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Pub. 988-0152-101



 **CUDA<sup>®</sup> 250** *S/Map*

**& Cuda<sup>®</sup> 250i S/Map**

**Fish-finding Sonar & GPS  
Installation and Operation  
Instructions**

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this product, its operation and accessories,  
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Printed in USA.

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**WARNING!**

**A CAREFUL NAVIGATOR NEVER RELIES ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION.**

**CAUTION**

*When showing navigation data to a position (waypoint), a GPS unit will show the shortest, most direct path to the waypoint. It provides navigation data to the waypoint regardless of obstructions. Therefore, the prudent navigator will not only take advantage of all available navigation tools when traveling to a waypoint, but will also visually check to make sure a clear, safe path to the waypoint is always available.*

**WARNING!**

**When a GPS unit is used in a vehicle, the vehicle operator is solely responsible for operating the vehicle in a safe manner. Vehicle operators must maintain full surveillance of all pertinent driving, boating or flying conditions at all times. An accident or collision resulting in damage to property, personal injury or death could occur if the operator of a GPS-equipped vehicle fails to pay full attention to travel conditions and vehicle operation while the vehicle is in motion.**

# Section 1: Read Me First!

## *How this manual can get you out on the water, fast!*

Welcome to the exciting world of digital sonar and GPS! We know you're anxious to begin finding fish, but we have a favor to ask. Before you grab the unit and begin installing it, please give us a moment or two to explain how our manual can help you get the best performance from your combination fish finder and GPS receiver.

First, we want to thank you for buying a Eagle sonar/GPS unit. Whether you're a first time user or a professional fisherman, you'll discover that your unit is easy to use, yet capable of handling demanding navigation and sonar tasks.

Our goal for this book is to get you on the water fast, with a minimum of fuss. Like you, we'd rather spend more time boating or fishing and less time reading the manual!

So, we designed our book so that you *don't* have to read the *whole thing* from front to back for the information you want. At the start (or end) of each segment, we'll tell you what content is coming up next. If it's a concept you're already familiar with, we'll show you how and where to skip ahead for the next important topic. We've also made it easy to look up any tips you may need from time to time. Here's how:

The manual is organized into 8 sections. This first section is an introduction to the Cuda™ 250 sonar and GPS. It tells you the basics you need to know before you can make the unit look below the surface to find some fish.

Section 2 will help you install your unit, as well as the transducer (the most important part of any sonar installation). We'll also tell you about some of the available accessories.

Section 3 covers *Basic Sonar Operation*. It will show you how easy it is to run your sonar, right out of the box.

This section features a one-page Sonar Quick Reference. **(If you've already jumped ahead and figured out how to install the unit yourself, and you just *can't* wait any longer, turn to the Quick Reference on page 50 and head for the water with your unit!)**

When you come to a sonar menu command on the unit's screen, you can look it up in the manual by skimming over the table of contents, looking it up in the manual's index, just flipping through Section 3 or scanning through the sonar setup options in Section 7.

If you're having difficulty with your sonar, you can find an answer to the most common problems in Section 5, *Sonar Troubleshooting*.

The manual switches from sonar to navigation in Section 6, which introduces you to *Basic GPS Operations*. **This section features a one-page GPS Quick Reference on page 99.**

Section 6 contains short, easy-to-scan GPS lessons that follow one another in chronological order. They're all you'll need to know to find your way on the water quickly.

When you come to a GPS menu command on the screen, you can look it up in the manual by skimming over the table of contents or index, just flipping through Section 6 or scanning through the setup options in Section 7.

This unit is ready to use right out of the box, but you can fine tune and customize its operation with dozens of options. Since sonar is the unit's key feature, we put the main sonar options in Section 3. Some options, such as screen brightness settings, affect both sonar and GPS operations. We describe how to use those common options along with GPS options in Section 7, *System Setup and GPS Setup Options*. Section 7 is organized in alphabetical order.

Finally, in Section 8, we offer *Supplemental Material*, including warranties and customer service information, and a handy index.

Now, if you're into the fine details, glance over the next segment on specifications to see just how much sonar and GPS power your unit con-

tains. It's important to *us* (and our power users), but, if *you* don't care how many watts of power the unit has, or how many waypoints it can store, skip ahead to important information on how sonar works, on page 5.

## Capabilities and Specifications: Cuda 250 S/Map

### General

- Display:**..... High Contrast Film SuperTwist LCD with 16-level grayline. Diagonal viewing area: 3.5" (8.9cm).
- Resolution:**..... 160 pixel x 240 pixel resolution. 38,400 total pixels.
- Backlighting:**..... LED backlit screen with multiple lighting levels; backlit keypad.
- Input power:**..... 10 to 17 volts DC.
- Current drain:** ..... 170 ma lights off; 250 ma lights on.
- Case size:**..... 5.8" H x 4.3" W x 2.5" D (14.7 cm H x 10.8 cm W x 6.6 cm D) sealed, waterproof; suitable for saltwater use.
- Back-up memory:** ..... Built-in memory stores GPS data for decades. User settings are stored when unit is turned off.
- Languages:**..... 10; menu languages selectable by user.

### Sonar

- Frequency:**..... 200 kHz.
- Transducer:**..... A Skimmer® transducer comes packed with your sonar unit. Its 20° cone angle offers a wide fish detection area of up to 60° with high sensitivity settings. Operates at boat speeds up to 70 mph (61 kts).
- Transmitter:** ..... 800 watts peak-to-peak; 100 watts RMS.

## **Sonar sounding**

**depth capability:** ..... 600 feet (180 meters). Actual capability depends on transducer configuration and installation, bottom composition and water conditions. All sonar units typically read deeper in fresh water than in salt water.

**Depth display:**..... Continuous display.

**Audible alarms:** ..... Deep/shallow/fish/zone.

**Automatic ranging:**..... Yes, with instant screen updates.

**Auto bottom track:**..... Yes

**Zoom bottom track:** ..... Yes.

**Split-screen zoom:**..... Yes.

**Surface water temp:** ..... Yes, built into transducer.

## **GPS**

**Receiver/antenna:** ..... Internal 12 parallel channel GPS/WAAS.

**Position updates:** ..... Every second.

**Position points:** ..... 1,000 waypoints; 1,000 event marker icons.

**Man Overboard:**..... MOB feature precisely marks man overboard location with special icon, then automatically displays navigation data to that position.

**Audible alarms:** ..... Arrival/off-course/destination passed/anchor.

## **Graphic symbols for waypoints or event marker icons:**

..... 42.

**Routes:**..... 100; up to 100 waypoints per route.

**Plot Trails:**..... 10 savable; up to 9,999 points per trail.

**Zoom range:**..... 40 ranges; 0.02 to 4,000 miles.

## ***NOTICE!***

The storage and operation temperature range for your unit is from -4 degrees to +167 degrees Fahrenheit (-20 degrees to +75 degrees Celsius). *Extended storage or operation in temperatures higher or lower than specified will damage the liquid crystal display in your unit. This type of damage is not covered by the warranty.* For more information, contact the factory's Customer Service Department; phone numbers are listed on the last page.

## **How Your Sonar Works**

Sonar has been around since the 1940s, so if you already know how it works, skip down to read about the relatively new technology of GPS. But, if you've never owned a sonar fish finder, this segment will tell you the underwater basics.

Sonar is an abbreviation for Sound Navigation and Ranging, a technology developed during World War II for tracking enemy submarines. A sonar consists of a transmitter, transducer, receiver and display. In simple terms, here's how it finds the bottom, or the fish:

The transmitter emits an electrical impulse, which the transducer converts into a sound wave and sends into the water. (The sound frequency can't be heard by humans or fish.) The sound wave strikes an object (fish, structure, bottom) and bounces back to the transducer, which converts the sound back into an electrical signal.

The receiver amplifies this return signal, or echo, and sends it to the display, where an image of the object appears on the scrolling sonar chart. The sonar's microprocessor calculates the time lapse between the transmitted signal and echo return to determine the distance to the object. The whole process repeats itself several times each second.

Your sonar unit can record a log of the sonar signals that scroll across the screen and save them in its memory. (These recordings are also called sonar charts or sonar graphs.)

You can replay this sonar log in the unit using the Sonar Simulator function. You can save several different sonar log files, erase 'em and record new ones, over and over again.

## How Your GPS Works

You'll navigate faster and easier if you understand how this unit scans the sky to tell you where you are on the earth — and, where you're going. (But if you already have a working understanding of GPS receivers and the GPS navigation system, skip on ahead to Section 2, *Installation & Accessories* on page 13. If you're new to GPS, read on, and you can later impress your friends with your new-found knowledge.)

First, think of your unit as a small but powerful computer. (But don't worry — we made this unit easy to use, so you don't need to be a computer expert to find your way!) The unit includes a keypad and a screen with menus so you can tell it what to do. The screen also lets the unit show your location on a GPS plotter, as well as point the way to your destination.

This unit uses an internal antenna/receiver module, which makes the whole system work something like your car radio. But instead of your favorite dance tunes, this receiver tunes in to a couple of dozen GPS satellites circling the earth. (It will also listen in to the WAAS satellites in orbit, but more about that in the upcoming segment introducing you to GPS and WAAS.)

Your unit listens to signals from as many satellites as it can "see" above the horizon, eliminates the weakest signals, then computes its location in relation to those satellites. Once it figures its latitude and longitude, the unit plots that position on the GPS screen. The whole process takes place several times a second!

Another portion of the unit's onboard memory is devoted to *recording* GPS navigation information, which includes waypoints, event marker icons, trails and routes. This lets you look back the way you came, and retrace your path.

Think of this data storage like the hard drive memory in a computer or a tape in a cassette tape recorder. You can save several different GPS data files, erase 'em and record new ones, over and over again.

## **Introduction to GPS and WAAS**

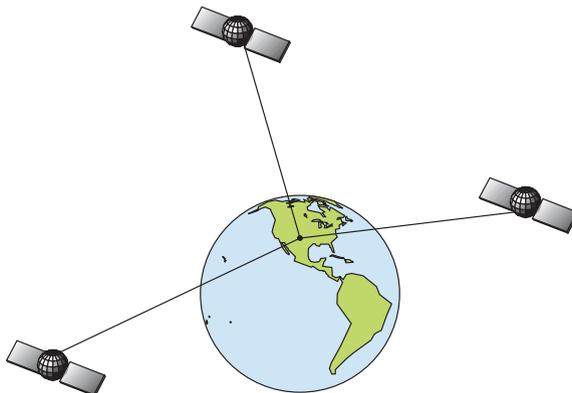
Well, now you know the basics of how the unit does its work. You might be ready to jump ahead to Section 2, *Installation*, on page 13, so you can mount your unit and plug in the power. Or you might want to see how our text formatting makes the manual tutorials easy to skim. If that's the case, move on to "How to Use This Manual" on page 9. But, if you want to understand the current state of satellite navigation, look over this segment describing how GPS and its new companion WAAS work together to get you where you're going.

The Global Positioning System (GPS) was launched July 17, 1995 by the United States Department of Defense. It was designed as a 24-hour-a-day, 365-days-a-year, all weather global navigation system for the armed forces of the U.S. and its allies. Civilian use was also available at first, but it was less accurate because the military scrambled the signal somewhat, using a process called Selective Availability (SA.)

GPS proved so useful for civilian navigation that the federal government discontinued SA on May 2, 2000, after the military developed other methods to deny GPS service to enemy forces. Reliable accuracy for civilian users jumped from 100 meters (330 feet) under SA to the present level of 10 to 20 meters (about 30 to 60 feet.)

Twenty-four satellites orbit 10,900 nautical miles above the Earth, passing overhead twice daily. A series of ground stations (with precisely surveyed locations) controls the satellites and monitors their exact locations in the sky. Each satellite broadcasts a low-power signal that identifies the satellite and its position above the earth. Three of these satellites are spares, unused until needed. The rest virtually guarantee that at least four satellites are in view nearly anywhere on Earth at all times.

The system requires signal reception from three satellites in order to determine a position. This is called a 2D fix. It takes four satellites to determine both position and elevation (your height above sea level — also called altitude). This is called a 3D fix.



**Three satellites are required to determine a 2D fix.**

Remember: the unit must have a clear view of the satellites in order to receive their signals. Unlike radio or television signals, GPS works at very high frequencies. These signals can be easily blocked by trees, buildings, an automobile roof, even your body.

Like most GPS receivers, this unit doesn't have a compass or any other navigation aid built inside. It relies solely on the signals from the satellites to calculate a position. Speed, direction of travel, and distance are all calculated from position information. Therefore, in order for the unit to determine direction of travel, you must be moving and the faster, the better. This is not to say that it won't work at walking or trolling speeds — it will. There will be more "wandering" of the data shown on the display.

GPS alone is plenty accurate for route navigation, but the U.S. Federal Aviation Administration has special aircraft navigation needs that go

beyond basic GPS. So, the FAA has developed a program to boost GPS performance with its Wide Area Augmentation System, or WAAS. The FAA commissioned the system on July 11, 2003.

WAAS is designed to increase GPS accuracy to within 7.6 meters vertically and horizontally, but it consistently delivers accuracies within 1-2 meters horizontal and 2-3 meters vertical, according to the FAA. It does this by broadcasting correction signals on GPS frequencies. Your unit automatically receives both GPS and WAAS signals.

There, however, are some fringe areas of the U.S., including parts of Alaska, that do not yet receive robust WAAS coverage. Continued WAAS development is planned to extend WAAS coverage in the years to come.

WAAS boosts the accuracy of land GPS navigation, but the system is designed for aircraft. The satellites are in a fixed orbit around the Equator, so they appear very low in the sky to someone on the ground in North America. Aircraft and vessels on open water can get consistently good WAAS reception, but terrain, foliage or even large man-made structures can sometimes block the WAAS signal from ground receivers.

You will find that using your GPS receiver is both easy and amazingly accurate. It is easily the most accurate method of electronic navigation available to the general public today. Remember, however, this receiver is only a tool. Always have another method of navigation available, such as a map or chart and a compass.

Also remember that this unit will always show navigation information in the shortest line from your present position to a waypoint, regardless of terrain! It only calculates position, it can't know what's between you and your destination, for example. It's up to you to safely navigate around obstacles, no matter how you're using this product.

## **How to use this manual: typographical conventions**

Many instructions are listed as numbered steps. The keypad and arrow "keystrokes" appear as boldface type. So if you are in a real hurry, you

can skim the instructions and pick out what menu command to use by finding the boldface command text. The following paragraphs explain how to interpret the text formatting for those commands and other instructions:

## Arrow Keys

The arrow keys control the movement of dotted cross-hair lines on your plotter screen called the cursor. The arrow keys also control a horizontal line depth cursor on the sonar screen. The arrow keys help you move around the menus so you can execute different commands. They are represented by symbols like these, which denote the down arrow key, the up arrow, the left arrow and the right arrow: ↓ ↑ ← →.

## Keyboard

The other keys perform a variety of functions. When the text refers to a key to press, the key is shown in bold, sans serif type. For example, the "Enter/Icons" key is shown as **ENT** and the "Menu" key is shown as **MENU**.

## Menu Commands

A menu command or a menu option will appear in small capital letters, in a bold sans serif type like this: **ROUTE PLANNING**. These indicate that you are to select this command or option from a menu or take an action of some kind with the menu item. Text that you may need to enter or file names you need to select are shown in italic type, such as *trail name*.

## Instructions = Menu Sequences

Most functions you perform with this unit are described as a sequence of key strokes and selecting menu commands. We've written them in a condensed manner for quick and easy reading.

For example, instructions for navigating a trail would look like this:

1. From the Plotter Page, press **MENU | MENU | ↓** to **MY TRAILS | ENT**.
2. Press ↓ to *Trail 1* | **ENT** | → | ↓ to **NAVIGATE | ENT**.
3. You are asked to wait while it converts the trail into a route.

4. The wait message disappears and the unit begins showing navigation information along the trail. Now, begin moving and follow your unit's directions.

Translated into complete English, step 1 above would mean: "Start on the Plotter Page. Press the Menu key twice. Next, repeatedly press (or press and hold) the down arrow key to scroll down the menu and select (highlight) the My Trails menu command. Finally, press the Enter key."

Step 2 would mean: "Press the down arrow key repeatedly to scroll to the trail named Trail 1, and press Enter. Next, press the right arrow key and then the down arrow key to highlight the Navigate command, then press Enter."

# Notes

# Section 2: Installation

## Preparations

You can install the sonar and GPS systems in some other order if you prefer, but we recommend this installation sequence:

### **CAUTION:**

*You should read over this entire installation section before drilling any holes in your vehicle or vessel!*

1. Determine the approximate location for the sonar/GPS unit, so you can plan how and where to route the power/transducer cable. This will help you make sure you have enough cable length for the desired configuration.
2. Determine the approximate location for the transducer and its cable route.
3. Determine the location of your battery or other power connection, along with the power cable route.
4. Install the transducer and route the transducer cable to the sonar/GPS unit.
5. Route the power cable from the unit's location to an appropriate power source and connect it there.
6. Connect the transducer/power cable to the unit and mount the sonar/GPS unit to the bracket.

## Transducer Installation

These instructions will help you install your Skimmer<sup>®</sup> transducer on a transom, on a trolling motor or inside a hull. Please read all instructions before proceeding with any installation.

Your Skimmer transducer typically comes packaged with a one-piece stainless steel bracket for mounting it to the transom of your boat. The optional trolling motor mount uses a one-piece plastic bracket with an adjustable strap. These are "kick-up" mounting brackets. They help prevent damage if the transducer strikes an object while the boat is moving. If the transducer does "kick-up," the bracket can easily be pushed back into place without tools.

Read these instructions carefully *before* attempting the installation. Determine which of the installation methods is right for your boat. ***Remember, the transducer location and installation is the most critical part of a sonar installation.***

### **Recommended Tools and supplies**

If you prefer the option of routing the cable through the transom, you will need a 5/8" drill bit.

### **NOTE:**

The following installation types also call for these recommended tools and required supplies that you must provide (supplies listed here are *not* included):

#### **Transom installation**

Tools include: two adjustable wrenches, drill, #29 (0.136") drill bit, flat-head screwdriver. Supplies: *high quality, marine grade* above- or below-waterline sealant/adhesive compound.

#### **Trolling motor installations**

Tools: two adjustable wrenches, flat-head screwdriver. Supplies: plastic cable ties.

#### **Shoot-through hull installations**

Tools: these will vary depending on your hull's composition. Consult your boat dealer or manufacturer. Other tools are a wooden craft stick or similar tool for stirring and applying epoxy, and a paper plate or piece of cardboard to mix the epoxy on. Supplies: rubbing alcohol, 100 grit

sandpaper, specially formulated epoxy adhesive available from LEI (see ordering information on the inside back cover). A sandwich hull also requires polyester resin.

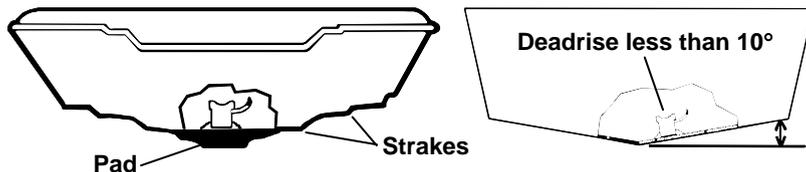
### Selecting a Transducer Location

1. The location must be in the water at all times, at all operating speeds.
2. The transducer must be placed in a location that has a *smooth flow* of water at all times. If the transducer is not placed in a smooth flow of water, interference caused by bubbles and turbulence will show on the sonar's display as random lines or dots when the boat is moving.

