States Coast Guard. The name LORAN is an acronym for "Long Range Navigation". The LORAN system covers the entire United States and the U.S. Coastal Confluence Zone. From the perspective of a mariner, the system is used for ocean and coastal navigation. It can be used as a supplemental system for harbor and harbor approach navigation, and it is used for inland navigation by recreational vehicles. The LORAN C system is also used in civil aviation.

The LORAN system consists of groups of land based transmitter stations called chains. A chain contains a master station (M) and at least two, but more commonly 4 or 5 secondary stations designated (M) Victor, (W) Whiskey, (X) Xray, (Y) Yankee, and (Z) Zulu. These stations are usually separated by hundreds of miles. Each station transmits radio pulses at precise time intervals. The receiver measures the difference in time it takes the pulsed signal from each Master/Secondary pair to reach the receiver. This time is quite small, generally in millionths of a second. These time differences are then displayed on the LORAN receiver as the TD (time difference) coordinates.

Many of the transmitter stations serve multiple roles. A station can serve as a master station for one chain and a secondary station for another, or as a secondary station for multiple chains. An example would be the chain 9610 master station and the chain 8970 Zulu station. These operate on the same transmitter located in Boise City, Oklahoma. LORAN is being phased out as a primary source of navigation, but should remain active until after the turn of the century.

LORAN TD Feature

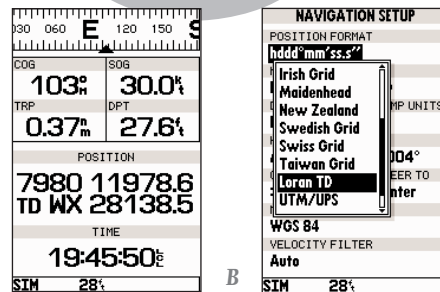
The LORAN TD feature eases the transition from using LORAN to using GPS. The GPSMAP 235 Sounder automatically converts GPS coordinates to LORAN TDs for those who have a collection of LORAN fixes for favorite fishing spots and other waypoints recorded as TDs. You can display your position as a TD or enter waypoints as TDs. The accuracy to be expected from this conversion is approximately thirty meters. When the sounder is placed in the LORAN TD format mode, the sounder **simulates** the full operation of a LORAN receiver. Position coordinate may be displayed as TDs, and all navigation functions may be used **as if** the unit were actually receiving LORAN signals.

Selecting and Setting Up the LORAN TD Format

The LORAN Position Format field is located in the Navigation Setup Menu. To access the list of available Position Formats highlight the Position Format field and press ENTER. Scroll through the list of formats until 'LORAN TD' is highlighted, then press ENTER to accept and activate the 'LORAN TD' position format. After the 'LORAN TD' format is selected, a new field will appear to the right of the Position Format. This field, called 'Setup TD' provides access to the 'LORAN Setup' page. The 'LORAN Setup' page contains the fields where the GRI-Chain Number and Secondary Stations are selected. To activate the 'LORAN SETUP' page, highlight the 'Setup TD' field and press ENTER.

SECTION 12

LORAN TDs Using the LORAN TD Position Display Format



- Position coordinates may be displayed as LORAN TDs, and all navigation functions may be used as if the unit were actually receiving LORAN signals.
- Scroll through the list of formats until 'LORAN TD' is highlighted, then press ENTER to accept and activate the 'LORAN TD' position format.

SECTION 12

LORAN TDs Using the LORAN TD Position Display Format

LORAN SETUP
LORAN CHAIN NUMBER
GRI-8970
GRI-8930
GRI-8970
GRI-9007
GRI-9610
GRI-9930
GRI-9940
GRI-9990
SIM 27%

LORAN SETUP
LORAN CHAIN NUMBER
GRI-8970
SECONDARY STATION 1
W
SECONDARY STATION 2
V
W
X
Y
Z
SIM 24%

- A. It is important to set the correct GRI Chain and secondary stations for the waypoint that you want to create. The GRI Chain and secondary station fields cannot be deleted on the Create Waypoints Page.
- B. To select a station, highlight the desired setting, then press ENTER to accept your selection.

It is important to set the correct GRI-chain and secondary stations for the waypoint that you want to create. The GRI-chain and Secondary station fields cannot be edited on the Create Waypoint page. The first setting on the LORAN Setup page is the LORAN Chain Number (GRI chain). Accessing this field activates a dropdown menu containing the 28 available chain numbers. Highlight the desired GRI-chain number, then press ENTER to accept your selection.

The next settings are the secondary stations. Accessing these fields also involves activating a dropdown menu containing the 5 secondary station identifiers. To select a station, highlight the desired setting, then press ENTER to accept your selection. If a secondary station is selected, but the identifier is not valid for the active GRI-chain, the corresponding field on the Position Page will be filled with zeros. To remedy this, select a valid secondary station identifier.