#### NOTE:

Some aluminum boats with strakes or ribs on the outside of the hull create large amounts of turbulence at high speed. These boats typically have large outboard motors capable of propelling the boat at speeds faster than 35 mph. Typically, a good transom location on aluminum boats is between the ribs closest to the engine.

3. The transducer should be installed with its face pointing straight down, if possible. *For shoot-thru applications:* Many popular fishing boat hulls have a flat keel pad that offers a good mounting surface. On vee hulls, try to place the transducer where the deadrise is  $10^\circ$  or less.

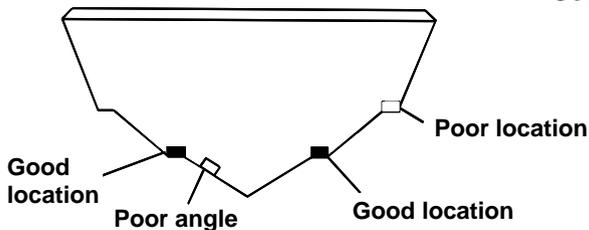
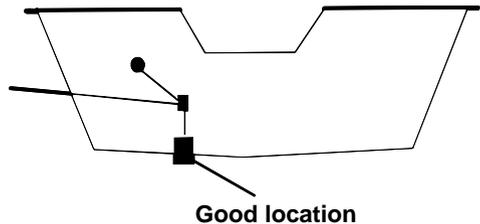


Vee pad hull (left); Vee hull (right). A pod style transducer is shown here, but the principle is the same for Skimmers inside a hull.

4. If the transducer is mounted on the transom, make sure it doesn't interfere with the trailer or hauling of the boat. Also, don't mount it closer than approximately one foot from the engine's lower unit. This will prevent cavitation (bubble) interference with propeller operation.

5. If possible, route the transducer cable away from other wiring on the boat. Electrical noise from engine wiring, bilge pumps and aerators can be displayed on the sonar's screen. Use caution when routing the transducer cable around these wires.

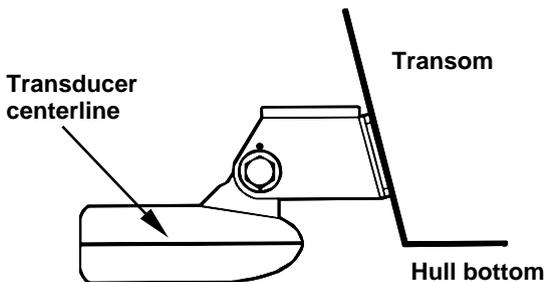
**CAUTION: Clamp the transducer cable to transom near the transducer. This will help prevent the transducer from entering the boat if it is knocked off at high speed.**



**Good and poor transducer locations.**

### **How low should you go?**

For most situations, you should install your Skimmer transducer so that its centerline is level with the bottom of the boat hull. This will usually give you the best combination of smooth water flow and protection from bangs and bumps.



### **Align transducer centerline with hull bottom.**

However, there are times when you may need to adjust the transducer slightly higher or lower. (The slots in the mounting brackets allow you to loosen the screws and slide the transducer up or down.) If you frequently lose bottom signal lock while running at high speed, the transducer may be coming out of the water as you cross waves or wakes. Move the transducer a little lower to help prevent this.

If you cruise or fish around lots of structure and cover, your transducer may be frequently kicking up from object strikes. If you wish, you may move the transducer a little higher for more protection.

There are two extremes you should avoid. Never let the edge of the mounting bracket extend below the bottom of the hull. Never let the bottom – the face – of the transducer rise above the bottom of the hull.

### **Shoot-thru-hull vs. Transom Mounting**

In a shoot-thru-hull installation, the transducer is bonded to the *inside* of the hull with epoxy. The sonar "ping" signal actually passes through the hull and into the water. This differs from a bolt-thru-hull installation (often called "thru-hull"). In that case, a hole is cut in the hull and a specially designed transducer is mounted *through* the hull with a threaded shaft and nut. This puts the transducer in direct contact with the water.

Typically, shoot-thru-hull installations give excellent high speed operation and good to excellent depth capability. There is no possibility of transducer damage from floating objects, as there is with a transom-mounted transducer. A transducer mounted inside the hull can't be knocked off when docking or loading on a trailer.

However, the shoot-thru-hull installation does have its drawbacks. First, some loss of sensitivity does occur, even on the best hulls. This varies from hull to hull, even from different installations on the same hull. This is caused by differences in hull lay-up and construction.

Second, the transducer angle cannot be adjusted for the best fish arches on your sonar display. (This is not an issue for flasher-style sonars.) Lack of angle adjustment can be particularly troublesome on hulls that sit with the bow high when at rest or at slow trolling speeds.

Third, a transducer **CAN NOT** shoot through wood and metal hulls. Those hulls require either a transom mount or a thru-hull installation.

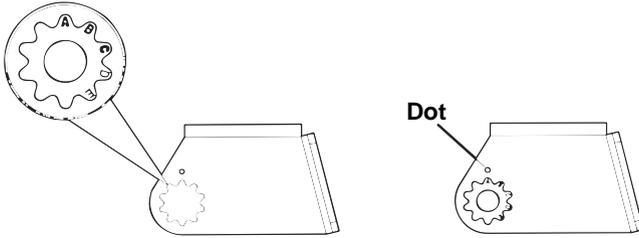
Fourth, if your Skimmer transducer has a built in temp sensor, it will only show the temperature of the bilge, not the water surface temp.

Follow the testing procedures listed in the shoot-thru-hull installation section at the end of this lesson to determine if you can satisfactorily shoot through the hull.

## **TRANSOM TRANSDUCER ASSEMBLY AND MOUNTING**

The best way to install the transducer is to loosely assemble all of the parts first, place the transducer's bracket against the transom and see if you can move the transducer so that it's parallel with the ground.

- 1. Assembling the bracket.** Press the two small plastic ratchets into the sides of the metal bracket as shown in the following illustration. Notice there are letters molded into each ratchet. Place each ratchet into the bracket with the letter "A" aligned with the dot stamped into the metal bracket. This position sets the transducer's coarse angle adjustment for a 14° transom. Most outboard and stern-drive transoms have a 14° angle.

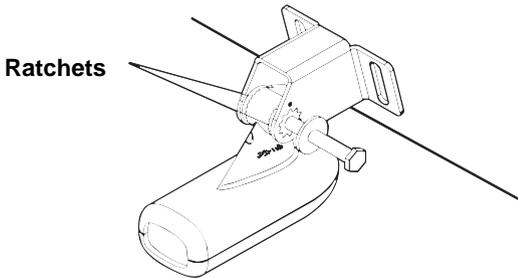


**Align plastic ratchets in bracket.**

**2. Aligning the transducer on the transom.** Slide the transducer between the two ratchets. Temporarily slide the bolt through the transducer assembly and hold it against the transom. Looking at the transducer from the side, check to see if it will adjust so that its face is parallel to the ground. If it does, then the "A" position is correct for your hull.

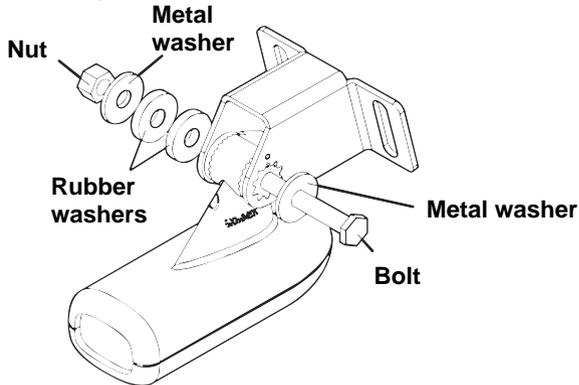
If the transducer's face isn't parallel with the ground, remove the transducer and ratchets from the bracket. Place the ratchets into the holes in the bracket with the letter "B" aligned with the dot stamped in the bracket.

Reassemble the transducer and bracket and place them against the transom. Again, check to see if you can move the transducer so it's parallel with the ground. If you can, then go to step 3. If it doesn't, repeat step 2, but use a different alignment letter until you can place the transducer on the transom correctly.



**Insert bolt and check transducer position on transom.**

- 3. Assembling the transducer.** Once you determine the correct position for the ratchets, assemble the transducer as shown in the following figure. Don't tighten the lock nut at this time.

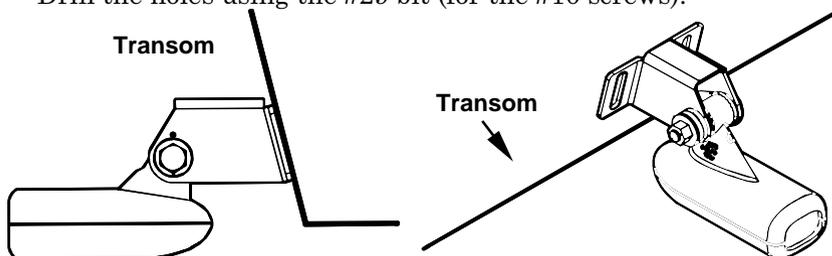


**Assemble transducer and bracket.**

- 4. Drilling mounting holes.** Hold the transducer and bracket assembly against the transom. The transducer should be roughly parallel to the ground. The transducer's centerline should be in line with the bottom of the hull. Don't let the bracket extend below the hull!

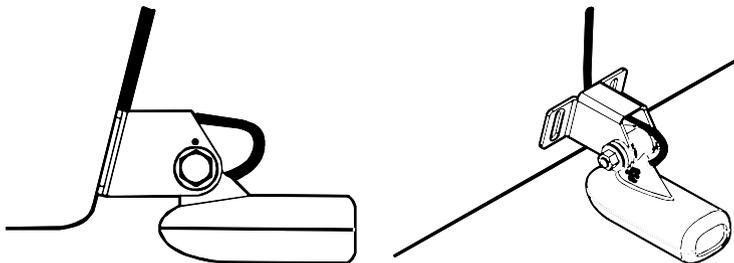
Mark the center of each slot for the mounting screw pilot holes. You will drill one hole in the center of each slot.

Drill the holes using the #29 bit (for the #10 screws).



**Position transducer mount on transom and mark mounting holes.**  
Side view (left) and seen from above (right).

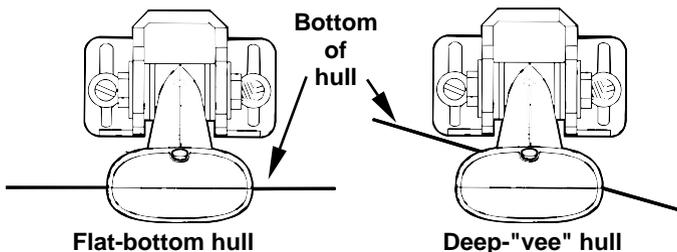
**5. Attaching transducer to transom.** Remove the transducer from the bracket and re-assemble it with the cable passing through the bracket over the bolt as shown in the following figures.



**Route cable over bolt and through bracket. Side view (left) and seen from above (right).**

Attach the transducer to the transom. Slide the transducer up or down until it's aligned properly with the bottom of the hull as shown in the preceding and following figures. Tighten the bracket's mounting screws, sealing them with the sealant/adhesive compound.

Adjust the transducer so that it's parallel to the ground and tighten the nut until it touches the outer washer, then add 1/4 turn. *Don't over tighten the lock nut!* If you do, the transducer won't "kick-up" if it strikes an object in the water.



**Align transducer centerline with hull bottom and attach to transom.**

- 6. Route the transducer cable through or over the transom to the sonar unit.** Make sure to leave some slack in the cable at the transducer. If possible, route the transducer cable away from other wiring on the boat. Electrical noise from the engine's wiring, bilge pumps, VHF radio wires and cables, and aerators can be picked up by the sonar. Use caution when routing the transducer cable around these wires.

**WARNING:**

**Clamp the transducer cable to the transom close to the transducer. This can prevent the transducer from entering the boat if it is knocked off at high speed.**

If you need to drill a hole in the transom to pass the connector through, the required hole size is 5/8".

**Caution:**

*If you drill a hole in the transom for the cable, make sure it is located above the waterline. After installation, be sure to seal the hole with the same marine grade above- or below-waterline sealant/adhesive used for the mounting screws.*

- 7. Make a test run to determine the results.** If the bottom is lost at high speed, or if noise appears on the display, try sliding the transducer bracket down. This puts the transducer deeper into the water, hopefully below the turbulence causing the noise. Don't allow the transducer bracket to go below the bottom of the hull!

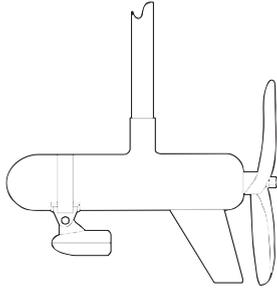
## **TROLLING MOTOR BRACKET INSTALLATION**

1. Attach the optional TMB-S bracket to the transducer as shown in the following figure, using the hardware supplied with the transducer. (Note: The internal tooth washer is supplied with the TMB-S.)



**Attach motor mounting bracket to transducer.**

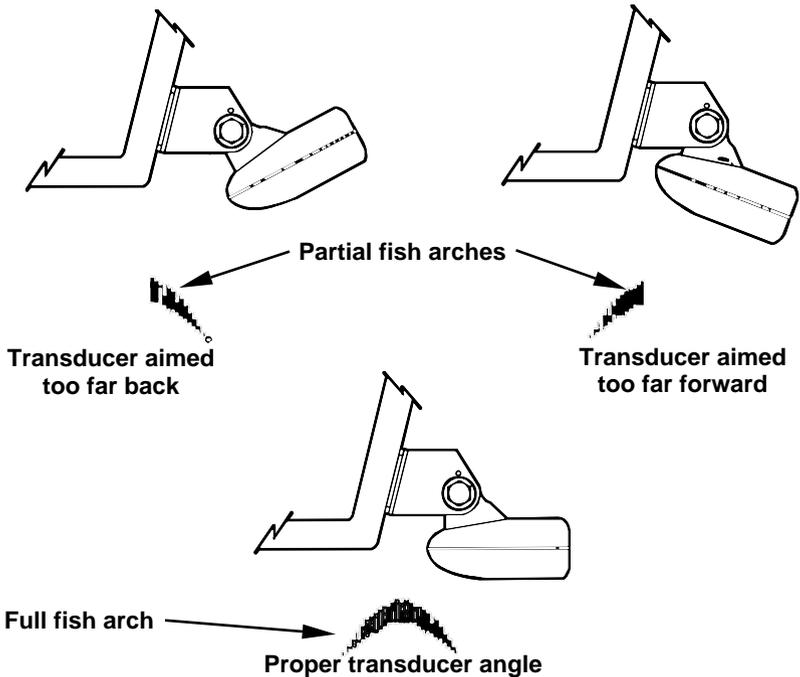
2. Slide the adjustable strap supplied with the TMB-S through the slot in the transducer bracket and wrap it around the trolling motor. Position the transducer to aim straight down when the motor is in the water. Tighten the strap securely.
3. Route the transducer cable alongside the trolling motor shaft. Use plastic ties (not included) to attach the transducer cable to the trolling motor shaft. Make sure there is enough slack in the cable for the motor to turn freely. Route the cable to the sonar unit and the transducer is ready for use.



**Transducer mounted on trolling motor, side view.**

### **TRANSDUCER ORIENTATION AND FISH ARCHES**

If you do not get good fish arches on your display, it could be because the transducer is not parallel with the ground when the boat is at rest in the water or at slow trolling speeds.



### Transducer angles and their effects on fish arches.

If the arch slopes up – but not back down – then the front of the transducer is too high and needs to be lowered. If only the back half of the arch is printed, then the nose of the transducer is angled too far down and needs to be raised.

#### NOTE:

Periodically wash the transducer's face with soap and water to remove any oil film. Oil and dirt on the face will reduce the sensitivity or may even prevent operation.

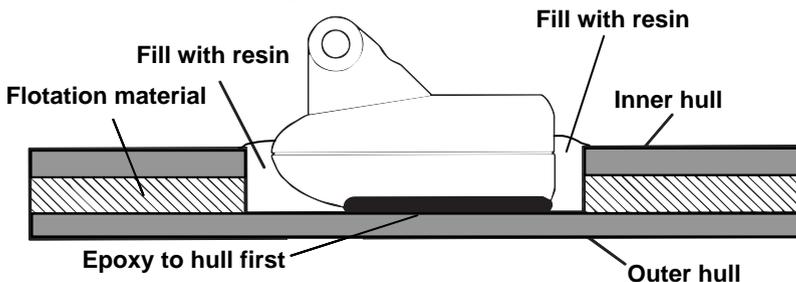
## SHOOT-THRU-HULL PREPARATION

### Hulls With Floatation Materials

The transducer installation inside a fiberglass hull must be in an area that does not have air bubbles in the resin or separated fiberglass layers. The sonar signal must pass through solid fiberglass. A successful transducer installation can be made on hulls with flotation materials (such as plywood, balsa wood or foam) between layers of fiberglass if the material is removed from the chosen area. See the figure below.

#### WARNING:

**Do not remove any material from your inner hull unless you know the hull's composition. Careless grinding or cutting on your hull can result in damage that could sink your boat. Contact your boat dealer or manufacturer to confirm your hull specifications.**



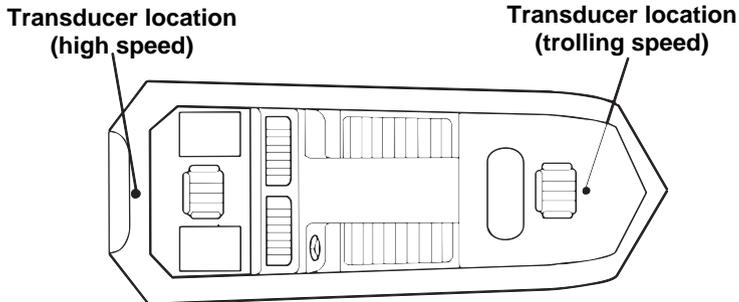
**Use epoxy to place the transducer in a solid portion of the hull.**

For example, some (but not all) manufacturers use a layer of fiberglass, then a core of balsa wood, finishing with an outer layer of fiberglass. Removing the inner layer of fiberglass and the balsa wood core exposes the outer layer of fiberglass. The transducer can then be epoxied directly to the outer layer of fiberglass. After the epoxy cures for 24 hours, fill the remaining space with polyester resin. When the job is finished, the hull is watertight and structurally sound.

Remember, the sonar signal must pass through *solid* fiberglass. Any air bubbles in the fiberglass or the epoxy will reduce or eliminate sonar signals.

### **Testing Determines Best Location**

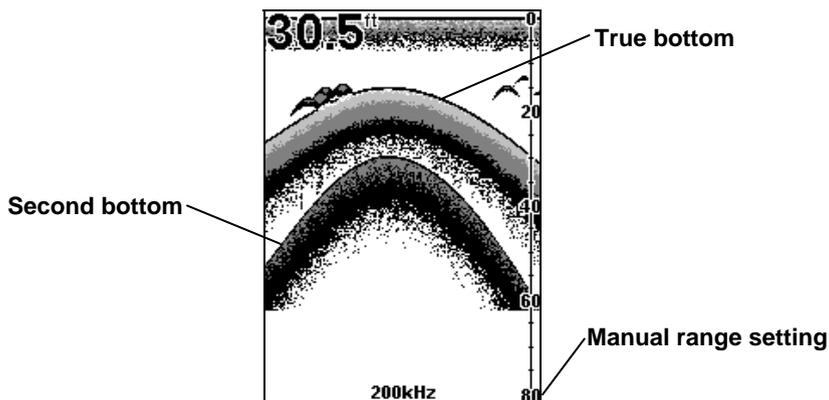
Ideally, the shoot-thru transducer should be installed as close to the transom as possible, close to the centerline. This will give you the best performance during high speed maneuvers.



**Shoot-thru-hull transducer locations for high speed or trolling speed operation.**

To choose the proper location for shoot-thru-hull mounting, follow these testing procedures: (You may need a helper to complete these steps.)

1. Anchor the boat in about 30 feet of water. Add a little water to the sump of the boat. Plug the transducer into the sonar unit, turn it on, then hold the transducer over the side of the boat in the water. Adjust the sensitivity and range controls until a second bottom echo is seen on the display. (You'll need to turn off Auto Sensitivity, Auto Depth Range and ASP™. Try a range setting that is two to three times the water depth. The harder (more rocky) the bottom, the easier it will be to get a second bottom signal.) Don't touch the controls once they've been set.



**Example of a second bottom signal. Unit is in 30 feet of water, with range set at 80 feet and sensitivity set at 87 percent.**

2. Next, take the transducer out of the water and place it in the water in the sump of the boat, face down. (The transducer face is shown in the figure on page 30.) Notice how the signal strength decreases. The second bottom signal will probably disappear and the bottom signal intensity will likely decrease.
3. Now move the transducer around to find the best location with the strongest possible bottom signal. If you find a spot with an acceptable bottom signal, mark the location and move on to step 4.

If you can't get an acceptable bottom signal, try turning up the sensitivity by three or five keystrokes and then move the transducer around once more. If you find a spot that works, mark it and move on to step 4.

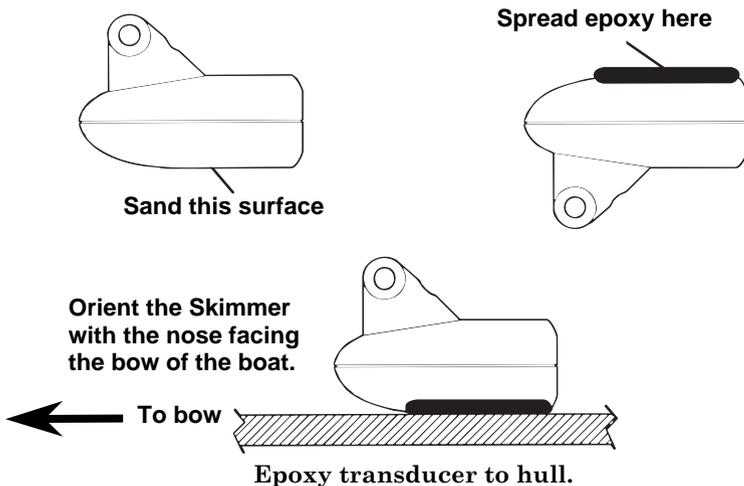
If you have to turn up sensitivity by more than five keystrokes to get a good signal, the transducer should be mounted on the outside of the hull. This is especially true if you have to turn sensitivity all the way up to get a decent bottom signal.

4. Most people can get good results by following steps 1 through 3, so this step is *optional*. If you want to make an extra effort to be absolutely sure that your selected location will work under all conditions, make a test run with the boat on plane and observe the bottom signal. You'll need to figure some way to prop the transducer into position while you make your test run. (A brick or two might be sufficient to hold it in place.)
5. When you're satisfied with a location, mark it and proceed with the installation.

### **Shoot-thru-hull Installation**

If you are installing the transducer on a hull with floatation material sandwiched within the hull, refer to the text "Hulls With Flotation Materials" beginning on page 26.

1. Make sure the area is clean, dry and free of oil or grease, then sand both the inside surface of the hull and the face of the transducer with 100 grit sandpaper. The sanded hull area should be about 1-1/2 times the diameter of the transducer. The surface of the hull must be flat so the entire transducer face is in contact with the hull prior to bonding. After sanding, clean the hull and transducer with rubbing alcohol to remove any sanding debris.



#### **WARNING:**

Use *only* the epoxy available from LEI. It has been formulated to work with these installation procedures. Other epoxy types may be too thin or may not cure to the right consistency for optimum transducer performance.

2. The epoxy consists of the epoxy itself and a hardener. Remove the two compounds from the package and place them on the paper plate. Thoroughly stir the two compounds together until the mixture has a uniform color and consistency. Do not mix too fast or bubbles will form in the epoxy. After mixing, you have 20 minutes to complete the installation before the epoxy becomes unworkable.  
Spread a thin layer of epoxy (about 1/16" or 1.5 mm thick) on the face of the transducer as shown in the previous figure. *Make sure there are no air pockets in the epoxy layer!* Then, apply the remaining epoxy to the sanded area on the hull.
3. Press the transducer into the epoxy, twisting and turning it to force any air bubbles out from under the transducer face. Stop pressing

when you bottom out on the hull. When you're finished, the face of the transducer should be parallel with the hull, with a minimum amount of epoxy between the hull and transducer.

4. Apply a weight, such as a brick, to hold the transducer in place while the epoxy cures. Be careful not to bump the transducer while the epoxy is wet. Leave the weight in place for a minimum of three hours. Allow the epoxy to cure for 24 hours before moving the boat.
5. After the epoxy has cured, route the cable to the sonar unit and it's ready to use.

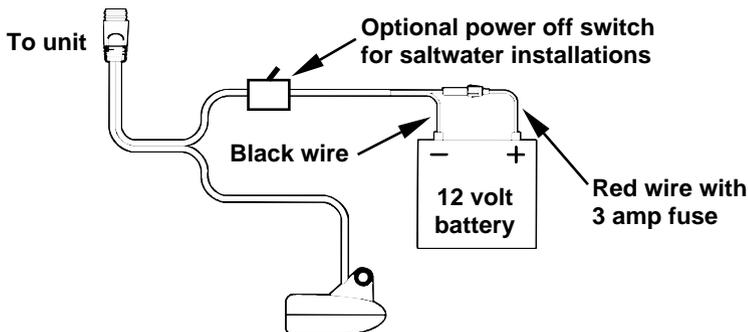
### **Power and Cable Connections**

The unit works from a 12-volt battery system. For the best results, attach the power cable directly to the battery. You can attach the power cable to an accessory or power buss, however you may have problems with electrical interference. Therefore, it's safer to go ahead and attach the power cable directly to the battery.

#### **CAUTION:**

*When using the unit in a saltwater environment, we strongly recommend that you shut off the power supply to the power cable when the unit is not in use. When the unit is turned off but still connected to a power supply, electrolysis can occur in the power cable plug. This may result in corrosion of the plug body along with the electrical contacts in the cable and the unit's power socket.*

*In saltwater environments we recommend you connect the power cable to the auxiliary power switch included in most boat designs. If that results in electrical interference, or if such a switch is not available, we recommend connecting direct to the battery and installing an inline switch. This will let you shut off power to the power cable when the unit is not in use. When you are not using the unit, you should always shut off power to the power cable, especially when the power cable is disconnected from the unit.*



**Power and transducer connections for the Cuda 250 sonar units (direct battery connection shown).**

If possible, keep the power cable away from other boat wiring, especially the engine's wires. This will provide the best isolation from electrical noise. If the cable is not long enough, splice #18 gauge wire onto it. The power cable has two wires, red and black. Red is the positive lead, black is negative or ground. Make sure to attach the in-line fuse holder to the red lead *as close to the power source as possible*.

For example, if you have to extend the power cable to the battery or power buss, attach one end of the fuse holder directly to the battery or power buss. This will protect both the unit and the power cable in the event of a short. It uses a 3-amp fuse.

**WARNING:**

**This product *must* be independently fused with the enclosed 3-amp fuse (or equivalent), even if you connect to a fused accessory or power buss.**

***If a malfunction happens inside the unit, extensive damage can occur if the enclosed fuse is not used. As with all electrical devices, this unit could be damaged to a point that it is unrepairable and could even cause harm to the user when not properly fused.***

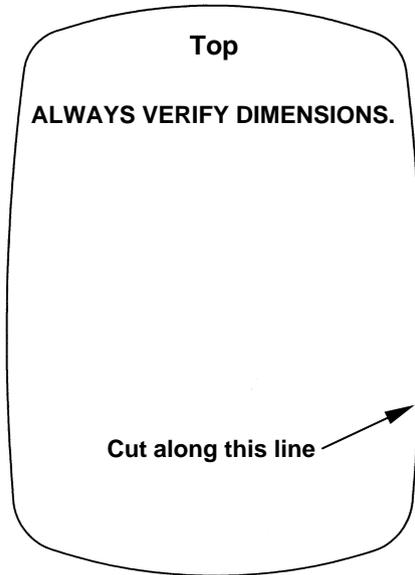
**CAUTION:**

*Failure to use the enclosed 3-amp fuse will void your warranty! For a replacement, use a type 3AG 3-amp fuse.*

This unit has reverse polarity protection. No damage will occur if the power wires are reversed. However, the unit will not work until the wires are attached correctly.

**Mounting the Sonar Unit: In-Dash or Bracket**

You can install the sonar unit on the top of a dash with the supplied bracket. It can also be installed in the dash with an optional FM-6 dash-mounting kit.



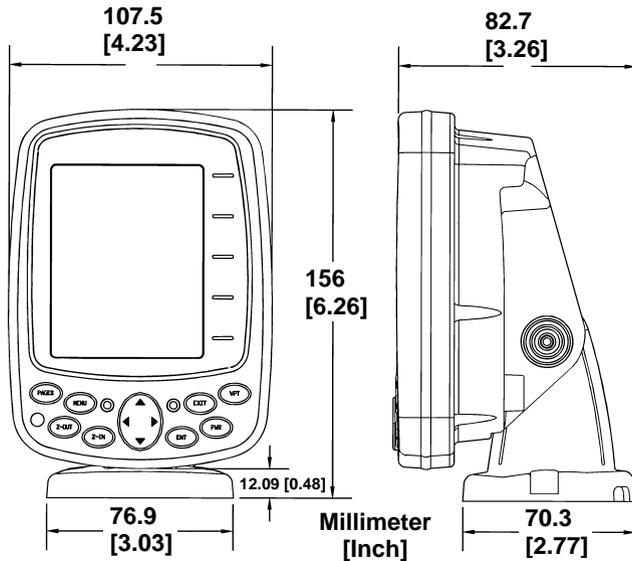
**In-dash mounting template for Cuda 250.**  
**NOTE: This figure is *not* printed to scale.**

## **Bracket Installation**

Mount the unit in any convenient location, provided there is clearance when it's tilted for the best viewing angle. You should also make sure there is enough room behind the unit to attach the power/transducer cable. (See the following drawings, which show the dimensions of a mounted Cuda 250 sonar unit.)

Holes in the bracket's base allow wood screw or through-bolt mounting. You may need to place a piece of plywood on the back side of thin panels to reinforce the panel and secure the mounting hardware.

Drill a 5/8" (15.9 mm) hole in the dash for the power/transducer cable. The best location for this hole is immediately under the mounting bracket location. This way, the bracket can be installed so that it covers the hole, holds the cable in position and results in a neat installation. Some customers, however, prefer to mount the bracket to the side of the cable hole — it's a matter of personal preference. After drilling the hole, pass the connector *up* through the hole from under the dash.

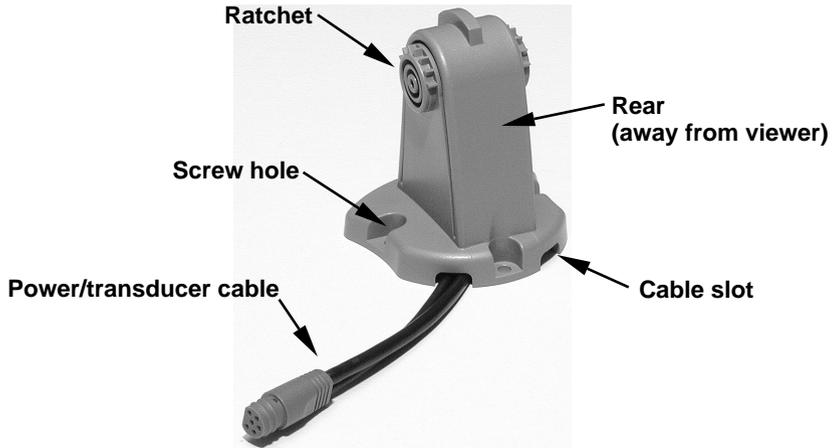


**Front view (left) and side view (right) showing dimensions of the Cuda 250 when mounted on quick release bracket.**

If you wish, you can fill in the hole around the cable with a good marine sealant compound. (Some marine dealers stock cable hole covers to conceal the opening.)

This unit uses a quick release-mounting bracket. When you run the cable through the hole, make sure you allow enough slack for tilting the unit and attaching the connector. (The snug fit of the push-on waterproof connector requires some force to attach.) Also be sure there is enough cable slack for rotation if you decide to use the optional GBSA-3 swivel base. The swivel base lets you rotate the sonar so it can be seen from different parts of the boat.

Align the bracket over the cable hole with the cable slots facing away from you and fit the cable through one of the slots. Fasten the bracket to the dash using the three screw holes.

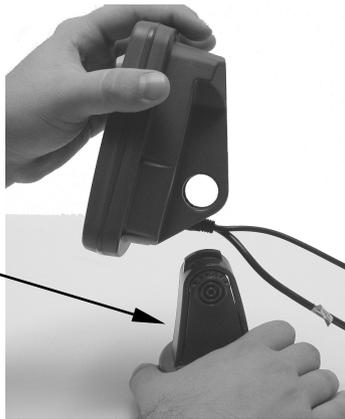


**Cuda 250 quick release mounting bracket. Slots in the base allow routing the cable from beneath the mount.**

Attach the unit to the bracket by first connecting the power/transducer cable. Then, hold the sonar unit vertically and slide it onto the bracket from above. (The back of the unit should be touching the front of the bracket as you lower it into position.) As you push down, the unit will lock into place with a distinct click.

To adjust the viewing angle, pinch the ratchets with one hand, then tilt the unit with your other hand. Release the ratchets and the unit locks into the new position. To dismount the unit for storage, press the ratchets and lift the unit off the bracket.

**Bracket front**



**Mount the sonar: slide the unit onto the bracket from above.**

**Depress  
ratchets to  
release.**

**Swivel base**



**Adjust viewing angle: use one hand to press and release the spring-loaded ratchets while you move the unit with the other hand. An optional GBSA-3 swivel base is shown with the quick release bracket.**

## **Portable Sonar Installation**

Like many Eagle products, the Cuda 250 sonar is capable of portable operation. It uses the optional PPP-12 portable power pack.

The power pack and portable transducers expand the uses for your sonar. You can use your Cuda 250 sonar unit on your boat or take it to the dock, on a float tube, on an ice fishing trip or use it as a second sonar in a friend's boat. (An alternative to the PPP-12 is the PPP-15 portable power pack, which was designed especially for ice fishing. It includes a rechargeable gel cell battery and a transducer designed for stationary use. The entire rig is contained in a carry bag that fits inside a five-gallon plastic bucket.)

The PPP-12 package includes the power pack, battery adapter and a portable transducer. The transducer can be stored inside the power pack. The PPP-12 requires eight AA alkaline batteries. Batteries are not included.

To use a portable power pack, you install the batteries and then attach the sonar unit to the power pack's bracket. Plug in the power/transducer cable and you're ready to fish.

The PPP-12 has a quick-release mounting bracket built into the case.

### **Installing the Batteries**

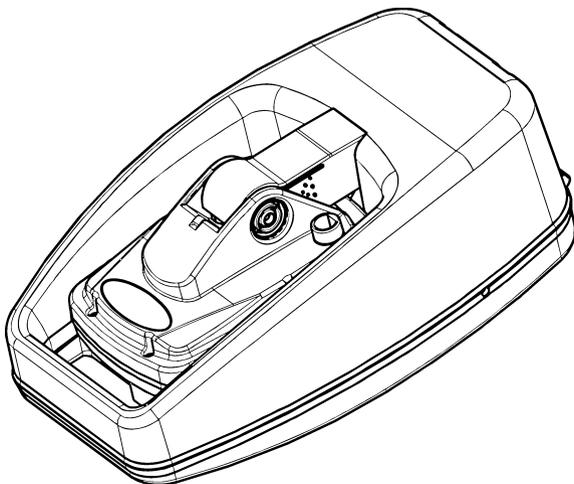
Release the latch on the front of the power pack case. Open the compartment and install eight AA batteries into the adapter. For the longest life, we recommend you use alkaline batteries.

#### **NOTE:**

When the unit is not in use, we recommend you unplug the power connector to reduce the possibility of corrosion or battery drain. When you store the unit, always remove the batteries because dead batteries can leak and corrode the contacts.

After installing the batteries, plug the cable's power connector into the socket on the battery compartment cover. Route the cable's unit connec-

tor and about 6 inches of cable through the opening under the sonar mount. Close the cover, plug the connector into the sonar unit and mount the unit on the built-in bracket.



**PPP-12 Portable Power Pack with a sonar unit stowed for transport.**

Turn the unit on. If it doesn't work, make sure the battery terminals are making good contact against the battery contacts. Also check the wiring connections on the battery adapter. The red wire on the power cable should be attached to the red wire on the battery adapter and the power cable's black wire should be connected to the black wire on the battery adapter.

If it still doesn't work, check the battery voltage. Most of the complaints we receive about portable units result from stale batteries. Make sure the ones you buy are fresh.

In cold weather the efficiency of dry cell batteries drops with the temperature. We find it a good idea to have the sonar unit good and warm along with the batteries before we leave home.

If the batteries do lose a charge, you can sometimes restore them by placing them in a warm room or car interior. A better way is to replace them with batteries that have been kept warm.

**WARNING:**

**Never heat the batteries over an open flame or direct hot air onto them. A fire or explosion could result.**

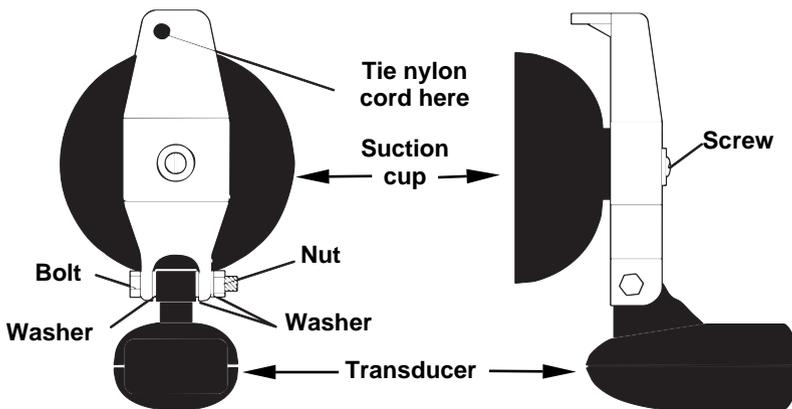
**Portable Transducer Assembly**

Recommended tools for installation include a slotted screw driver and two adjustable wrenches.

Assemble the transducer and bracket as shown in the following figure. Attach the transducer to the bracket with the supplied hardware.

Make sure there is one washer on each side of the transducer, inside the bracket. Slide the other washer over the end of the bolt and thread the nut onto it.

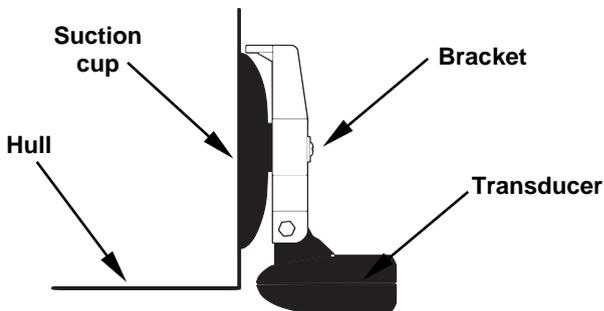
Screw the suction cup onto the bracket using the supplied screw and flat washer. Tie the nylon cord through the hole in the top of the bracket. When using this transducer, tie the other end of the nylon cord to the boat. This will help prevent the loss of the transducer if it comes off the boat.