When the 'LORAN TD' position format is active, any waypoint stored in the unit's memory will ALWAYS reference the GRI Chain and secondary stations that are currently selected on the 'LORAN SETUP' page. This can become confusing when reviewing waypoints that have already been saved in the unit's memory.

If the active GRI Chain, and secondary stations have been changed since the waypoint was created, the waypoint will now reference the active GRI-chain and secondary stations and the TD coordinates will be adjusted accordingly. Remember that the GPS is not relying on the LORAN signal for navigation and actually converts the TD coordinate to a useful LAT/LON coordinate (in the background) before storing the waypoint in unit memory or using it for navigation. Because of this the unit can navigate to a TD coordinate anywhere in the world.

Creating Waypoints in the LORAN TD Format

Waypoints can be created graphically, using the Mark Key, and by Text Entry (see page 53). Waypoints can also be created using LORAN TDs. To create a waypoint using the LORAN TD Position Format:

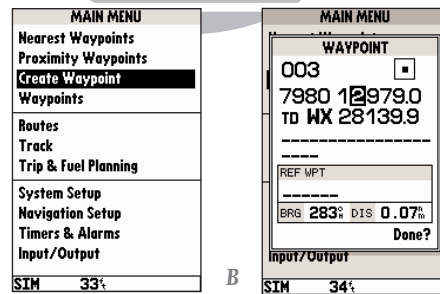
1. Verify that the correct GRI Chain and secondary stations are selected on the 'LORAN SETUP' page.
2. Following the instructions given in the Waypoint section of the manual, begin creating a new waypoint.
3. Highlight the position field and press ENTER.
4. Using the data entry technique described in the Waypoint section of the manual, enter the TD coordinates. When finished, highlight 'DONE' and press ENTER.

You can now navigate using LORAN TD waypoints the same as you would using GPS waypoints. Remember, the GPS converts the TD coordinate to a LAT/ LONG coordinate for use by the GPS. To improve accuracy, update the location information when you are at the site, since the waypoint gets converted.

SECTION 12

LORAN TDs

Using LORAN TD Waypoints



- A.** Follow the instructions given in the waypoint section of the manual to begin creating a new waypoint.
- B.** Using the data entry technique, enter the TD coordinates (B).



It is possible to route the coaxial cable through, or outside the antenna mount. The BNC connector on the coaxial cable can be removed and the coax shortened to ease installation. If the BNC connector is removed, it must be replaced with a new BNC connector.

Sounder Installation

The GPSMAP 235 Sounder must be properly installed according to the following instructions to get the best possible performance. The GPSMAP 235 Sounder is available both with and without a transducer and cable (the cable must be used for FCC compliance). The part numbers are 010-00119-00 (unit without the transducer) and 010-00119-01 (unit with the transducer and cable). Also available is a power data cable (P/N 320-00023-02). To complete the installation, you'll need appropriate fasteners and a 1" x 14-thread marine antenna mount (which is available at most marine dealers).

Mounting the GPS Antenna

Mount the GPS antenna in a location that has a clear, unobstructed view of the sky in all directions. Avoid mounting the antenna where it will be shaded by the boat's superstructure, a radome antenna, or the mast. Sailboat users should avoid mounting the antenna high on the mast to prevent inaccurate speed readings caused by excessive heeling. Most marine VHF and Ioran antennas will not seriously degrade the GPS antenna's reception. Never paint the antenna or clean it with harsh solvents.

The GARMIN antenna screws directly onto any standard 1 x 14-thread antenna mount. If you need to raise the antenna to avoid shading, try using a 1" x 14-thread extension mast available at most marine dealers.

To install the GPS antenna:

1. Screw the antenna onto the 1" x 14-thread mount. Route the cable to the mounting location of the display unit. Use the appropriate tie-wraps, escutcheon plates and sealant to secure the cable along the route, and through any bulkhead or deck.
2. Once the sounder unit has been installed, connect the antenna cable to the antenna connector on the back of the unit. Turn the antenna cable connector 1/4 turn clockwise to lock the cable into place.

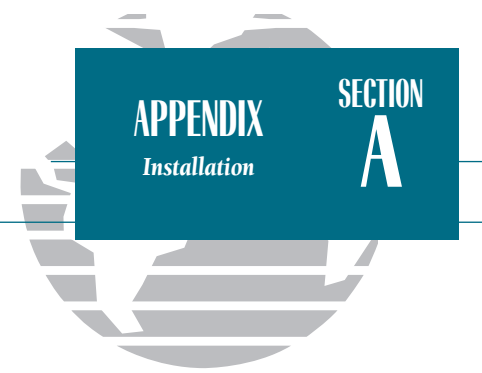
Mounting the Sounder

The unit's waterproof case is suitable for mounting in exposed locations or at the nav station. The unit comes with a gimbal bracket that can be used for surface or overhead mounting. When choosing a location for the unit, make sure you consider the following conditions:

- There should be at least a 3" (7.7 cm) clearance behind the case to allow room for connecting the antenna, power/data cables, and ferrite clamp.
- The unit should not be mounted where it is exposed to excessive temperatures for extended periods of time (see page 95).
- The mounting surface should be heavy enough to support the unit and protect it from excessive vibration and shock.