**Portable transducer assembly: rear view (left) and side view (right.)**

Clean the chosen area of the hull before attaching the suction cup. Locate the transducer on the hull as shown in the following figure. Don't allow the bracket to extend below the hull, because water pressure against it can cause the suction cup to come off at speed.

Moisten the cup, then press it onto the hull as firmly as possible. Tie the nylon cord to the boat and route the transducer cable to the sonar unit. Your portable sonar is now ready for use.



**Portable transducer installed on boat transom.**

**NOTE:**

For optimum operation, the portable transducer should be adjusted so that it is parallel to the ground. For more information on this, see the earlier segment on Transducer Orientation and Fish Arches.

Now that you have your unit installed, move on to Sec. 3, *Basic Sonar Operations*. There, we'll present a series of step-by-step tutorials to teach you the basics of your sonar operation.

# Section 3: Basic Sonar Operation

## Keyboard

The unit sounds a tone when you press any key. This tells you the unit has accepted a command. Numbers in the photo correspond to key explanations below:



Eagle Cuda 250 S/Map.

1. **PWR/LIGHT** – The PWR key turns the unit on and off and activates the backlight.
2. **PAGES** – Pressing this and the arrow keys (4) switches the unit between the different page display screens.
3. **MENU** – Press this key to show the menus and submenus, which allow you to select a command or adjust a feature. This also accesses search functions for streets, intersections, addresses and highway exits.
4. **ARROW KEYS** – These keys are used to navigate through the menus, make menu selections, move the plotter cursor and sonar chart cursor and enter data.
5. **ENT** – This key allows you to save data, accept values or execute menu commands. It is also used to create event marker icons.
6. **EXIT** – The Exit key lets you return to the previous screen, clear data or close a menu.
7. **WPT** – The Waypoint key is used to save and recall waypoints, search for waypoints and access the waypoint list. It is also involved in some navigation functions.
8. **ZOUT** – This key lets you zoom the screen out. On the Sonar Page, this key returns you to a full sonar chart display, showing the entire water column from surface to bottom. On the Plotter Page, this lets you see a larger geographic area on the display. Less detail is seen as you zoom out.
9. **ZIN** – This key lets you zoom the screen in. On the Sonar Page, this key enlarges fish signals and bottom detail. On the Plotter Page, zooming in lets you see greater detail in a smaller geographic area on the display.

## Memory

This unit has permanent memory that saves all user settings, even when power is removed. It does not require, nor does it use an internal backup battery, so you never have to worry about replacement batteries.

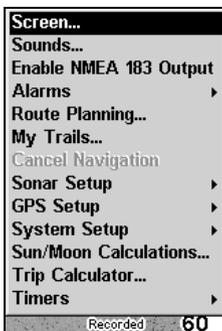
## Menus

Your sonar unit will work fine right out of the box with the factory default settings. You only need to learn a few basic functions to enhance your viewing. We'll discuss them briefly here, then discuss them and all the other commands in more detail in Sec. 4, *Advanced Sonar Operation*.

Sonar Mode has two primary menus: the Main Menu and the Sonar Menu.

### Main Menu

The Main Menu contains basic function and setup option commands. You access the Main Menu by pressing **MENU | MENU**. You execute a command by using **↑** or **↓** to highlight a command and pressing **ENT**. To clear the Main Menu screen and return to the main page display, press **EXIT**.



### Main Menu.

#### Main Menu Commands

**Screen:** changes the appearance of the display screen.

**Sounds:** controls sound levels for keystrokes and alarms.

**Enable NMEA 183 Output:** enables NMEA 0183 output and disables temperature 2, water speed and water distance. For more information, see Cuda addendum, part number 988-0152-082.

**Alarms:** turns sonar and GPS alarms on or off and changes alarm thresholds.

**Route Planning:** used to plan, view or navigate a route.

**My Trails:** shows, creates and deletes plot trails. Also used to navigate or backtrack a trail.

**Cancel Navigation:** used to stop navigating after you have reached your destination.

**Sonar Setup:** sets various sonar options.

**GPS Setup:** sets various GPS receiver options.

**System Setup:** sets general configuration options.

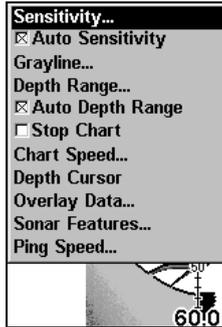
**Sun/Moon Calculations:** finds the rising and setting time of the sun and the moon.

**Trip Calculator:** shows trip status and statistics.

**Timers:** controls the up timer, down timer and alarm clock settings.

## **Sonar Menu**

The Sonar Menu provides access to major sonar features and options. With the sonar chart on the screen, press **MENU** to launch the sonar menu. You can execute a command by using **↑** or **↓** to highlight the desired action and pressing **ENT**. To return to the main page display, press **EXIT**.



Sonar Page Menu.

### Sonar Menu Commands

**Sensitivity:** sets threshold of sonar echoes shown on sonar chart.

**Auto Sensitivity:** automatically adjusts sensitivity based on depth.

**GrayLine™:** separates fish and structure near the bottom from the actual bottom and defines bottom composition/hardness.

**Depth Range:** manually sets the depth range shown on sonar chart.

**Auto Depth Range:** automatically sets the depth range shown on the sonar chart to always keep the bottom in view.

**Stop Chart:** stops the sonar chart from scrolling. Used when you want to freeze the image for closer study.

**Chart Speed:** sets the scrolling speed of sonar chart.

**Depth Cursor:** displays a cursor line on the sonar chart which allows you to accurately measure the depth of a sonar target.

**Overlay Data:** chooses what types of information (such as water temperature) to display on sonar screen.

**Sonar Features:** launches the Sonar Features menu which controls options including, sonar chart mode, auto depth, surface clarity, noise rejection, Fish I.D.™ and the zoom and zone alarm bars.

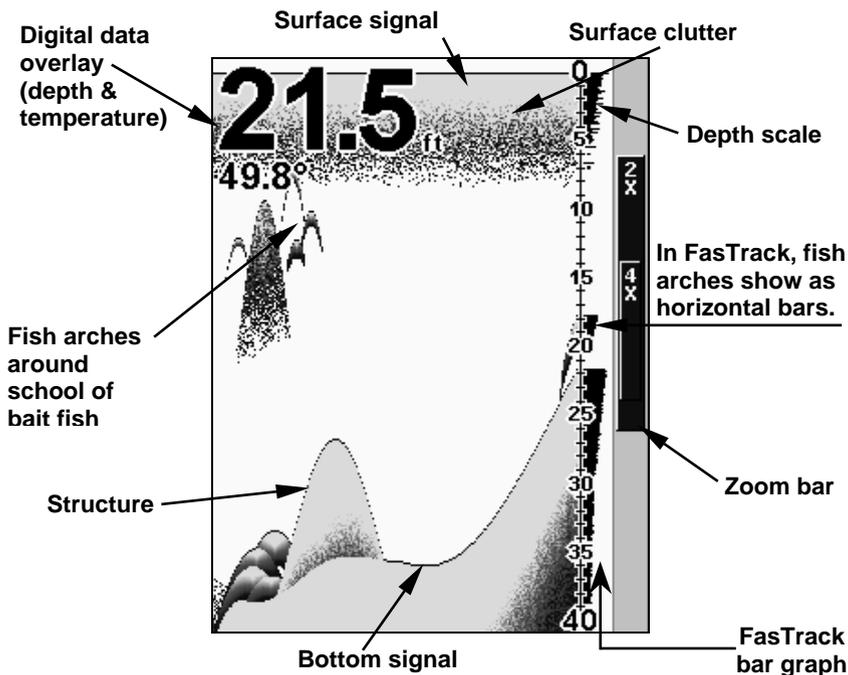
**Ping Speed:** sets the rate at which sonar pings are made.

## Pages

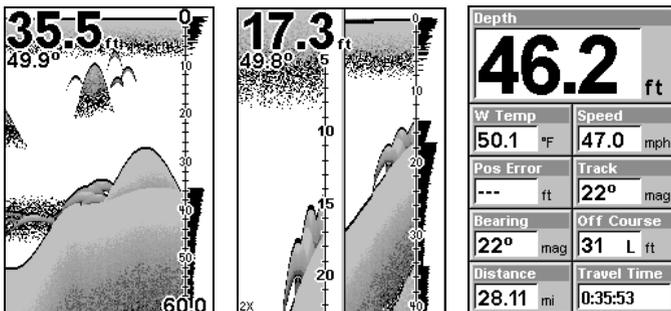
The Cuda 250 has three major Sonar display options. They are the Full Sonar Chart, Split Zoom Sonar Chart and Digital Data.

You access display modes by pressing the **PAGES** key. Press **→** to **SONAR** | **↑** or **↓** to *desired page* | **ENT**. Press **EXIT** to clear the Page menu.

The Full Sonar Chart is the main Sonar display option. This is a cross-section view of the water column beneath the boat. The chart moves across the screen, displaying sonar signals that represent fish, structure and the bottom.



Sonar Page, showing full sonar chart mode.



**Full sonar chart (left); split zoom (center); Digital data (right).**

You can customize how the Sonar Page pictures and other data are displayed in many ways. We will discuss all of those features and options in the Advanced Sonar Operation section, but to show you how easy the sonar unit is to operate, the following page contains a simplified, 10-step quick reference that will cover most fish finding situations. The quick reference describes how your unit will operate with all the sonar features in their automatic modes, which are set at the factory.

## Sonar Quick Reference

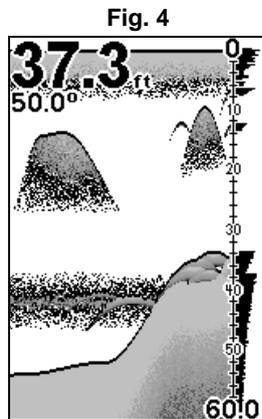
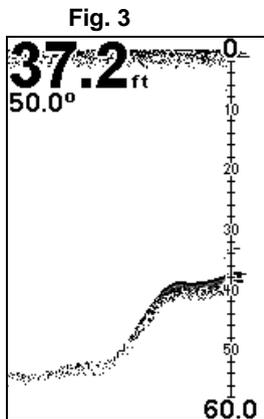
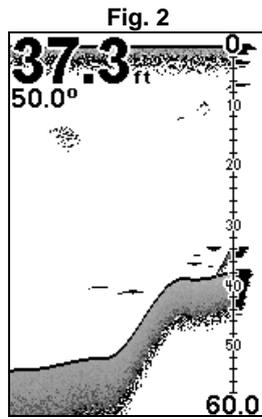
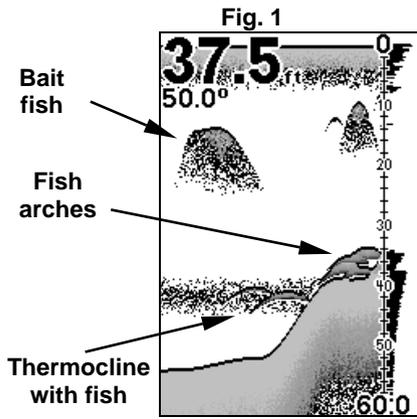
1. Mount the transducer and unit. Connect the unit to electric power and the transducer.
2. Launch your boat.
3. To turn on the unit, press and release **PWR** key.
4. Head for your fishing area. Your unit automatically displays digital depth and surface water temperature in the corner of the screen.
5. As you watch the sonar returns, you can change the display by:
  - Zoom in** to enlarge the chart for more detail: press **ZIN**.
  - Zoom out** to return to full chart mode: press **ZOUT**.
6. If necessary, adjust sensitivity to improve chart readability. Press **MENU|ENT** and the Sensitivity Menu will appear on the left of your screen. Use **↑** and **↓** to change the setting.
7. Watch the display for the appearance of fish arches. When you see arches, you have found fish!
8. Gauge the fish depth by visually comparing the fish arches with the depth scale on the right side of the screen or get a more accurate measure with the Depth Cursor. Press **MENU|↓** to **DEPTH CURSOR|ENT**. Press **↓** **↑** to align the cursor line with the fish arch. The depth appears in a box at the right end of the cursor line. To clear the cursor, press **EXIT**.
9. If you are drifting at a very low speed or anchored, you are not moving fast enough for the unit to return a fish arch signal. As you drift over a fish or as a fish swims through the transducer's signal cone, the fish echo will appear as a straight line suspended between the surface and the bottom.
10. To turn off the unit, press and hold **PWR** key for three seconds.

## Sonar Operations

As you can see from the quick reference on the previous page, basic operation is pretty easy, right out of the box. If you are a sonar novice, try operating the unit with the factory defaults until you get a feel for it.

As you are learning the basics, there is one setting you might want to tinker with from time to time — Sensitivity.

Sensitivity controls the unit's ability to pick up echoes. If you want to see more detail, try increasing the sensitivity. There are times when too much clutter appears on the screen. Decreasing sensitivity will reduce the clutter and show the strongest fish echoes — if fish are present. As you change the sensitivity setting, you can see the difference on the chart as it scrolls.



These figures show results of different sensitivity levels on the same location. Fig. 1: Sensitivity at 87 percent, determined by Auto Sensitivity. Typical of full auto mode. Fig. 2: Sensitivity set at 50 percent. Fig. 3: Sensitivity set at 20 percent. Fig. 4: Sensitivity set at 100 percent.

You can change the sensitivity level whether you are in Auto or Manual Sensitivity mode. The adjustment procedure works the same in both modes, but gives you slightly different results.

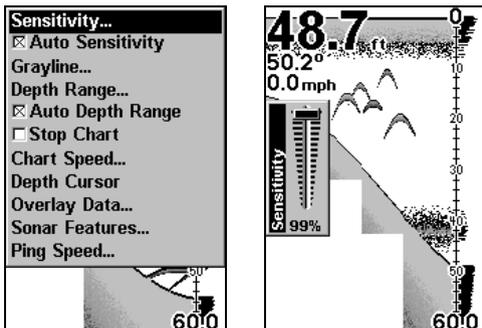
Adjusting sensitivity in Auto Sensitivity Mode is similar to manually adjusting a car's speed while cruise control is on. You can tell the car to run faster, but when you let off the gas the cruise control *automatically* keeps you from running slower than the minimum speed setting. In this sonar unit, auto mode will let you increase sensitivity to 100 percent, but the unit will *limit* your *minimum* setting. This prevents you from turning sensitivity down too low to allow automatic bottom tracking. When you change the setting with auto turned on, the unit will continue to track the bottom and make minor adjustments to the sensitivity level with a bias toward the setting you selected.

Adjusting sensitivity in Manual Sensitivity Mode is similar to driving a car without cruise control — you have *complete* control of the car's speed. In the sonar unit, manual mode allows you to set sensitivity at to the maximum or minimum settings. Depending on water conditions, the bottom signal may completely disappear from the screen when you reduce sensitivity to about 50 percent or less.

Try adjusting sensitivity in both auto and manual modes to see how they work.

**To adjust sensitivity:**

1. Press **MENU | ENT**.
2. The Sensitivity Control Bar appears. Press ↓ to decrease sensitivity. Press ↑ to increase sensitivity. When it is set at a desired level, press **EXIT**. If you reach the maximum or minimum limit, a tone will sound.



Sonar Menu with Sensitivity command selected (left).  
Sensitivity Control Bar (right).

**NOTE:**

If you want to change the sensitivity in Manual Mode, turn off Auto Sensitivity. From the Sonar Page, press **MENU** | **↓** to **AUTO SENSITIVITY** | **ENT** | **↑** to **SENSITIVITY** | **ENT**. Press **↓** or **↑** to pick a different sensitivity setting. When it is set at the desired level, press **EXIT**.

**Tip:**

While you are experimenting and learning, it is possible to scramble the settings so the sonar picture disappears from the screen. If that happens, remember it is easy to switch back to full automatic operation by restoring the factory default settings.

**To Restore Factory Settings**

1. Press **MENU** | **MENU** | **↓** to **SYSTEM SETUP** | **ENT** | **↓** to **RESET OPTIONS** | **ENT**.
2. A reset options confirmation message will appear. Select **YES** and press **ENT**. All options are reset and the unit reverts back to the original settings.

## **Fish Symbols vs. Full Sonar Chart**

You may have noticed in the quick reference we used fish arches in full sonar chart mode for our example and not the popular Fish I.D.<sup>™</sup> fish symbol feature. Here is why.

Fish I.D. is an easier way for a sonar novice to recognize a fishy signal return when he sees it. But locating fish by symbol *only* has some limitations.

Your sonar unit's microprocessor is remarkably powerful, but it can be fooled. Some of the echoes *calculated* to be fish could be tree limbs or turtles. *To see under your boat in maximum detail, we recommend you turn off Fish I.D. and begin learning to interpret fish arches.*

Fish I.D. is most handy when you are in another part of the boat or performing a task that prevents you from watching the sonar screen. While in Fish I.D. mode, you can turn on the audible fish alarm, so when a fish swims under your boat, you will hear it!

Fish I.D. can also be useful when you want to screen out some of the sonar detail. In one case, a fishermen in San Francisco Bay saw clouds of clutter in the water but no fish arches. When a downrigger was pulled up, it brought up several small jellyfish. The fishermen switched his sonar to Fish I.D., which screened out the schools of jellyfish and clearly showed game fish as fish symbols.

## **Other Free Training Aids**

The following section discusses in greater detail, Fish I.D. and fish alarms among other features. If you or a friend has Internet access, you can also learn more about interpreting what you see on your sonar screen. Visit our web site, **[WWW.EAGLESONAR.COM](http://WWW.EAGLESONAR.COM)**. Be sure to check out the free Sonar Tutorial, which includes animated illustrations and more pictures of actual sonar returns, all described in detail. There's even a printer friendly version of the tutorial available on our web site. It makes a great supplement to this operation manual.

For the ultimate training aid, download the free emulator software for your unit. Aside from being fun, the program can help you learn both basic and advanced operations without burning boat fuel! Eagle is the first sonar manufacturer to provide this type of training tool for customers.

This PC application simulates the actual sonar unit on your computer. You can run it from your computer keyboard or use your mouse to press the virtual keys. Easy download and installation instructions are available on our web site.

## Section 4: Sonar Options & Features

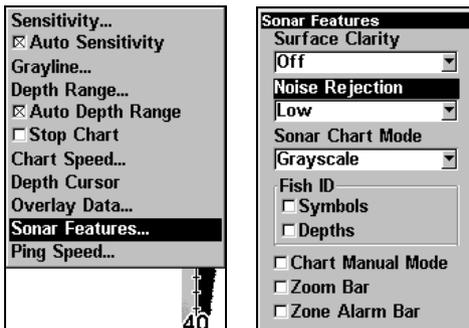
### ASP™ (Advanced Signal Processing)

The ASP™ feature is a noise rejection system built into the sonar unit that constantly evaluates the effects of boat speed, water conditions and interference. This feature automatically gives you the best display possible under most conditions.

The ASP feature is an effective tool in combating noise. In sonar terms, noise is any undesired signal. It is caused by electrical and mechanical sources like bilge pumps, engine vibration, ignition systems, wiring and air bubbles passing over the face of the transducer. In all cases, noise can produce unwanted marks on the display.

The ASP feature has four settings — Off, Low, Medium and High. If you have high noise levels, try using the High ASP setting. If, however, you are having trouble with noise, we suggest you take steps to find the interference source and fix it rather than continually using the unit with a high ASP setting.

There are times when you may want to turn the ASP feature off. This allows you to view all incoming echoes before they are processed by the ASP feature.



Sonar Features selected (left). In the Sonar Features menu, Noise Rejection is selected with ASP in the default low setting (right).

### To change the ASP level:

1. From the Sonar Page, press **MENU** |  $\downarrow$  to **SONAR FEATURES** | **ENT**.
2. Press  $\downarrow$  to **NOISE REJECTION** | **ENT**.
3. Press  $\downarrow$  or  $\uparrow$  to select a setting, then press **ENT**.
4. To return to the previous page, press **EXIT** | **EXIT**.

## Alarms

This unit has three different types of sonar alarms. The first is a Fish Alarm. It sounds when the Fish I.D.<sup>TM</sup> feature determines an echo is a fish.

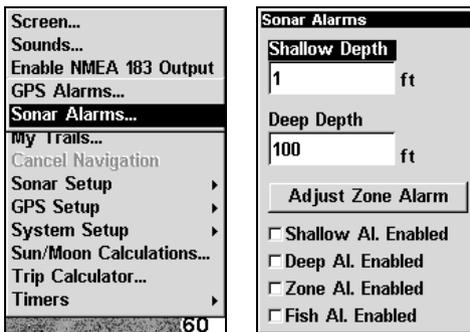
Another alarm is the Zone Alarm, which consists of a bar on the side of the screen. Echoes that appear inside the range of the bar trigger the alarm.

The last alarm setting is the Depth Alarm, which has both a Shallow and a Deep setting. Only the bottom signal will trigger this alarm. This is useful anchor alert, a shallow water alert or for navigation.

### Depth Alarms

The depth alarms sound a tone when the bottom signal goes shallower than the shallow alarm's setting or deeper than the deep alarm's setting. For example, if you set the shallow alarm to 10 feet, the alarm will sound a tone if the bottom signal is less than 10 feet. It will continue to

sound until the bottom goes deeper than 10 feet. The deep alarm works just the opposite. It sounds a warning tone if the bottom depth goes deeper than the alarm's setting. Both depth alarms work only off the digital bottom depth signals. No other targets will trip these alarms. These alarms can be used at the same time or individually.



Sonar Alarms selected from main menu (left).  
The Sonar Alarms menu (right).

#### To adjust and turn on the shallow alarm:

1. Press **MENU | MENU | ↓** to **ALARMS | ENT.**
2. Press **↓** to **SONAR ALARMS | ENT.**
3. Press **↑** or **↓** to **SHALLOW ALARM ENABLED** and press **ENT.**
4. Press **↑** to **SHALLOW DEPTH | ENT.**
5. Use **↑ ↓** to change the first digit, then press **→** to the next digit. Repeat these steps until you have entered the desired depth and press **ENT.**

To switch to a different depth setting, open the Sonar Alarms menu and repeat the instructions in steps 4 and 5 above.

#### To adjust and turn on the deep alarm:

1. Press **MENU | MENU | ↓** to **ALARMS | ENT.**
2. Press **↓** to **SONAR ALARMS | ENT.**

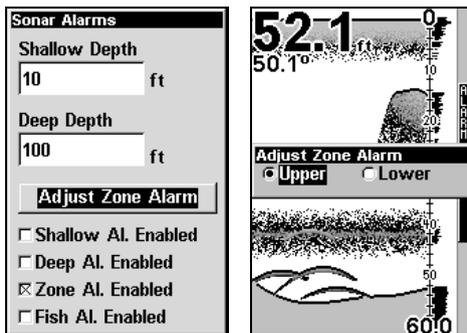
3. Press ↓ to **DEEP ALARM ENABLED | ENT**.
  4. Press ↑ to **DEEP DEPTH** and press **ENT**.
  5. Use ↑ ↓ to change the first digit, then press → to the next digit. Repeat these steps until the desired depth has been input. Press **ENT**.
- To switch to a different depth setting, open the Sonar Alarms menu and repeat the instructions in steps 4 and 5 above.

## Zone Alarm

The zone alarm is triggered when any echo passes inside the zone alarm bar, shown on the right side of the screen.

### To adjust and turn on the zone alarm:

1. Press **MENU | MENU | ↓** to **ALARMS | ENT | ↓** to **SONAR ALARMS | ENT**.
2. Press ↓ to **ZONE ALARM ENABLED | ENT | ↑** to **ADJUST ZONE ALARM | ENT**.



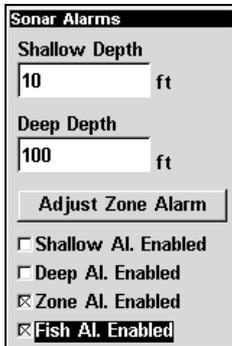
Sonar Alarms menu with Adjust Zone selected (left). Adjust Zone Alarm selection box with Upper selected (right).

3. To set upper boundary for the Zone Alarm, use ← → to select **UPPER**, then press ↑ ↓ to move the top of the bar to the desired depth.
4. To set lower boundary for the Zone Alarm, use ← → to select **LOWER**, then press ↑ ↓ to move the bottom of the bar to the desired depth.
5. Press **EXIT** repeatedly.

To switch to a different depth setting, open the Sonar Alarms menu and repeat the instructions above, beginning with step 2.

## Fish Alarm

Use the fish alarm for a distinctive audible alarm when fish or other suspended objects are detected by the Fish I.D.™ feature (Fish I.D. must be turned on for the Fish Alarm to work). A different tone sounds for each fish symbol size shown on the display.



Sonar Alarms menu with Fish Alarm selected. The check box to the left is checked, indicating the alarm is turned on.

**To turn the fish alarm on:**

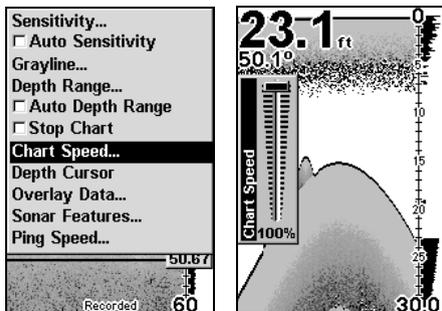
1. Press **MENU | MENU | ↓ | ALARMS | ENT.**
2. Press **↓** to **SONAR ALARMS | ENT.**
3. Press **↓** **FISH ALARM ENABLED** and press **ENT** to turn on (check) the alarm. Press Exit repeatedly to get back to the main page display.

## Chart Speed

The rate that echoes scroll across the screen is called the chart speed. Maximum is the default. We recommend you leave the chart speed at the default setting for most all fishing conditions. You, however, might consider experimenting with chart speed when you are stationary or

drifting very slowly. You may achieve better fish signals when you decrease the chart speed until it matches your speed across the water.

If you are at anchor, ice fishing or fishing from a dock, experiment with a chart speed around 50 percent. If you are drifting slowly, try a chart speed around 75 percent. When you are stationary and a fish swims through the sonar signal cone, the image appears on the screen as a long line instead of a fish arch. Reducing the chart speed may result in a shorter line that more closely resembles a regular fish return.



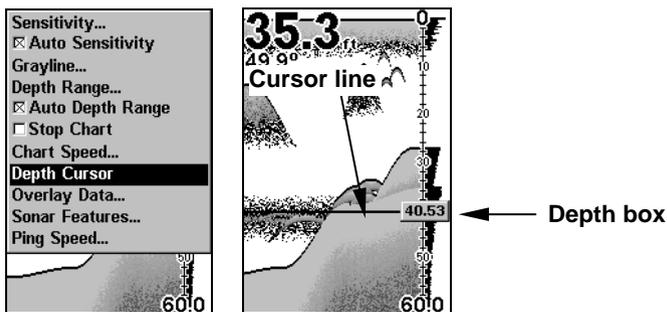
Sonar Page menu with Chart Speed command selected (left).  
Chart Speed Control Bar (right).

If you do experiment with chart speed, remember to reset it to maximum when you resume trolling or moving across the water at a higher speed. To change chart speed:

1. From the Sonar Page, press **MENU** | ↓ to **CHART SPEED** | **ENT**.
2. The Chart Speed Control Bar appears. Press ↓ to decrease chart speed. Press ↑ to increase chart speed.
3. When it is set at the desired level, press **EXIT**.

## Depth Cursor

The depth cursor consists of a horizontal line with a digital depth box on the right side. The numbers inside the box show the depth of the cursor.



Sonar Page menu with Depth Cursor command selected (left). Sonar chart with the depth cursor active (right). The line indicates the large fish is 40.53 feet deep.

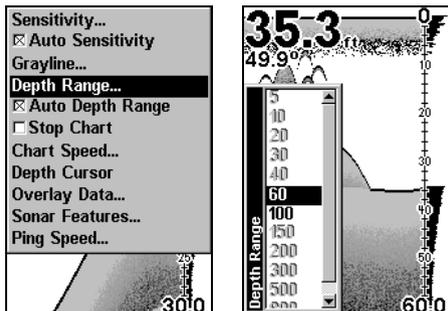
The cursor can be moved to any location on the screen, allowing you to pinpoint the depth of a target.

1. From the Sonar Page, press **MENU** | **↓** to **DEPTH CURSOR** | **ENT**.
2. The depth cursor appears. Press **↓** to lower the cursor line. Press **↑** to raise the cursor line.
3. To clear the depth cursor press **EXIT**.

## Depth Range - Automatic

When turned on for the first time, the bottom signal is automatically placed in the lower half of the screen. This is called Auto Ranging and is part of the automatic function. Depending upon the bottom depth and current range, you can change the range to a different depth.

1. From the Sonar Page, press **MENU** | **↓** to **DEPTH RANGE** | **ENT**.



Sonar Page menu with Depth Range command selected (left). The Depth Range Control Scale (right).

2. The Depth Range Control Scale appears. Press  $\uparrow$  or  $\downarrow$  to select a different depth range. A dark bar highlights the selected range. Range numbers in gray cannot be selected.
3. When the new range is selected, press **EXIT** to close the menu.

## Depth Range - Manual

You have complete control over the range when the unit is in the manual mode. There are 12 depth ranges, from 5 feet to 800 feet.

### To switch to Manual Depth Range:

1. Turn off automatic depth range. From the Sonar Page, press **MENU** |  $\downarrow$  to **AUTO DEPTH RANGE** | **ENT**.
2. Press  $\uparrow$  to **DEPTH RANGE** | **ENT** and the Depth Range Control Scale appears.
3. Press  $\downarrow$  or  $\uparrow$  to select a different depth range. A horizontal dark bar highlights the selected range.
4. When the new range is selected, press **EXIT** to close the menu.

### To turn Auto Depth Range on again:

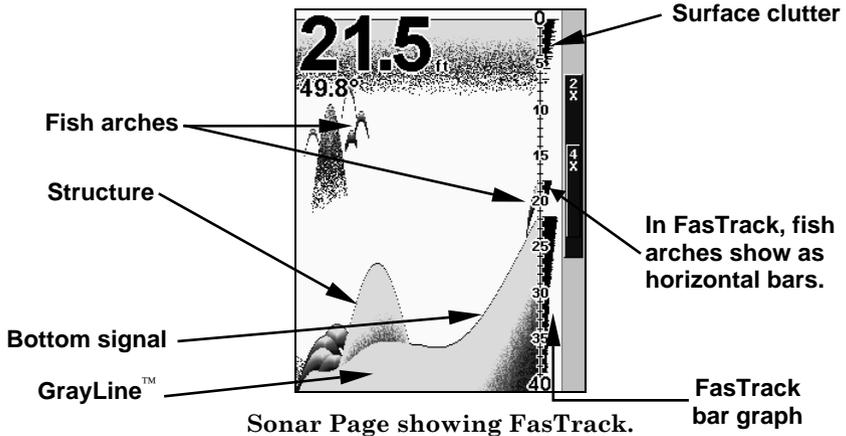
1. From the Sonar Page, press **MENU** |  $\downarrow$  to **AUTO DEPTH RANGE** | **ENT** | **EXIT**.

## NOTE:

The sonar's depth capability depends on transducer installation, water and bottom conditions, among other factors.

## FasTrack™

This feature automatically converts all echoes to short horizontal lines on the right side of the screen. The graph on the rest of the screen continues to operate normally. FasTrack gives you a rapid update of conditions directly under the boat. This makes it useful for ice fishing or when you are fishing at anchor.



When the boat is not moving, fish signals are long, drawn out lines on a normal chart display. FasTrack converts the graph to a vertical bar graph that, with practice, is useful for stationary fishing.

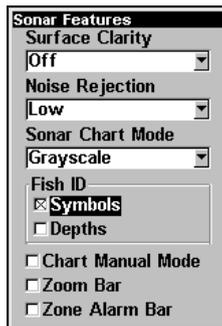
## Fish I.D.™ (Fish Symbols & Depths)

The Fish I.D. feature identifies targets that meet certain conditions as fish. The microcomputer analyzes all echoes and eliminates surface clutter, thermoclines and other undesirable signals. In most instances, remaining targets are fish. The Fish I.D. feature displays fish symbols

on the screen in place of the actual fish echoes. There are several fish symbol sizes. These are used to designate the relative size between targets. In other words, Fish I.D. displays a small fish symbol when it thinks a target is a small fish, a medium fish symbol on a larger target and so on.

The sonar's microcomputer is sophisticated, but can be fooled. It can not distinguish between fish and other suspended objects such as trot-lines, turtles, submerged floats, air bubbles, etc. Individual tree limbs extending outwards from a group of limbs is the most difficult object for Fish I.D. to distinguish from fish. You may see fish symbols on the screen when actually, there are no fish. The reverse is also true.

Does that mean Fish I.D. is broken? No — the feature is interpreting sonar returns in a specific way to help take some of the work out of reading the screen. Remember: Fish I.D. is one of many tools we provide so you can analyze your sonar returns for maximum fish finding information. This and other features can help you successfully see beneath the boat under varied water and fishing conditions. So practice with the unit with and without Fish I.D. mode to become more familiar with the feature. The default for Fish I.D. is off.



**Sonar Features menu with Fish I.D. Symbols selected.  
When the check box to the left is checked, the feature is on.**

## To turn the Fish I.D. feature on:

1. From the Sonar Page, press **MENU** | ↓ to **SONAR FEATURES** | **ENT**.
2. Press ↓ to **FISH ID SYMBOLS** | **ENT** | **EXIT** | **EXIT**.

To turn off Fish I.D., repeat these instructions.

## FishTrack™

The FishTrack feature shows the depth of a fish symbol when it appears on the display. This lets you accurately gauge the depth of targets. This feature is available only when the Fish I.D. feature is on. The default setting for FishTrack is off.

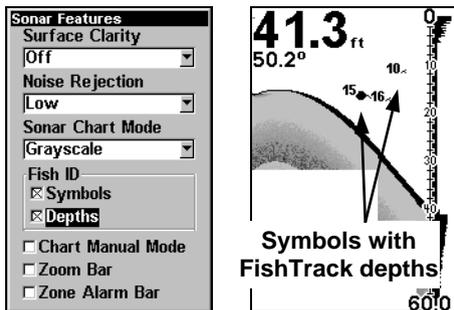
## To turn on FishTrack:

### NOTE:

These instructions will turn on FishTrack *and* Fish I.D. at the same time.

1. From the Sonar Page, press **MENU** | ↓ to **SONAR FEATURES** | **ENT**.
2. Press ↓ to **FISH ID DEPTHS** | **ENT** | **EXIT** | **EXIT**.

To turn off FishTrack, repeat these instructions. Turning off FishTrack in this manner will not turn off Fish I.D. symbols.



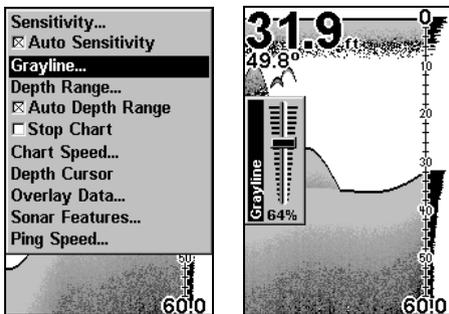
Sonar Features menu with Fish I.D. Depths selected (left). Sonar Page showing Fish I.D. symbols and FishTrack depths turned on (right).

## Grayline®

Grayline lets you distinguish between strong and weak echoes. It paints gray on targets that are stronger than a preset value. This allows you to tell the difference between a hard and soft bottom. For example, a soft, muddy or weedy bottom returns a weaker signal, which is shown with a narrow gray line or no gray line at all. A hard bottom returns a strong signal, which causes a wide gray line.

If you have two signals of equal size, one with gray and the other without, then the target with gray is the stronger signal. This helps distinguish weeds from trees on the bottom, or fish from structure.

Grayline is adjustable. Experiment with your unit to find the Grayline setting that's best for you.



Sonar Page menu with GrayLine command selected (left).  
The GrayLine control bar (right).

### To adjust the Grayline level:

1. From the Sonar Page, press **MENU** | ↓ to **GRAYLINE** | **ENT**.
2. The Grayline Control Bar appears. Press ↓ to decrease Grayline. Press ↑ to increase Grayline.
3. When it's set at the desired level, press **EXIT**.

# HyperScroll™

See the entry on Ping Speed, which controls the HyperScroll feature.

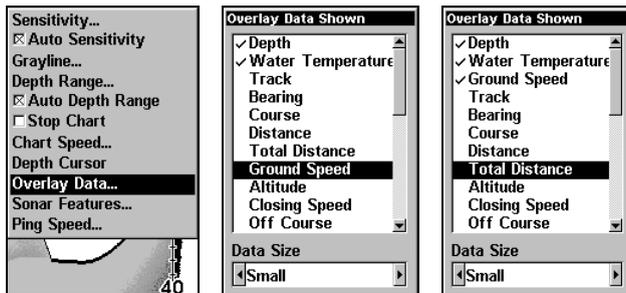
## Noise Rejection

See the entry on Advanced Signal Processing in this section.

## Overlay Data

To change the digital data shown on top of the sonar page:

1. Press **MENU** | ↓ to **OVERLAY DATA** | **ENT**.
2. Press ↓ or ↑ to select *Data Type*, then use ← → to turn on the data type and select its desired size — Small, Medium, Large or Enormous. Data Size is displayed in the bottom of the Overlay Data Shown window and may be changed using the ← → keys.



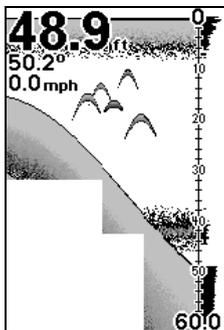
**Overlay Data** command on the Sonar Menu (left). **Overlay Data Shown** selection menu (center). In this example, we scrolled down the data list to highlight **Ground Speed**. It will be displayed in a small size. Data list with **Total Distance** selected (right).

After you have selected the data and the size you want, you can use ↓ ↑ to select other Data Types for display.

3. To return to the previous page, press **EXIT**.

### To turn off displayed data:

1. Press **MENU** | ↓ to **OVERLAY DATA** | **ENT**.
2. Press ↓ or ↑ to select *Data Type*, then press ← → until the checkmark next the selected data type disappears. After you have turned off the data type, you can use ↓ ↑ to select another data type.
3. To return to the previous page, press **EXIT**.



Sonar chart with Overlay Data turned on. This example shows Depth, Water Temperature and the Ground Speed of the boat.

## Ping Speed & HyperScroll™

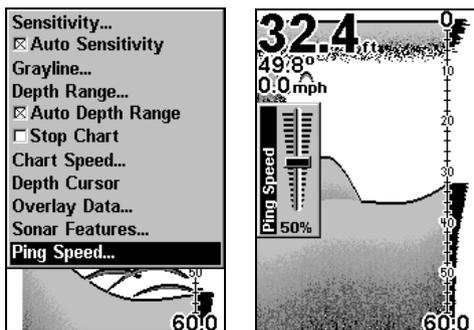
Ping Speed controls the rate at which the transmitter and transducer broadcast sonar sound waves — pings — into the water. The unit has a default ping speed of 50 percent. At normal boating speeds, this automatically provides enough return echoes to refresh the screen and scroll the chart at maximum chart speed.