To surface mount the sounder:

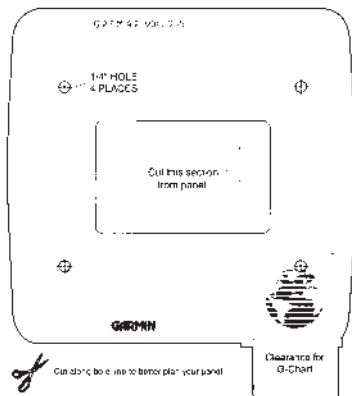
1. Place the mounting bracket in the desired location.
2. Mark and drill the four mounting holes for the fastener you are using.
3. Fasten the mounting bracket to the surface using the appropriate fasteners (not included).
4. Insert the unit into the mounting bracket. The mount is designed for a tight fit to provide additional support when swiveling the unit.
5. Screw the two mounting knobs into the mounting bracket.
6. Connect the power/data, antenna, and transducer cables to the back of the unit, making sure the locking rings are tightened on all connectors.



The mounting bracket can be rotated, allowing the unit to be mounted overhead or on a vertical surface.

SECTION A

APPENDIX Installation



GPSMAP 235 Mounting Template

To flush mount the sounder:

1. Remove the four M5 screws from the back of the unit and remove the mounting bracket.
2. Using the mounting template provided in the box, determine where you want to mount the unit and tape the template in place.
3. Using a hammer and center punch, mark the centers of the relief hole and mounting screw holes.
4. Using a drill and a 2.75" hole saw, cut the center relief hole from the panel. Drill four 0.25" screw holes using a 1/4" drill bit.
5. From the front, place the unit until the relief hole rests flush against the mounting surface.
6. Secure the unit to the mounting surface using M5 screws. Note: for thick mounting surfaces, insert the M5 screws directly through the four drilled holes (figure 1). For thin panels, place the mounting bracket on the back side of the panel for additional support (figure 2).
7. Attach the power/data/transducer cable and antenna connector.

CAUTION!

The four M5 screw holes on the back of the unit are blind holes (having a closed end). Do not try to force screws deeper into these holes than the holes will allow. Over insertion of screws will damage the housing and break the waterproof sealing.

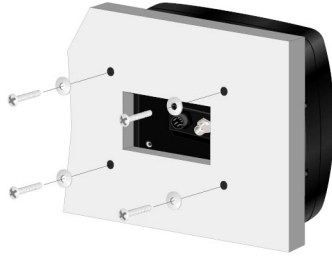


Figure 1-For thick mounting surfaces, insert the M5 screws directly through the four drilled holes.



Figure 2-For thin panels, place the mounting bracket on the back side of the panel for additional support.



Through-Hull



Trolling Motor

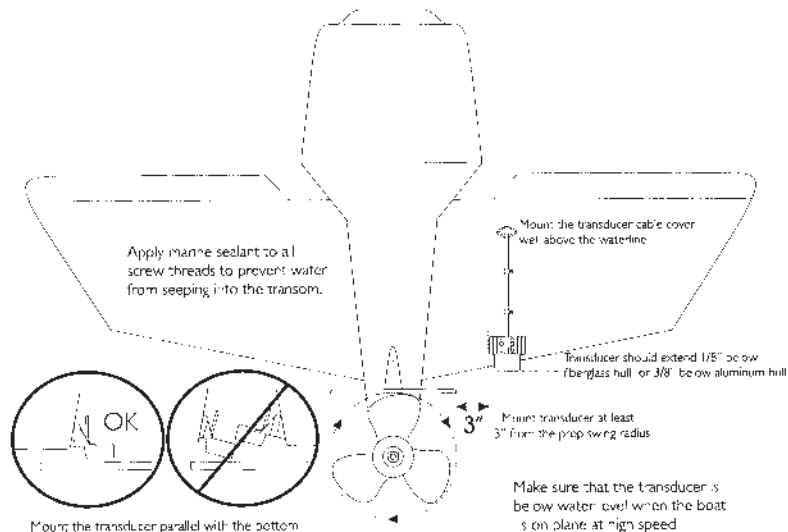
Garmin offers a variety of transducers for use with your Sounder. Detailed installation instructions for the transducer you have selected are included with the transducer. Proper placement and installation of the transducer are essential in the operation of the sounder portion of the unit. Carefully follow the instructions provided with your transducer.