But when you are running at high speeds or just want the fastest possible screen update, you may want to use the HyperScroll™ feature. When you change the Ping Speed to any setting greater than 50 percent, the unit automatically enters HyperScroll mode.

These faster ping rates allow you to maintain a high-detail picture on the screen.

The increased ping rate allows the screen refresh rate and chart scroll speed to keep pace with the boat as it moves quickly over the water.

When using HyperScroll, you may also need to manually decrease the sensitivity for optimum performance. Depending on water depth and other conditions, HyperScroll may cause a second bottom echo to return to the transducer during the next ping cycle or sounding. This can result in a large amount of clutter appearing on the screen. If this occurs, just decrease the sensitivity to a level that eliminates the clutter. When you turn HyperScroll off, you can return to your original sensitivity level.



Sonar Menu with Ping Speed command selected (left).  
Ping Speed Control Bar at default setting (right).

### To change Ping Speed:

1. From the Sonar Page, press **MENU** | **↓** to **PING SPEED** | **ENT**.
2. The Ping Speed Control Bar appears. Press **↑** to increase ping speed. Press **↓** to decrease ping speed. When it is set at the desired level, press **EXIT**.

### To turn off HyperScroll:

1. From the Sonar Page, press **MENU** | **↓** to **PING SPEED** | **ENT**.
2. The Ping Speed Control Bar appears. Press **↓** to decrease ping speed to 50 percent. When it is set at the desired level, press **EXIT**.

When you boost ping speed and switch into HyperScroll, the width of the FasTrack bar graph display doubles in width at the right side of the screen. This allows you to better see the virtually instantaneous sonar returns, just as you would on a flasher sonar unit. For more information on FasTrack, see it's entry in this section.

## Reset Options

This command is used to reset all features, options and settings to the factory defaults. This is useful when you have changed several settings and want to return the unit to basic automatic operation.

1. Press **MENU | MENU | ↓** to **SYSTEM SETUP | ENT | ↓** to **RESET OPTIONS | ENT**.
2. A confirmation message will appear. Select **Yes** and press **ENT**.
3. All the menus are cleared and all options return to factory settings.



System Menu with Reset Options command selected.

## Sensitivity & Auto Sensitivity

The sensitivity controls the ability of the unit to pick up echoes. Sensitivity can be adjusted, because water conditions vary greatly. A low sensitivity level (from zero to 50 percent) excludes much of the bottom information, fish signals and other target information.

High sensitivity levels let you see this detail, but it can also clutter the screen with many undesired signals. Typically, the best sensitivity level shows a good solid bottom signal with Grayline and some surface clutter.

### **Automatic Sensitivity**

The default sensitivity mode is automatic. The unit bases the sensitivity level on water depth and conditions. When the unit is in the automatic mode, sensitivity is automatically adjusted to keep a solid bottom signal displayed, plus a little more power. This gives it the capability to show fish and other detail.

Situations occur, however, when it becomes necessary to increase or decrease the sensitivity. This typically happens when you wish to see more detail, so an increase in sensitivity is necessary or when wave action and boat wakes create tiny air bubbles that clutter the water column. In that case, a decrease in sensitivity is needed to reduce some of the clutter.

In automatic mode you can adjust sensitivity up to 100 percent, but the unit will limit your *minimum* setting. It will continue to make small adjustments, allowing for the setting you selected.

In manual mode, you have *complete* control over sensitivity with the ability to set it anywhere from zero to 100 percent. Once you select a level in manual mode, the unit will continue to use that sensitivity setting until it is modified or until the unit is put back into auto mode.

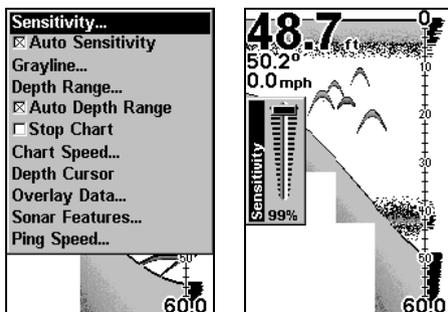
### **To adjust sensitivity in auto mode:**

1. Press **MENU | ENT**.
2. The Sensitivity Control Bar appears. Press ↓ to decrease sensitivity. Press ↑ to increase sensitivity. When it is set at the desired level, press **EXIT**. (When you reach the maximum or minimum limit, a tone sounds.)

### **Tip:**

For quicker sensitivity adjustments, try leaving the Sensitivity Control Bar on the screen as the chart scrolls. You can see the

changes on the screen as you press the up or down arrows. This is handy when there is a lot of clutter in the water and you are matching the sensitivity to rapidly changing water conditions.



Sonar Menu with Sensitivity command selected (left).  
The Sensitivity Control Bar (right).

### To adjust sensitivity in manual mode:

1. First, turn off Auto Sensitivity. From the Sonar Page, press **MENU** | **↓** to **AUTO SENSITIVITY** | **ENT**.
2. Press **↑** to **SENSITIVITY** | **ENT** and the Sensitivity Control Bar appears. Press **↓** or **↑** to pick a different sensitivity setting. When it is set at the desired level and press **EXIT**.

### NOTE:

To return to the original factory setting for Auto Sensitivity, see the entry in this section on Reset Options. If sensitivity is in manual mode, the Reset Options command will switch back to Auto and reset the factory setting at the same time.

## Set Keel Offset

This unit measures water depth from the face of the transducer. Since the transducer is installed below the water surface, the distance displayed by the digital depth, chart depth scale, chart cursor or fish symbols is *not* the exact water depth.

If the transducer is 1 foot below the surface and the screen shows the water depth as 30 feet, then the actual depth is 31 feet.

On sailboats or other large vessels with deep drafts, the distance between the transducer installation and the keel or lower engine unit can be several feet. In those cases, an inexact depth reading could result in grounding or striking underwater structure. The Keel Offset feature eliminates the need for the navigator to mentally calculate how much water is under his keel.

Keel Offset lets you calibrate the digital depth indicators: chart depth scale, chart cursor depth and fish symbol depth displayed on the screen. To calibrate the depth indicators, measure the distance from the face of the transducer to the lowest part of the boat. In this example, we will use 3.5 feet. We enter this as a *negative* 3.5 feet, which makes the depth indicators perform as if the transducer is lower in the water than it really is.

1. Press **MENU | MENU | ↓** to **SONAR SETUP | ENT.**
2. Select **SET KEEL OFFSET** and press **ENT.**
3. The Keel Offset dialog box appears. Press **↓** so the displayed number shows a minus (–) sign instead of the plus (+) sign.
3. To change the next digit, press **→** then use **↑ ↓** to enter 3. Move to the next digit and enter 5, then press **EXIT.** The depth indicators now accurately show the depth of water beneath the keel as -3.5.

**NOTE:**

If knowing the exact depth of water beneath the keel is less important, you can calibrate the depth indicators so they show actual water depth from surface to bottom. To do this, measure the distance from the face of the transducer to the surface (the water line on the boat). In this example, we will use 1.5 feet. This will be entered as a *positive* 1.5 feet, which makes the depth indicators perform as if the transducer is higher in the water than it really is.

1. Press **MENU | MENU | ↓** to **SONAR SETUP | ENT.**
2. Select **SET KEEL OFFSET** and press **ENT.**
3. The Keel Offset dialog box appears. Press **↓** so the displayed number shows a plus (+) sign instead of the minus (-) sign.
3. To change the next digit, press **→** then use **↑ ↓** to enter 1. Move to the next digit and enter 5, then press **EXIT.** The depth indicators now accurately show the waterline as 1.5 feet above the transducer.

## Sonar Color Mode

The default color scheme for the sonar chart is grayscale, but we offer other variations to suit your viewing preferences. You can select the chart to be displayed in reverse grayscale, bottom black or FishReveal mode. (For more information on FishReveal, see the entry on that topic elsewhere in this section.)

**To change the chart mode color scheme:**

1. From the Sonar Page, press **MENU | ↓** to **SONAR FEATURES | ENT.**
2. Press **↓** to **SONAR CHART MODE | ENT.**
3. Press **↓** or **↑** to *Mode Name* | **ENT.**
4. Press **EXIT | EXIT** to return to the Sonar Page.

## Sonar Page & Sonar Chart Display Options

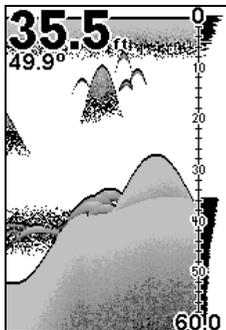
The Cuda 250 offers three Sonar chart display options. To choose one, press **EXIT** to clear any menus, then press **PAGES** and use the **↑ ↓** keys to select the desired mode.

### Full Sonar Chart

This is the default mode used when the Sonar is turned on for the first time or when it is reset to the factory defaults. The bottom signal scrolls across the screen from right to left. Depth scales on the right side of the screen aid in determining depth of targets. The line at the top of the screen represents the surface.

The bottom depth and surface temperature (if the unit is equipped with a temperature sensor or a transducer with a temp sensor built in) show at the top left corner of the screen.

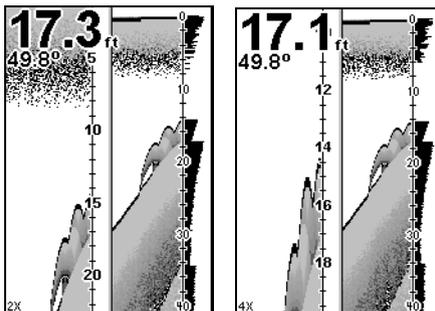
The FasTrack™ display shows just to the right of the scale. This changes all echoes into short horizontal bars, replicating a flasher sonar. The zoom bar on the far right shows the area that is zoomed when the zoom is in use. (See the Zoom section for more information.)



**Full Sonar Chart. The Overlay Data (depth and water temperature) are set to a different text size.**

### **Split Zoom Sonar Chart**

A split chart shows the underwater world from the surface to the bottom on the right side of the screen. The left side shows an enlarged version of the right side. The zoom range shows at the bottom left corner of the screen.



**Split Zoom Sonar Chart.** First image (left) shows the left window zoomed to 2X. The second image (right) shows the left window zoomed to 4X. The depth overlay data is set to the default large text size. The water temperature is set to the medium text size.

The water temperature is set to the medium text size.

### Digital Data/Chart

This mode shows nine digital boxes or windows containing (by default): Water Depth, Water Temp, Position Error, Bearing, Distance, Speed, Travel Time, Track and Off Course.

Depth	
<b>46.2</b> ft	
W Temp	Speed
50.1 °F	47.0 mph
Pos Error	Track
--- ft	22° mag
Bearing	Off Course
22° mag	31 L ft
Distance	Travel Time
28.11 mi	0:35:53

**Digital Data/Chart**

## Sonar Simulator

This unit has a built-in simulator that will allow you to practice as though you were on the water. All sonar features and functions will be useable during a simulation. When in simulator mode, you will see [Simulator Mode] in the Sonar Page title bar. To use the simulator:

1. From the Sonar Page, press **MENU | MENU | ↓** to **SONAR SETUP | ENT**.
2. Select **SONAR SIMULATOR ON** and press **ENT**. If you want to simulate your position, highlight **SIMULATE POSITION** and press **ENT**, which will turn on the GPS Simulator.

### NOTE:

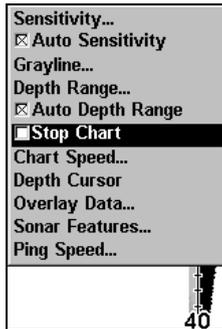
If you turn on your unit before attaching a transducer, it may enter a demo mode. The words demo mode flash on the bottom of the screen and a sonar chart will play. Unlike the simulator, the demo mode is for demonstration only and will automatically stop as soon as you turn on the unit with a transducer attached. The simulator will continue to function normally.

## Stop Chart

If you are running multiple units on a boat, there are times when you may want to turn off the sonar. This command turns off the sonar and stops the chart from scrolling. Sonar restarts automatically each time you turn on your unit.

Press **MENU | ↓** to **STOP CHART | ENT | EXIT**.

To turn the sonar on again, repeat the step above.



Sonar Menu with Stop Chart selected. The box is unchecked, indicating the chart is scrolling across the screen.

## Surface Clarity

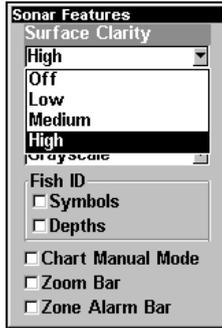
The onscreen marks scattered at the top of the sonar chart are known as surface clutter. They are caused by wave action, boat wakes, temperature inversion and more.

The surface clarity control reduces or eliminates surface clutter signals from the display. It does this by changing the sensitivity of the receiver, decreasing it near the surface and gradually increasing it as the depth increases.

There are four levels of surface clarity available: off, low, medium or high. The default level is off.

### To adjust the Surface Clarity level:

1. From the Sonar Page, press **MENU** | **↓** to **SONAR FEATURES** | **ENT** | **ENT**.
2. Press **↓** **↑** to select *clarity level*, then press **EXIT** repeatedly to get back to the main page display.



Sonar Features menu with Surface Clarity selected.

## Zoom & Zoom Bar

The Zoom in key is used to enlarge small detail, fish signals and the bottom with its associated structure.

The 2X zoom doubles the size of all echoes on the screen. The 4X zoom quadruples the size of the echoes. You can also turn on a zoom bar on the far right side of the screen. This shows which echoes will be displayed on the screen when the Zoom commands are used.

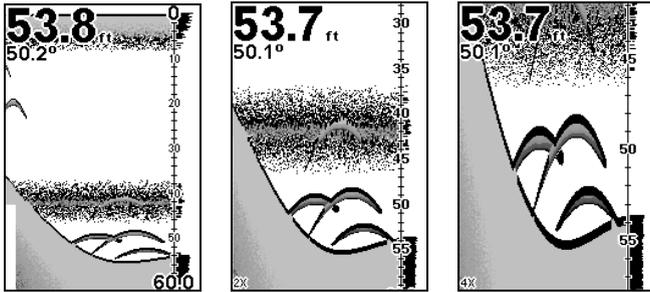
For example, turning on the 2X zoom will show all echoes that are between the top and bottom of the 2X zoom bar. The 4X zoom will show only the echoes between the top and bottom of the 4X zoom bar.

### To switch the zoom:

1. Press **ZIN** to increase the zoom display to 2X. Press **ZIN** again for a 4X zoom.
2. Press **ZOUT** to reduce the zoom and show more of the chart.

### To turn on the Zoom Bar:

1. Press **MENU** | **↓** to **SONAR FEATURES** | **ENT**.
2. The Sonar Features menu appears. Press **↓** to **ZOOM BAR** | **ENT** | **EXIT** | **EXIT**.
3. To turn off the Zoom Bar, repeat steps 1 and 2.



Sonar Page with normal view (left). Sonar page with view zoomed to 2X (middle). Sonar page with view zoomed to 4X (right)

## Zoom Pan

Your unit has the ability to quickly zoom in on any portion of the water column with just the touch of an arrow key. The Zoom Pan feature lets you rapidly move the zoomed area up and down to different depths. By pointing your zoom at different portions of the chart, you can get a good, close-up look at structure or cover below you.

To use Zoom Pan, switch to a manual depth Range setting (see page 49) and turn on 2X or 4X Zoom. Then use the  $\uparrow$   $\downarrow$  keys to pan up and down the water column.

## Section 5: Sonar Troubleshooting

If your unit is not working, or if you need technical help, please use the following troubleshooting section before contacting the factory customer service department. It may save you the trouble of returning your unit for repair. For contact information, refer to the last page, just inside the back cover of this manual.

### **Unit won't turn on:**

1. Check the power cable's connection at the unit. Also check the wiring.
2. Make certain the power cable is wired properly. The red wire connects to the positive battery terminal, black to negative or ground.
3. Check the fuse.
4. Measure the battery voltage at the unit's power connector. It should be at least 11 volts. If it isn't, the wiring to the unit is defective, the battery terminals or wiring on the terminals are corroded, or the battery needs charging.

### **Unit operates only in demo mode:**

The transducer or antenna module has not yet been connected or has been disconnected. To leave demo mode, make sure that either the transducer or the antenna is securely connected before turning the unit on.

### **Unit freezes, locks up or operates erratically:**

1. Electrical noise from the boat's motor, trolling motor, or an accessory may be interfering with the sonar unit. Rerouting the power and transducer cables away from other electrical wiring on the boat may help. Route the sonar unit's power cable directly to the battery instead of through a fuse block or ignition switch
2. Inspect the transducer cable for breaks, cuts, or pinched wires.
3. Check both the transducer and power connectors. Make certain both are securely plugged in to the unit.

### **Weak bottom echo, digital readings erratic or no fish signals:**

1. Make sure the transducer is pointing straight down. Clean the face of the transducer. Oil, dirt and fuel can cause a film to form on the transducer, reducing its effectiveness. If the transducer is mounted inside the hull, be sure it is shooting through only one layer of fiberglass and that it is securely bonded to the hull. Use only LEI epoxy.

2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display.

3. The water may be deeper than the sonar's ability to find the bottom. If the sonar can't find the bottom signal while it's in the automatic mode, the digital sonar display will flash continuously. It may change the range to limits far greater than the water you are in. If this happens, place the unit in the manual mode, then change the range to a realistic one, (for example, 0-100 feet) and increase the sensitivity. As you move into shallower water, a bottom signal should appear.

4. Check the battery voltage. If the voltage drops, the unit's transmitter power also drops, reducing its ability to find the bottom or targets.

### **Bottom echo disappears at high speeds or erratic digital reading or weak bottom echo while boat is moving**

1. The transducer may be in turbulent water. It must be mounted in a smooth flow of water in order for the sonar to work at all boat speeds. Air bubbles in the water disrupt the sonar signals, interfering with its ability to find the bottom or other targets. The technical term for this is cavitation.

2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display.

Try using resistor spark plugs or routing the sonar unit's power and transducer cables away from other electrical wiring on the boat.

### **No fish arches when the Fish I.D. feature is off:**

1. Make sure the transducer is pointing straight down. This is the most common problem if a partial arch is displayed.
2. The sensitivity may not be high enough. In order for the unit to display a fish arch, it has to be able to receive the fish's echo from the time it enters the cone until it leaves. If the sensitivity is not high enough, the unit shows the fish only when it is in the center of the cone.
3. Use the Zoom feature. It is much easier to display fish arches when zoomed in on a small range of water than a large one. For example, you will have much better luck seeing fish arches with a 30 to 60 foot range than a 0 to 60 foot range. This enlarges the targets, allowing the display to show much more detail.
4. The boat must be moving at a slow trolling speed to see fish arches. If the boat is motionless, fish stay in the cone, showing on the screen as straight horizontal lines.

### **NOISE**

A major cause of sonar problems is electrical noise. This usually appears on the sonar's display as random patterns of dots or lines. In severe cases, it can completely cover the screen with black dots, or cause the unit to operate erratically, or not at all.

To eliminate or minimize the effects of electrical noise, first try to determine the cause. With the boat at rest in the water, the first thing you should do is turn all electrical equipment on the boat off. Make sure the engine is also off. Turn your sonar on, then turn off Noise Reject [also known as the ASP feature (Advanced Signal Processing)]. Sensitivity should be set at 90-95 percent. There should be a steady bottom signal on the display. Now turn on each piece of electrical equipment on the boat and view the effect on the sonar's display. For example, turn

on the bilge pump and view the sonar display for noise. If no noise is present, turn the pump off, then turn on the VHF radio and transmit. Keep doing this until all electrical equipment has been turned on, their effect on the sonar display noted, then turned off.