Transducer Installation

Proper transducer placement and installation are key to getting the best performance from your new unit. Detailed installation instructions are provided with the transducer that you have selected. Below are some tips and basic instructions for proper transom mount transducer installation.

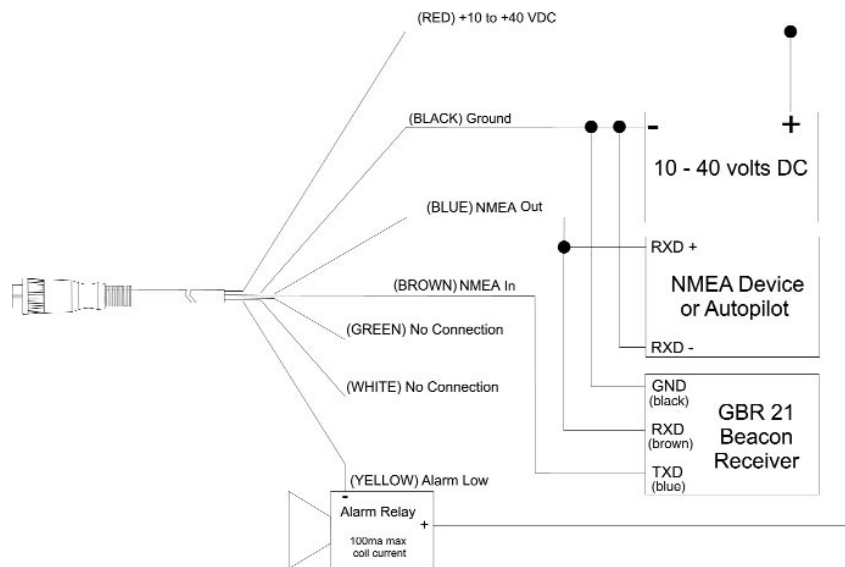
TIP

DO NOT mount the transducer near strakes, struts, fittings, water intake or discharge ports, or anything that creates air bubbles or causes the water to become turbulent. It is important that the transducer be in clean (non turbulent) water for optimal performance.



Connecting the Power/Data Cable

The power/data cable connects the GPSMAP 235 to a 10-40 volt DC system and provides interface capabilities for connecting external devices, including an external alarm. The color code in the diagram below indicates the appropriate harness connections.



WARNING!

The temperature range for the GPSMAP 235 Sounder is -4° to $+158^{\circ}$ F (-20° to 70° C). Extended exposure to temperatures exceeding this range (in storage or operating conditions) may cause failure of the LCD screen. This type of failure and related consequences are NOT covered by the manufacturer's limited warranty.



DGPS corrections are accepted in RTCM-104 v. 2.0 format through the NMEA In (BROWN) harness lead. The GARMIN GBR 21 is the recommended beacon receiver for use with the GPSSMAP 235 system. Other receivers with the correct RTCM format may be used, but may not correctly display status or allow tuning control from the sounder unit.

NMEA Supported Sentences

The following formats are supported for connection to up to 3 NMEA devices:

- **NMEA 0180/NMEA 0182**

- **NMEA 0183 version 1.5**

Approved sentences--GPBWC, GPGLL, GPRMB, GPRMC, GPXTE, GPVTG, GPWPL, GPBOD, SDDBT, SDMTW and SDVHW

Proprietary sentences--PGRMM, PGRMZ (alt.) PSLIB (beacon receiver control input)

- **NMEA 0183 version 2.0**

Approved sentences-GPGGA, GPGLL, GPGSA, GPGSV, GPRMB, GPRMC, GPRTE, GPWPL, GPBOD, SDDPT, SDMTW, and SDVHW

Proprietary sentences- PGRME (estimated error), PGRMM (map datum)

PGRMZ (altitude), PSLIB (beacon rec. control input)

To interpret the sentences, the NMEA standard can be purchased at www.nmea.org.

PHYSICAL

Case:	Gasketed Construction
Size:	7.5"H x 7.7"W 2.6"D (19.2 x 19.74 x 6.7cm)
Weight:	Less than 2 lb.
Temperature Range:	-4° to +158°F (-20° to 70°C)

PERFORMANCE (GPSMAP 235 Sounder)

Receiver:	12 parallel channel
Acquisition Time:	Approx. 15 seconds (warm) Approx. 45 seconds (cold) Approx. 5 minutes (AutoLocate™) Approx. 5 minutes (Search the sky)
Update Rate:	1/second, continuous
Position Accuracy:	1-5 meters (3-16 ft.)* 15 meters (49 ft.) RMS**
Velocity Accuracy:	0.1 knot RMS steady state, 999 knots max.
Dynamics:	6g's
Sounder Power Output:	500 WRMS 4000 W peak to peak
Frequency:	50, 200, 50/200, 200/50 kHz

POWER

Input:	10-40v DC
Usage:	10 watts max.

Specifications subject to change without notice.

* With optional GARMIN GBR 21 Beacon Receiver Input.

** Subject to accuracy degradation to 100m 2DRMS under the U.S. DOD-imposed Selective Availability Program.

APPENDIX

Specifications


SECTION

B

Note: For transducer specifications, see the booklet included with your transducer.

SECTION C

APPENDIX Messages

The GPSMAP 235 Sounder uses an on-screen message prompt to alert you to important information. Whenever a message appears, press the  key to view the message.

Alarm Clock—The alarm clock has sounded.

Anchor Drag Alarm—You have drifted out of the specified distance range.

Approaching—You are less than one minute away from reaching a destination waypoint at your present speed over ground.

Arrival At—You have arrived at the destination waypoint.

Can't Change An Active Waypoint—You have attempted to change the 'active to' or 'active from' waypoint. Clear the active route or GOTO before making your changes.

Card Format is Not Recognized—The cartridge inserted is not readable by the GPSMAP 235 Sounder system and may be damaged. Reinsert the cartridge to make sure it is properly installed. If the cartridge is still not recognized, call the G-chart information line at 1-800-427-6460.

Cross-Track Alarm—You have exceeded the off-course distance specified in the CDI setup.

Data Transfer is Complete—The receiver is finished uploading or downloading information to the connected device.

Database Memory has Failed—The built-in 64 nm (32 in U.S.) database has failed. See an authorized service center for repair.

Deep Water Alarm—The current depth is equal to or more than the set alarm depth.

Degraded Accuracy—The accuracy of your GPSMAP 235 Sounder system has been degraded beyond 500 meters due to poor satellite geometry or data quality.

Max Calibration Is 5000mt (16,400 ft)—You have exceeded the maximum possible map calibration.

Memory Battery Power is Low—The internal battery that stores waypoints, routes and track plots needs to be replaced. Take your unit to an authorized GARMIN service center for installation of a new battery.

Need Altitude—Your GPSMAP 235 Sounder system needs the altitude to maintain a position fix due to poor satellite coverage. Enter your approximate altitude on the initialize Position Page.

Need to Select Init Method—The GPSMAP 235 Sounder needs to be initialized to your present position. See pages 1-2 for complete instructions on initialization.

No Differential GPS Position—Not enough data is being received to compute a DGPS position.

No Transducer, Sounder Turned Off—The unit has detected that its transducer has been removed and has shut the sounder off. GPS is still functional.

Oscillator Needs Adjustment—The GPSMAP 235 Sounder has detected excessive drift in its internal oscillator, which may result in longer acquisition times. Take the unit to an authorized GARMIN service center for adjustment.

Poor GPS Coverage—The GPSMAP 235 Sounder cannot acquire the necessary number of satellites to compute a position.

Power Down and Re-init—The GPSMAP 235 Sounder cannot calculate a position due to abnormal satellite conditions. Power down and verify the last position shown by other means.

Proximity Alarm—You have entered the alarm radius for the proximity waypoint indicated.

Proximity List Full—You have used all nine proximity waypoints.

Proximity Overlaps Another Prox Wypt—The alarm radius specified overlaps the area specified for another proximity waypoint. (See section 10 for more information on proximity overlaps.)

RAM has Failed—The random access memory has failed and the unit is not operable. Take your unit to an authorized GARMIN service center for repairs.

ROM has Failed—The unit's permanent memory has failed and the unit is not operable. Take your unit to an authorized GARMIN service center for repairs.

Received Invalid Waypoint—A waypoint was received during upload transfer that has an invalid identifier.

Receiver has Failed—A failure in receiver hardware has been detected. If this message persists, do not use the unit and take it to an authorized dealer for repair.

Route Already Exists—The route number you are trying to copy to is already used.

Route Does Not Exist—The route number you are trying to use or copy is not defined.

Route is Full—You have attempted to add more than 30 waypoints to a route.

Route Memory is Full—You have attempted to create more than 20 routes.

Route Waypoint was Deleted—A route waypoint entered does not exist in the database and has been deleted from the route.

RTCM Input has Failed—DGPS data being received has been lost. You are no longer receiving the beacon signal.

Searching the Sky—The GPSMAP 235 Sounder is searching the sky for almanac data.

Shallow Water Alarm—The depth is equal to or less than the set alarm depth.

Sonar ASIC has Failed—The unit's internal monitoring system indicates a malfunction. Send in for service as soon as possible.

Sonar Transfer Timeout—The sonar is intermittently losing data. Sonar is usable but should be returned for service if the message persists.