If you find noise interference from an electrical instrument, trolling motor, pump, or radio, try to isolate the problem. You can usually reroute the sonar unit's power cable and transducer cable away from the wiring that is causing the interference. VHF radio antenna cables radiate noise when transmitting, so be certain to keep the sonar's wires away from it. You may need to route the sonar unit's power cable directly to the battery to isolate it from other wiring on the boat.

If no noise displays on the sonar unit from electrical equipment, then make sure everything except the sonar unit is turned off, then start the engine. Increase the RPM with the gearshift in neutral. If noise appears on the display, the problem could be one of three things; spark plugs, alternator, or tachometer wiring. Try using resistor spark plugs, alternator filters, or routing the sonar unit's power cable away from engine wiring. Again, routing the power cable directly to the battery helps eliminate noise problems. Make sure to use the in-line fuse supplied with the unit when wiring the power cable to the battery.

When no noise appears on the sonar unit after all of the above tests, then the noise source is probably cavitation. Many novices or persons with limited experience make hasty sonar installations which function perfectly in shallow water, or when the boat is at rest. In nearly all cases, the cause of the malfunction will be the location and/or angle of the transducer. The face of the transducer must be placed in a location that has a smooth flow of water at all boat speeds. Read your transducer owner's manual for the best mounting position.

## Section 6: Basic GPS Operations

This section addresses the unit's *most basic* GPS operations. Sec. 7, *Advanced GPS Operations*, will discuss other more advanced functions and utilities.

Before you turn on the Cuda 250 and find where you are, it is a good idea to learn about the different keys, the five GPS Pages and how they all work together. BUT, if you just can't wait to get outside, turn to the one-page **Quick Reference** on page 99.

### Keyboard



**Eagle Cuda 250 S/Map.**

1. **PWR** – The power key turns the unit on and off and activates the backlight.
2. **PAGES** – Use in conjunction with the arrow keys, the Pages key switches the unit between the different GPS Page screens.
3. **MENU** – Press this key to show the menus and submenus, which allow you to select a command or adjust a feature. This also accesses search functions for streets and intersections.

4. **ARROW KEYS** – These keys are used to navigate through the menus, make menu selections, move the map cursor and sonar chart cursor and enter data.

5. **ENT** – The Enter key allows you to save data, accept values or execute menu commands. It is also used to create event marker icons.

6. **EXIT** – The Exit key lets you return to the previous screen, clear data or close a menu.

7. **WPT** – The Waypoint key is used to save and recall waypoints, search for waypoints and access the waypoint list. It's also involved in some navigation functions.

8. **ZOUT** (Zoom Out) – This key lets you zoom out the screen. On the Sonar Page, it will allow you to see the full sonar chart display, showing the entire water column from surface to bottom. On the Full Map display, this lets you see a larger geographic area on the display. Less detail is seen as you zoom out.

9. **ZIN** (Zoom In) – This key lets you zoom in the screen. On the Sonar Page, it enlarges fish signals and bottom detail. On the Full Map display, zooming in lets you see greater detail in a smaller geographic area on the display.

## **Power/lights on and off**

To turn on the unit, press **PWR**. When the unit is powered up, the Full Map GPS Page will be displayed. To switch between Sonar and Map page options, press **PAGES** | ← →. To select a page, press ↓ ↑ to the *Page Name* | **ENT**.

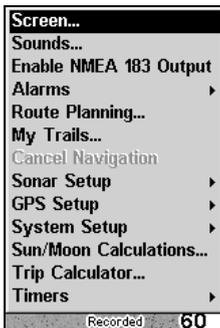
To turn on the backlight, press **PWR** again. The unit has four backlight levels to select from. Repeatedly pressing **PWR** will cycle through the backlight settings and turn off the backlight.

Turn off the unit by pressing and holding the **PWR** key for 3 seconds.

## Main Menu

The Cuda 250 has a Main Menu, which contains function commands and setup option commands. The instructions in this section will deal with functions, the basic commands that make the Cuda 250 do something. The unit will work fine for this right out of the box with the default settings. But, if you want to learn about the various options, see Sec. 8, *System Setup and GPS Setup Options*.

You can access the Main Menu from any of the display options by pressing **MENU | MENU**. To clear the menu screen and return to the page display, press **EXIT**.



Main Menu.

The Main Menu commands and their functions are:

**Screen:** changes the contrast or brightness of the display screen.

**Sounds:** enables or disables the sounds for key strokes and alarms and sets the alarm style.

**Enable NMEA 183 Output:** enables NMEA 0183 output and disables temperature 2, water speed and water distance. For more information, see Cuda addendum, part number 988-0152-082.

**Alarms:** turns GPS or sonar alarms on or off and changes alarm thresholds.

**Route Planning:** used to plan, view or navigate a route.

**My Trails:** shows, hides, creates and deletes plot trails. Also used to navigate or backtrack a trail.

**Cancel Navigation:** turns off the various navigation commands. Used to stop navigating after you have reached your destination.

**Sonar Setup:** sets various sonar options.

**GPS Setup:** sets various GPS receiver options.

**System Setup:** sets general configuration options.

**Sun/Moon Calculations:** finds the rising and setting time of the sun and the moon.

**Trip Calculator:** shows trip status and statistics.

**Timers:** controls the up timer, down timer and alarm clock settings.

## **Pages**

The unit has two Pages categories, one for each of the two major operating modes: Sonar and GPS. The categories are the Map Page and the Sonar Page. Each Page category has its own display options. They are accessed by pressing **PAGES**, then using ← → to select either Map or Sonar. To select a page display use ↑ ↓ to select the desired page and press **ENT**.



Pages Menu, showing Map display options.

### Sonar Page

The Sonar Page displays the sonar chart, a view of the water column from the surface to the bottom. The chart scrolls across the screen from right to left, displaying signal echoes that represent fish, structure and the bottom. The Sonar Page is discussed in detail in Sec. 3. To get to the Sonar Page press **PAGES** | → to **SONAR** | **EXIT**.

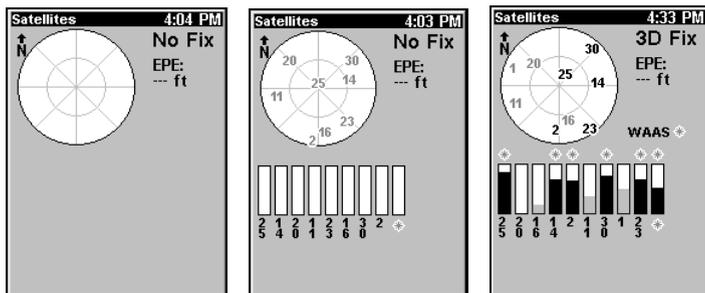
### Satellite Status Page

The Satellite Status GPS Page provides detailed information on the status of the Cuda's satellite lock-on and position acquisition. To get to the Satellite Status Page press **PAGES** | ← to Map | ↓ to **SATELLITES** | **EXIT**.

No matter what Page display you are on, a flashing current position indicator/question mark symbol and flashing GPS data displays indicate satellite lock has been lost and no position has been acquired. The Satellite Status Page shows you the quality and accuracy of the current satellite lock-on and position calculation.

### WARNING:

**Do not begin navigating with this unit until the numbers have stopped flashing!**



**Satellite Page. First page (left) indicates unit has not locked on to any satellites and does not have a fix on its position. The second page (center) shows satellites being scanned. The last page (right) shows satellite lock-on with a 3D position.**

The Satellite Page screen shows a graphical view of satellites the unit is tracking. A satellite is shown on the circular chart relative to your position. The point in the center of the chart is directly overhead. The small inner ring represents 45° above the horizon and the large ring represents the horizon. North is at the top of the screen. You can use this to see which satellites are obstructed by obstacles in your immediate area, if the unit is facing north.

The GPS receiver is tracking satellites that are in gray. The receiver has not locked onto a satellite if the number is black, therefore it isn't being used to resolve the position.

Beneath the circular graph are the bar graphs, one for each satellite in view. Since the unit has twelve channels, it can dedicate one channel per visible satellite. The taller the bar on the graph, the better the unit is receiving the signals from the satellite.

The Estimated Position Error (horizontal position error) shown in the upper right corner of the screen is the expected error from a benchmark location. In other words, if the EPE shows 50 feet, then the position shown by the unit is estimated to be within 50 feet of the actual location. This also gives you an indicator of the fix quality the unit cur-

rently has. The smaller the position error number, the better (and more accurate) the fix is. If the position error flashes dashes, then the unit hasn't locked onto the satellites, and the number shown isn't valid.

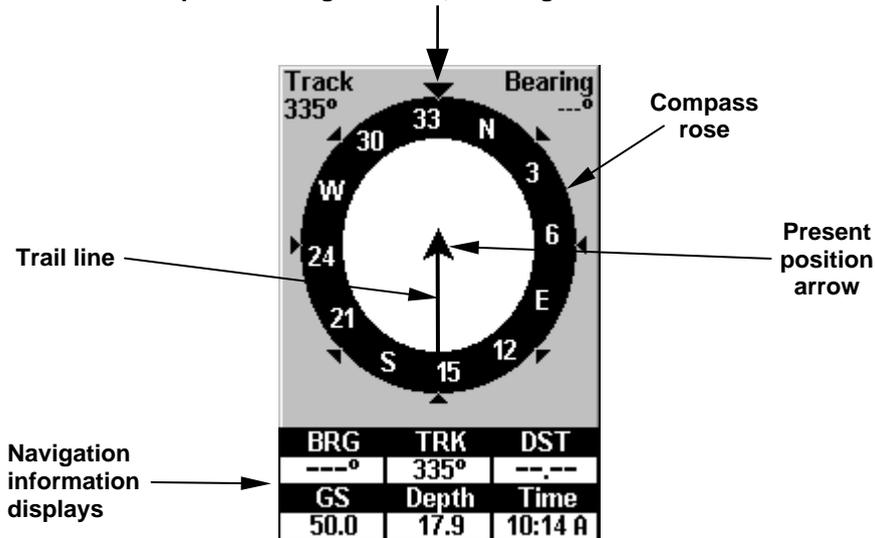
The Satellite Status Page has its own menu, which is used for setting various options. (Options and setup are discussed in Sec. 8.) To access the Satellite Status Page Menu, from the Status Page, press **MENU**.

### **Navigation Page**

This screen has a compass rose that not only shows your direction of travel, but also the direction to a recalled waypoint. To get to the Navigation Page press **PAGES** | ← to **MAP** | ↑ ↓ to **NAVIGATION** | **EXIT**.

The navigation screen looks like the one below when you are *not* navigating to a waypoint or following a route or trail. Your position is shown by an arrow in the center of the screen. Your trail history —path you've just taken — is depicted by the line extending from the arrow. The arrow pointing down at the top of the compass rose shows your current track (direction of travel).

Track or compass heading indicator, showing direction of travel



Navigation Page, recording a trail, traveling north. The page looks like this when the unit is not navigating to a waypoint, following a route, or backtracking a trail.

When navigating to a waypoint, the Navigation screen looks like the following figure. Your ground speed, track, distance and bearing to waypoint and course are all shown digitally on this screen.

**NOTE:**

Remember: when Speed, Track and Position information displays are flashing, satellite lock has not been acquired and no position fix has been determined. A question mark will also flash on the present position arrow in the center of the compass rose.

Speed is the velocity you are making over the ground. If you wanted, you could customize the Speed window to display Closing Speed instead. Closing Speed is also known as velocity made good.

It is the speed you are making toward the waypoint. For more detailed instructions, see the Customize Page Displays entry in Sec. 8.)

Track is the heading or the current direction you are traveling. Bearing is the direction of a line-of-sight from your present position to the destination. No matter what direction you are steering, the Bearing window shows the compass direction straight to the destination from your location at the moment. Distance shows how far it is to the waypoint you are navigating toward.

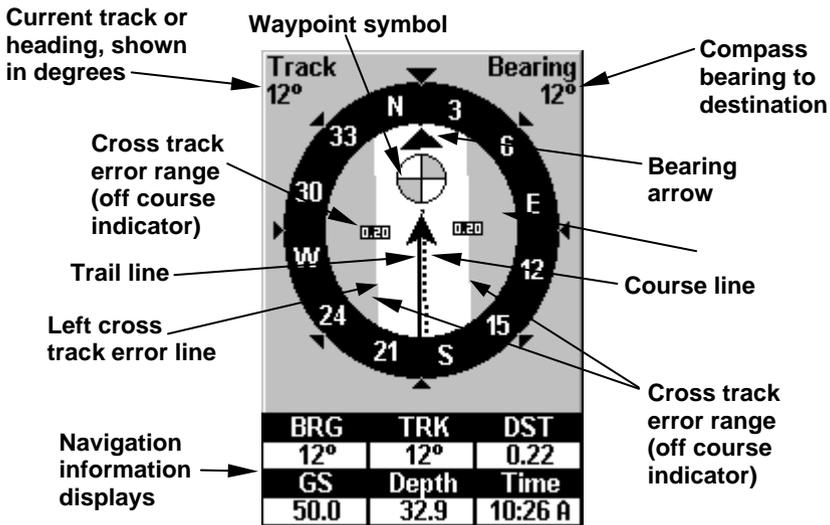
The Off Course window shows the current cross track error. This shows the distance you are off-course to the side of the desired course line. The course line is an imaginary line drawn from your position when you started navigating to the destination waypoint. The course line is shown on the Navigation Page screen and the Map Page screen as a dotted line.

The cross track error range is shown on the compass rose as a wide, white, corridor enclosing the course line. The outer edges of this white corridor represent lines that show the current cross track error range. The default for the cross track error range is 0.20 miles.

For example, if the present position symbol touches the right cross track error line, then you are 0.20 miles to the right of the desired course. You need to steer left to return to the desired course. You can use the **ZIN** or **ZOUT** keys to change the cross track error range.

A circular symbol depicting your destination (waypoint) appears on the screen when approach the waypoint, as shown on the screen in the following figure.

Travel Time is the time that it will take to reach your destination at your present closing speed. You can also customize the time window to show Arrival Time instead. Arrival Time is the local time it will be when you arrive at the destination, based upon your present closing speed and track.



Navigation Page, backtracking a trail while creating a new trail.

In the example figure above, the driver is headed north (a 12° track) toward a waypoint 12° (bearing) away. The cross track error range (white corridor) is 0.20 miles either side of the course. The driver is headed toward a waypoint which is 0.22 miles away.

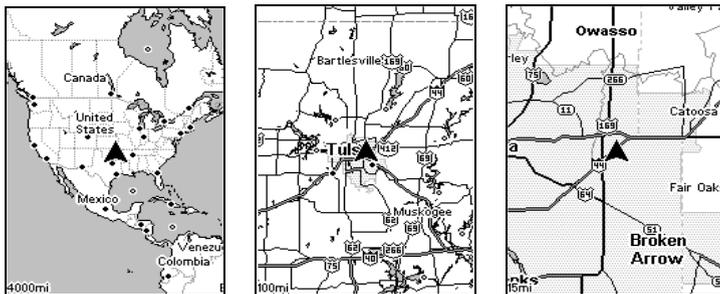
The Navigation Page has its own menu, which is used for some advanced functions and for setting various options. To access the Navigation Page Menu, from the Navigation Page, press **MENU**.

### Full Map Page

The Full Map screen shows your course and track from a bird's-eye view. By default, this unit shows the map with north always at the top of the screen. (This can be changed. See the topic *Map Orientation*, in Sec. 8.) If you're navigating to a waypoint, the map also shows your starting location, present position, course line and destination. You do not have to navigate to a waypoint to use the map. Full Map is the default screen that appears when you turn on the unit.

To get to the Full Map press **PAGES** | ← to **MAP** | **ENT**. When the Map Page is displayed, a screen similar to the following figures appears.

The arrow in the center of the screen is your position. It points in the direction you are traveling. The flashing line extending from the back of the arrow is your plot trail. The map zoom range is the distance across the screen. This number shows in the lower right corner of the screen. In the first example figure below, the range is 4,000 miles. The Zoom In and Zoom Out keys zoom the map to enlarge or reduce its coverage area and the amount of mapping detail shown. There are 40 available map zoom ranges, from 0.02 miles to 4,000 miles.



**Map Page opening screen (left). Map page zoomed to 100 miles (center). Map page zoomed to 15 miles (right).**

The maximum zoom range is 20 miles. You can zoom in closer, but the map only will be enlarged without revealing more map content, except for a few major city streets. The background map includes low-detail maps of the whole world, containing cities, major lakes, major rivers and political boundaries.

The Cuda 250 includes high-detail mapping of lakes, rivers, the Great Lakes and coastal waters in the United States with enhanced shoreline detail and nav aids. Its medium-detail U.S. maps contain: all incorporated cities; shaded metropolitan areas; county boundaries; shaded public lands (such as national forests and parks); some major city streets; Interstate, U.S. and state highways; lakes and streams; and

more than 60,000 navigation aids and 10,000 wrecks and obstructions in U.S. coastal and Great Lakes waters

#### NOTE:

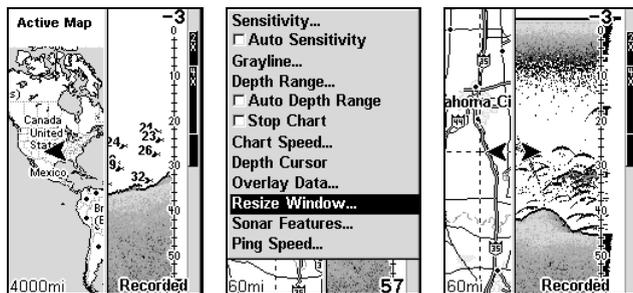
If you have a Cuda 250i, your unit has medium-detail maps of the entire world.

The Map Page has its own menu, which is used for several functions and for setting various options. To access the Map Page Menu, from the Map Page, press **MENU**.

The Pages Menu has several display options under the Map Page category. Press **PAGES** | ← → to **MAP** | ↓ to page display option | **EXIT**.

#### Map with Sonar Page

This page mode splits the screen in half, with a map on the left and the sonar chart on the right. This screen option can be found on the Pages Menu under the Map Page category.



**Map with Sonar page (left). Resize Window command selected from sonar menu (center). Resizing the window (right).**

When this screen is activated, you need to specify which side of the Menu is active. To toggle between the two windows, press **PAGES** | **PAGES**. To switch back, press **PAGES** | **PAGES** again.

The following page contains a 12-step quick reference for the most basic GPS operations.

## GPS Quick Reference

*Start outdoors, with a clear view of the open sky. As you practice, try navigating to a location at least a few blocks away. While you're learning, navigation in too small an area will constantly trigger arrival alarms.*

1. Install the unit. (See complete installation details beginning on page 9.)
2. To turn on the Cuda 250, press and release **PWR** key.
3. Opening screen displays the moving map at the 4,000-mile zoom range. Rotate through the five main GPS Page screens (Full Map, Digital Data, Navigation, Satellite Status and Map with Sonar) by pressing **PAGES**|← to **MAP**|↓ ↑ to select *Page Name*|**EXIT**. Switch Pages to display Satellite Status Page.
4. Wait while unit locates satellites and calculates current position. Process is visible on Satellite Page. This takes an average of 1 minute or less under clear sky conditions (unobstructed by terrain or structures). When the unit acquires position, a tone sounds and a position acquired message appears.
5. With position acquired, press **PAGES** key and select Full Map display, which shows your position in the center.

**Zoom in** closer to see greater detail: press **ZIN** (zoom in key.)

**Zoom out** to see more area, less detail: press **ZOUT** (zoom out key.)

**Scroll** display north, south, east or west using arrow keys ↑ ↓ → ←.

To stop scrolling and return to current position, press **EXIT** key.