Stored Data was Lost—All waypoints, routes and almanac data has been lost due to internal battery failure.

There is No RTCM Input—The beacon receiver is not properly connected or baud rates do not match.

Timer Has Expired—The countdown timer has expired.

Track Memory is Full—The track memory is full and no additional track plot will be recorded until the track memory has been cleared or set to wrap mode.

Unit Too Hot Sounder Turned Off—The internal temperature of the unit is too hot. GPS will remain operational but the depth sounder function is turned off. To restore sounder operation, turn off unit and allow unit to cool by shading from direct sunlight. Note: To avoid this message use a DC voltage source less than 16 volts.

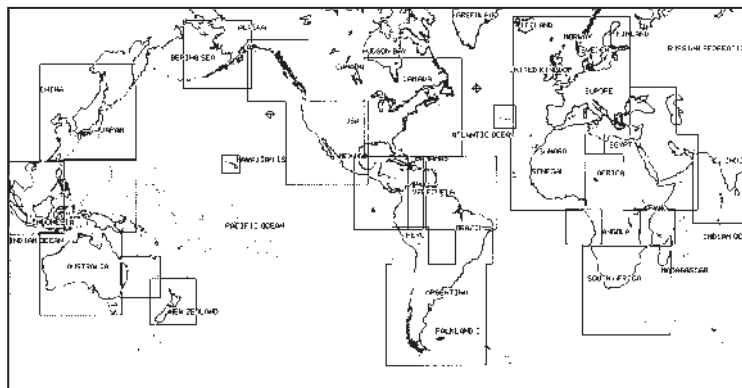
Wypt Already Exists—The waypoint name you've entered already exists in memory.

Waypoint Memory is Full—You have used all 250 waypoints in the GPSMAP 235 Sounder system.

SECTION D

APPENDIX Map Datums

The GPSMAP 235 Sounder's built-in worldwide database includes chart coverage down to 64 nm (32 in U.S.) for the areas outlined above. Note that the database is only valid to 68°15' of latitude. The maximum cursor latitude is 85°05', and the maximum waypoint latitude is 89°24.543 north or south.



Adindan	Adindan- Ethiopia, Mali, Senegal, Sudan	Astrln Geod '84	Australian Geod '84- Australia, Tasmania Island
Afgooye	Afgooye- Somalia	Austria	Austria
AIN EL ABD '70	AIN EL ANBD 1970- Bahrain Island, Saudi Arabia	Bellevue (IGN)	Efate and Erromango Islands
Anna 1 Ast '65	Anna 1 Astro '65- Cocos I.	Bermuda 1957	Bermuda 1957- Bermuda Islands
ARC 1950	ARC 1950- Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe	Bogata Observ	Bogata Observatry- Colombia
ARC 1960	Kenya, Tanzania	Campo Inchspe	Campo Inchauspe- Argentina
Ascnsn Islld '58	Ascension Island '58- Ascension Island	Canton Ast '66	Canton Astro 1966- Phoenix Islands
Astro B4 Sorol	Sorol Atoll- Tern Island	Cape	Cape- South Africa
Astro Bcn "E"	Astro Beacon "E"- Iwo Jima	Cape Canavrl	Cape Canaveral- Florida, Bahama Islands
Astro Dos 71/4	Astro Dos 71/4- St. Helena	Carthage	Carthage- Tunisia
Astr Stn '52	Astronomic Stn '52- Marcus Island	CH-1903	CH 1903- Switzerland
Astrln Geod '66	Australian Geod '66- Australia, Tasmania Island	Chatham 1971	Chatham 1971- Chatham Island (New Zealand)
		Chua Astro	Chua Astro- Paraguay

Corrego Alegre Djakarta	Corrego Alegre- Brazil Djakarta (Batavia)- Sumatra Island (Indonesia)	Kerguelen Isld Kertau 1948	Kerguelen Island West Malaysia, Singapore
Dos 1968	Dos 1968- Gizo Island (New Georgia Islands)	L. C. 5 Astro	Cayman Brac Island
Easter Isld 67	Easter Island 1967	Liberia 1964	Liberia 1964- Liberia
European 1950	European 1950- Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland	Luzon Mindanao Luzon Philippine	Luzon- Mindanao Island Luzon- Philippines (excluding Mindanao Isl.)
European 1979	European 1979- Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland	Mahe 1971	Mahe 1971- Mahe Island
Finland Hayfrd Gandajika Base	Finland Hayford- Finland Gandajika Base- Republic of Maldives	Marco Astro	Marco Astro- Salvage Isl.
Geod Datm '49	Geodetic Datum '49- New Zealand	Massawa	Massawa- Eritrea (Ethiopia)
Guam 1963	Guam 1963- Guam Island	Merchich	Merchich- Morocco
Gux 1 Astro	Guadalcanal Island	Midway Ast '61	Midway Astro '61- Midway
Hjorsey 1955	Hjorsey 1955- Iceland	Minna	Minna- Nigeria
Hong Kong '63	Hong Kong	NAD27 Alaska	North American 1927- Alaska
Hu-Tzu-Shan	Taiwan	NAD27 Bahamas	North American 1927- Bahamas (excluding San Salvador Island)
Indian Bngldsh	Indian- Bangladesh, India, Nepal	NAD27 Canada	North American 1927- Canada and Newfoundland
Indian Thailand	Indian- Thailand, Vietnam	NAD27 Canal Zone	North Am. 1927- Canal Zone
Indonesia '74	Indonesia '74	NAD27 Caribbean	North American 1927- Caribbean (Barbados, Caicos Islands, Cuba, Dom. Rep., Grd. Cayman, Jamaica, Leeward and Turks Islands)
Ireland 1965	Ireland 1965- Ireland	NAD27 Central	North American 1927- Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua)
ISTS 073 Astro	ISTS 073 ASTRO '69- Diego Garcia	NAD27 CONUS	North Am. 1927- Mean Value (CONUS)
Johnston Island	Johnston Island Kandawala Kandawala- Sri Lanka	NAD27 Cuba	North American 1927- Cuba
Kandawala	Sri-Lanka		



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Map Datums

NAD27 Greenland	North American 1927- Greenland (Hayes Peninsula)	Rome 1940	Rome 1940- Sardinia Isl. Sweden
NAD27 Mexico	N. American 1927- Mexico	RT 90	Santo (Dos)- Espirito Santo
NAD27 San Salvadr	North American 1927- San Salvador Island	Santo (Dos)	Sao Braz- Sao Miguel, Santa Maria Islands
NAD83	North American 1983- Alaska, Canada, Central America, CONUS, Mexico	Sao Braz	Sapper Hill 1943- East Falkland Island
Nahrwn Masirah lnd	Nahrwn- Masirah Island (Oman)	Sapper Hill '43	Schwarzeck- Namibia
Nahrwn Saudi Arbia	Nahrwn- Saudi Arabia	Schwarzeck	S. American '69- Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trin/Tobago
Nahrwn United Arab	Nahrwn- United Arab Emirates	South American '69	South Asia- Singapore
Naparima BWI	Naparima BWI- Trinidad and Tobago	South Asia	Southeast Base- Porto Santo and Madiera Islands
Obsrvtorio '66	Observatorio 1966- Corvo and Flores Islands (Azores)	Southeast Base	Southwest Base- Faial, Graciosa, Pico, Sao Jorge and Terceira Islands
Old Egyptian	Old Egyptian- Egypt	Southwest Base	Timbalai 1948- Brunei and E. Malaysia (Sarawak and Sabah)
Old Hawaiian	Old Hawaiian- Mean Value	Timbalai 1948	Tokyo- Japan, Korea, Okinawa
Oman	Oman- Oman	Tokyo	Tristan Astro '68
Ord Srvy Grt Britn	Old Survey Grt Britn- England, Isle of Man, Scotland, Shetland Isl., Wales	Tristan Astro '68	Tristan Astro 1968- Tristan da Cunha
Pico De Las Nieves	Canary Islands	Viti Levu 1916	Viti Levu 1916- Viti Levu/ Fiji Islands
Potsdam	Germany	Wake-Eniwetok	Wake-Eniwetok- Marshall
Pitcairn Astro '67	Pitcairn Astro '67- Pitcairn	WGS 72	World Geodetic System 72
Prov So Amrcn '56	Prov So Amrcn '56- Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela	WGS 84	World Geodetic System 84
Prov So Chilean '63	So Chilean '63- S. Chile	Zanderij	Zanderij- Surinam
Puerto Rico	Puerto Rico & Virgin Isl.		
Qatar National	Qatar National- Qatar		
Qornoq	Qornoq- South Greenland		
Reunion	Reunion- Mascarene Island		

Almanac Data: The satellite constellation information (including location and health of satellites) that is transmitted to your receiver from every GPS satellite. Almanac data must be acquired before GPS navigation can begin.

Bearing (BRG): The compass direction from your position to a destination.

Course Over Ground (COG): Direction of movement relative to a ground position.

Crosstrack Error (XTK): The distance you are off a desired course in either direction.

Desired Track (DTK): The compass course between the 'from' and 'to' waypoints.

Differential GPS (DGPS): An extension of the GPS system that uses land-based radio beacons to transmit position corrections to GPS receivers.

Estimated Time of Arrival (ETA): The time of day of your arrival at a destination.

Estimated Time Enroute (ETE): The time remaining to your destination at your present speed.

Grid: A coordinate system that projects the earth on a flat surface, using square zones for position measurements.

Ground Speed (SOG): The velocity you are traveling relative to a ground position.

Latitude: A north/south measurement of position perpendicular to the earth's polar axis.

Longitude: An east/west measurement of position in relation to the Prime Meridian, an imaginary circle that passes through the north and south poles.

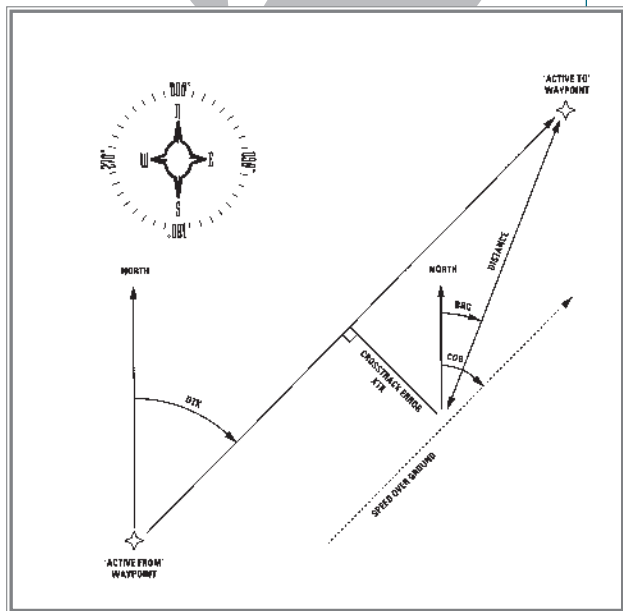
Position: An exact, unique location based on a geographic coordinate system.

Sensitivity: A measure of how sensitive the sounder is to sonar echoes.

Speed Through Water (STW): The speed you are traveling relative to the water's surface.

SECTION E

APPENDIX Glossary



Thermocline— A layer of water separating warmer water above from cooler water below.

Turn (TRN)— The difference and direction in degrees between the bearing to your destination and your course over ground. The TRN value is used to indicate what direction, and how many degrees, to turn to get back on course.

Universal Time Coordinated (UTC)— The time of day at the prime meridian (0° longitude) in Greenwich, England.

Universal Transverse Mercator (UTM)— A grid coordinate system that projects global sections onto a flat surface to measure position in specific zones.

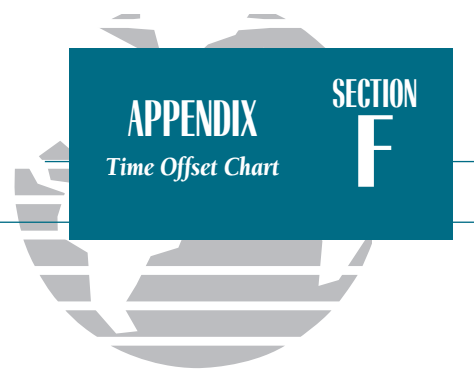
Velocity Made Good (VMG)—The speed you are traveling in the direction of the destination.

Waypoint—A specific location saved in the receiver's memory.

Whiteline—A term applied to the portion of the sonar display which shows the area of strongest sonar return (typically the bottom).

The chart below gives an approximate UTC time offset for the various longitudinal zones. Check with local charts for more detailed information. If you are in daylight savings time, add one hour to the offset.

Longitudinal Zone	Offset
W180.0° to W172.5°	-12
W172.5° to W157.5°	-11
W157.5° to W142.5°	-10
W142.5° to W127.5°	-9
W127.5° to W112.5°	-8
W112.5° to W097.5°	-7
W097.5° to W082.5°	-6
W082.5° to W067.5°	-5
W067.5° to W052.5°	-4
W052.5° to W037.5°	-3
W037.5° to W022.5°	-2
W022.5° to W007.5°	-1
W007.5° to E007.5°	0
E007.5° to E022.5°	1
E022.5° to E037.5°	2
E037.5° to E052.5°	3
E052.5° to E067.5°	4
E067.5° to E082.5°	5
E082.5° to E097.5°	6
E097.5° to E112.5°	7
E112.5° to E127.5°	8
E127.5° to E142.5°	9
E142.5° to E157.5°	10
E157.5° to E172.5°	11
E172.5° to E180.0°	12



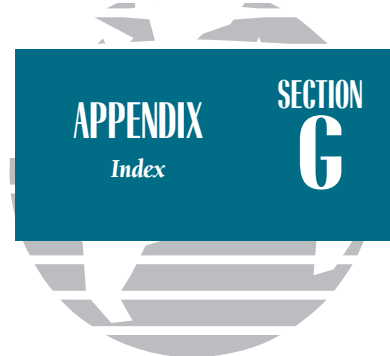


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