6. To a waypoint (*Wpt 001*) at your current position press **WPT**|**WPT**. Waypoint symbol and "001" appears.
7. If you have already made some waypoints or event marker icons, zoom/scroll to find a nearby location to go to. Otherwise, travel around some and place some waypoints at places of interest. When you have several in place, use arrow keys to center cursor crosshairs over one of your existing waypoints or locations.
8. To navigate to selected destination press **MENU**|**ENT**|**EXIT**. Follow dotted course line on Map or compass bearing arrow on Navigation Page.

9. At destination, Arrival Alarm goes off; to clear it, press **EXIT**. Cancel navigation: press **MENU | MENU | ↓** to **CANCEL NAVIGATION | ENT | ←** to **YES | ENT**.

10. Return to Wpt 1 by Backtrack Trail. Press **MENU | MENU | ↓** to **MY TRAILS | ENT**. Press **↓** to *Trail 1* | **ENT | ↓** to **NAVIGATE | ENT | →** to **REVERSE ROUTE | ENT | ←** to **NAVIGATE ROUTE | ENT**. (If arrival alarm sounds, press **EXIT**.) Follow navigation displays.

11. Back home, Arrival Alarm goes off; press **EXIT**. Cancel navigation: press **MENU | MENU | ↓** to **CANCEL NAVIGATION | ENT | ←** to **YES | ENT**.

12. To turn off the unit, press and hold **PWR** key for three seconds.

## Find Your Current Position

Turn on the unit. It automatically searches for satellites and calculates its position in approximately one minute or less, under clear sky conditions.

### NOTE:

Clear sky means open sky, unobstructed by terrain, dense foliage or structures. Clouds do not restrict GPS signal reception.

If for some reason satellite acquisition takes longer, you may be inside a structure or vehicle or in terrain that is blocking signal reception. To correct this, be sure you are positioned so the unit's antenna module has as clear a view of the sky as possible, then turn the unit off and back on again.

## Moving Around the Map: Zoom & Cursor Arrow Keys

The map is presented from a bird's eye view perspective. The current zoom range shows in the lower left corner of the screen.

1. Press the **ZIN** key (zoom in) to move in closer and see greater detail in a smaller geographic area.

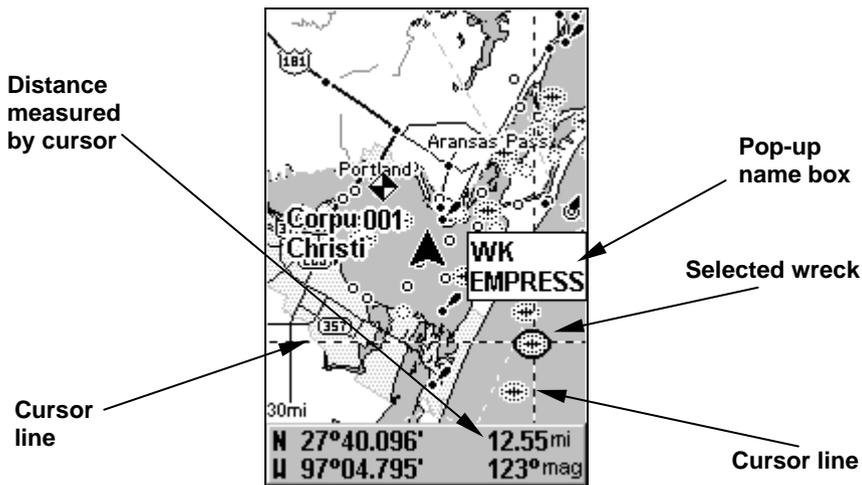
2. Press the **ZOUT** key (zoom out) to move farther away and see less map detail, but a larger geographic area.

When you are traveling, the map will automatically move as you move. This keeps your current location roughly centered on the screen.

You can manually pan or scroll the map northward, southward, eastward or westward by using the arrow keys, which launch the cursor crosshairs. This allows you to look at map places other than your current position. To clear the cursor, press **EXIT**, which jumps the map back to the current position or the last known position.

**Tip:**

Use the cursor to determine the distance from your current position (or last known position, when working indoors) to any map object. Use the arrow keys to position the cursor over the object or landmark. The distance, measured in a straight line, appears in the box at the bottom of the screen. Press **EXIT** to clear the cursor.



The selected wreck (the *Empress*) to the southeast is 12.55 miles away.

## Selecting Any Map Item With the Cursor

1. Use the zoom keys and the arrow keys to move around the map and find the item you wish to select.
2. Use the arrow keys and center the cursor crosshairs on the desired object. On most items, a pop-up box will give the name of the selected item.

## Set a Waypoint

A waypoint is an electronic address, based on the latitude and longitude of a position on the earth. A waypoint represents a location, spot or destination that can be stored in memory, then recalled later for navigation purposes.

You can create a waypoint at the cursor position on the map or at your current position while you are navigating. You can create a waypoint at any location by manually entering the position's latitude and longitude.

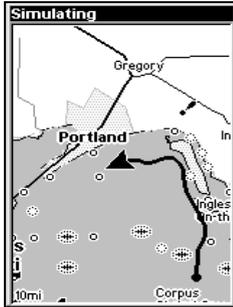
### **To create and save a Waypoint:**

These first two techniques use the Quick Save method, the fastest and easiest way to create a waypoint.

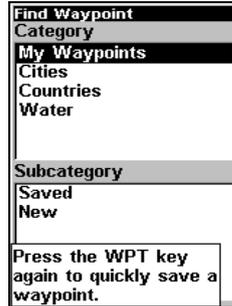
### **Create Waypoint at Current Position**

While you are traveling, press **WPT|WPT**. The waypoint is saved and automatically given a name with a sequential number, such as "waypoint 003." The waypoint symbol and number appear on the map.

### Step 1.



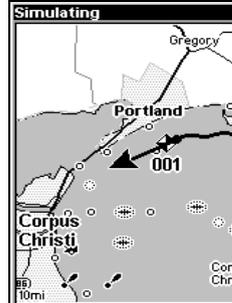
### Step 2.



### Step 3.



### Step 4.



Sequence for setting a waypoint. Step 1: while traveling, *quickly* press **WPT** *twice* to call up Find Waypoint screen (seen in Step 2) and set a point. Step 3: a message says the waypoint has been saved. Step 4: vehicle continues on its way; number waypoint symbol is visible on map.

### NOTE:

The Quick Save method uses the default waypoint symbol until you edit an existing waypoint and change its symbol. (Edit Waypoint Symbol is described in Sec. 7.) After you have changed a waypoint symbol, the unit will remember the one you chose and use it the *next* time you quick save a waypoint. To revert to the *default* symbol, edit the waypoint or use the Reset Options.

## Create Waypoint on Map

1. Use the arrow keys to move the cursor to the place where you want to make a waypoint.
2. Press **WPT|WPT**. The waypoint is saved and automatically given a name with a sequential number, such as "waypoint 001." The waypoint symbol and number appear on the map.

## Create Waypoint by Entering a Position

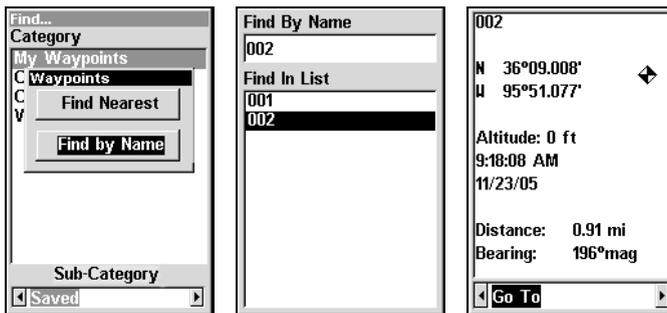
1. Press **WPT**, then use **→** to select **NEW** as the Subcategory | **ENT**.
2. Press **↓** to **ENTERED POSITION|ENT|↑** to **CREATE|ENT**.
3. Press **↓** to **LATITUDE|ENT**. Enter the latitude by pressing **↑** or **↓** to change the first character, then press **→** to the next character and repeat until the latitude is correct. Press **ENT**.
4. Press **↓** to **LONGITUDE|ENT**. Enter the longitude by pressing **↑** or **↓** to change the first character, then press **→** to the next character and repeat until the longitude is correct. Press **ENT**, then **EXIT|EXIT** to return to the previous page display. The waypoint is saved and automatically given a name with a sequential number, such as "waypoint 001." The waypoint symbol and number appear on the map and in the waypoint list.

## Navigate To a Waypoint

You can select any waypoint visible on the Map Page with the cursor, then use the Navigate to Cursor command. You, however, can avoid scrolling the map to pick your waypoint if you use the Find Waypoint commands:

1. Press **WPT|→** to **SAVED|ENT**. To look up the nearest waypoint, press **ENT** or to look by name press **↓|ENT**. For this example, look by name.
2. If your waypoint list is a long one, you can spell out the waypoint name in the **FIND BY NAME** box. Press **↑↓** to change the first character, then press **→** to move the cursor to the next character and repeat until the name is correct, then press **ENT** to jump to the list below.

- If the list is short, you can jump directly to the **FIND IN LIST** box by pressing **ENT**. Use  $\uparrow$   $\downarrow$  to select the waypoint name, press **ENT** and the waypoint information screen appears with the **Go To** command selected.
- To begin navigating to the waypoint, press **ENT**.



Find by Name highlighted (left). Find By Name menu (center). Waypoint information screen (right).

## Set Man Overboard (MOB) Waypoint

One of boating's most terrifying events is having a friend or family member fall overboard. It is particularly dangerous at night or if there is no land in sight. This unit has a man overboard feature that shows navigation data to the location where the feature was activated. To activate it, press the **ZOUT** and **ZIN** keys at the same time. Your position at the time these keys are pressed is used as the man overboard position.

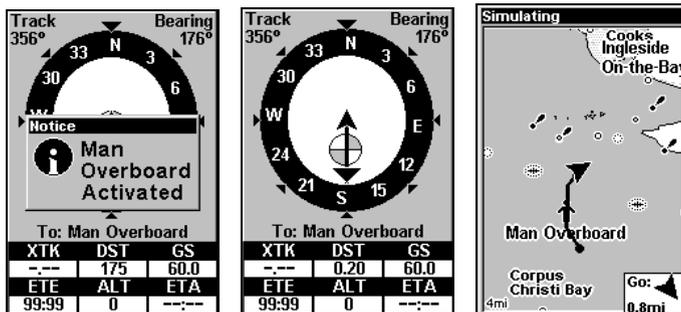
### Caution:

*Saving a new Man Overboard waypoint will overwrite and erase the previous Man Overboard waypoint.*

## Navigate Back to MOB Waypoint

Find your way back to the accident position with the Navigation Page or Map Page. When MOB is activated, the Navigation Page automati-

cally shows the compass rose with its bearing arrow pointing toward the man overboard position, and the destination name says "Going To Man Overboard." The Map Page displays a Man Overboard waypoint, represented by a human figure, and the steering arrow points where to steer to reach that position.



Navigating to Man Overboard: Man Overboard activated (left), Navigation Page (center), and Map Page (right). The victim is astern of the vessel. The GPS shows which direction to steer to for the rescue.

The man overboard position is also stored in the waypoint list for future reference. It can be edited the same as any other waypoint.

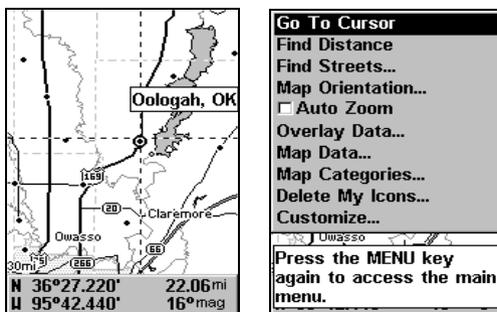
To cancel navigation to MOB, press **MENU | MENU | ↓** to **CANCEL NAVIGATION | ENT | ←** to **YES | ENT**. The unit stops showing navigation information.

## Navigate to Cursor Position on Map

The **Go To CURSOR** command navigates to the current cursor position on the map. It's a quick and handy way to navigate to anything you can see on the map display.

1. Use the cursor with the zoom in and zoom out keys to maneuver around the map until you find a location you want to go to.
2. Center the cursor crosshairs over the location to select it. See the example in the following figure. Many map items such as waypoints, marine NavAids, towns, etc. can be selected and appear highlighted with a

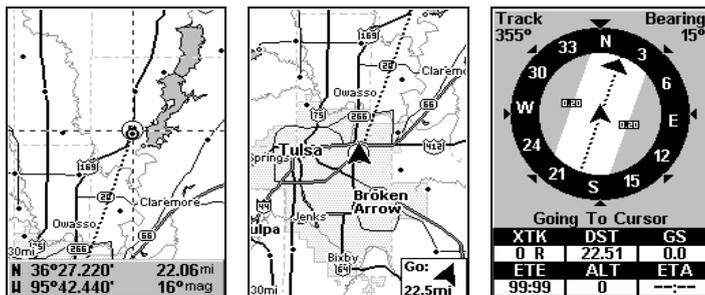
pop-up box. Other features, such as a river or a street intersection will not appear highlighted, but the cursor will take you to those locations just the same.



In this example, the cursor is centered on Oologah, Oklahoma.

3. Press **MENU | ENT** to begin navigating to the cursor location.

The Map Page will display a dotted line from your current position to the cursor position. The Navigation Page displays a compass rose showing navigation information to your destination. See the following examples.



The 30-mile zoom figure (left) clearly shows the dotted course line connecting your current position to your destination. The 30-mile zoom (center) shows both current position and direction to destination on screen.

The Navigation Page (right) will also show navigation information.

To stop navigating to the cursor, use the Cancel Navigation command: press **MENU|MENU|↓** to **CANCEL NAVIGATION|ENT|←** to **YES|ENT**. The Cuda stops showing navigation information.

## Navigate to a Map Place

For map places that are in view on the map, you can easily use the Navigate to Cursor command above; just use the cursor to select the map place.

The other method involves searching for map places with the Find Waypoint command, launched with the **WPT** key. Turn to Sec. 9, *Searching*, for detailed instructions on map place searches.

After you have looked up an item with the Find Waypoint command, use the **→** to make sure the **Go To** command is highlighted at the bottom of the screen, then press **ENT**. The Cuda begins showing navigation information to the item.

To cancel navigation, press **MENU|MENU|↓** to **CANCEL NAVIGATION|ENT|←** to **YES|ENT**. The Cuda stops showing navigation information.

## Creating and Saving a Trail

A trail, or plot trail, is a string of position points plotted by the Cuda 250 as you travel. It's a travel history, a record of the path you have taken. Trails are useful for repeating a journey along the same track. They are particularly handy when you are trying to retrace your trip and go back the way you came. On the screen, trails are represented by a flashing line extending from the back of the current position arrow.

The Cuda is set at the factory to automatically create and record a trail while the unit is turned on. The unit will continue recording the trail until the length reaches the maximum trail point setting (default is 2,000, but the unit can record trails 9,999 points long). When the point limit is reached, the Cuda begins recording the trail over itself.

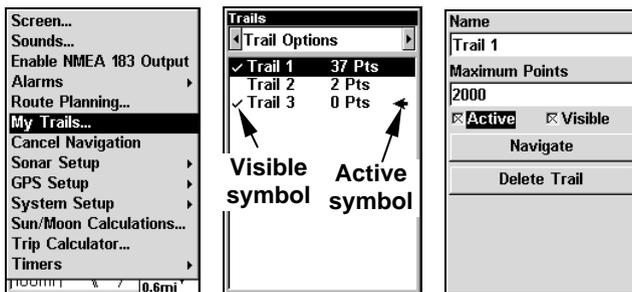
By default, the trail flashes once a second, making it easier to see against the background map. With the default setting, the Cuda creates

a trail by placing a trail point on the screen every time you change directions. (The methods used for creating a trail and the trail update rate can be adjusted or even turned off. See Sec. 8 for *Trail Options*.)

To preserve a trail from point A to point B, you must turn off the trail by making it *inactive* before heading to point C or even back to point A. When the current trail is set inactive, the unit *automatically* begins recording a new trail.

## To Save a Trail

1. Press **MENU | MENU | ↓** to **MY TRAILS | ENT**.



Sequence for saving a trail and beginning a new one. My Trails command (left). The Trails Menu (center). The arrow to the right of Trail 3 indicates the trail is active and the check to the left indicates the trail is visible on the map display. The Edit Trail menu (right) with the Name command selected.

2. Press **↓** to the *Active Trail Name* | **ENT**.
3. Press **↓** to **ACTIVE** | **ENT**. This unchecks the Active option.
4. To return to the previous page, press **EXIT** repeatedly. As you left the Edit Trail menu, you will notice that a new trail was started with a new sequential number. In the example figure below, the new trail is number 15, showing zero points. Note that Trail 14 is inactive, but is still visible on the map.

Trails	
Trail Options	
✓ Trail 1	37 Pts
Trail 2	2 Pts
✓ Trail 3	0 Pts ←

New trail, named Trail 3, is created when Trail 2 is made inactive. Any new travel will be recorded in this trail, which is active and visible.

Trails do not need to be visible in order to be active.

You can save and recall up to 10 different plot trails.

**Tip:**

Another quick way to stop recording one trail and begin a new one is to use the New Trail command. Press **MENU | MENU | ↓** to **MY TRAILS | ENT**. Use **→** to select **NEW TRAIL** and press **ENT**.

**Caution:**

*You also have the option of completely turning off trail recording, under the trail Options command. If, however, the Update Active Trail option is left turned off, it will cancel the automatic trail creation feature.*

## Displaying a Saved Trail

The active trail is automatically displayed on the with the default settings. You can selectively turn trail display on and off for any saved or active trail. In the Saved Trails List, visible trails have a check mark in front of the trail name.

### To turn trail display on or off:

1. Press **MENU | MENU | ↓** to **MY TRAILS | ENT**.
2. Press **↓** to enter the Saved Trail list, then use **↑ ↓** to select the desired *Trail Name* | **ENT**.
3. Press **↓ →** to **VISIBLE | ENT**. To return to the main page display, press **EXIT** repeatedly.

## Navigating Trails

There are three methods for following a trail: visual trailing, navigating a trail (forward) and backtracking a trail (backward). Try each method to see which you prefer.

Visual trailing is the simplest method. It uses only the Map Page and requires no menu commands at all. The technique works the same if you are running a trail forward (from start to end) or backward (from end to start.) Visual trailing, however, provides no navigation information during the trip, such as the time to your destination.

The other two methods provide a full range of navigation data and work with both the Map Page and Navigation Page. The only difference between them is navigating a trail follows a trail forward (from start to end) while backtracking follows a trail in reverse (from end to start.)

When hiking at walking speed with a hand-held GPS, we often just use visual back trailing because it is a bit better at following each little turn on a foot path. At faster speeds, such as the highway or on the water, the Navigate Trail and Backtrack Trail commands are handy.

### Visual Trailing

1. On the Map Page, zoom (**ZIN** or **ZOUT**) so your flashing trail is visible.
2. Begin moving and watch the Map Page. Walk or steer so that your current position arrow traces along the trail you have just made.

### ***Tip:***

Generally, when using this method, the smaller the zoom range, the more accurately you will be able to steer along the trail.

### **Navigate a Trail (forward)**

The following figures illustrate the menu sequence for navigating a trail.

1. Press **MENU | MENU | ↓** to **MY TRAILS | ENT.**
2. Press **↓** to enter the Saved Trail list, then use **↑ ↓** to select the desired *Trail Name* | **ENT.**
3. Press **↓** to **NAVIGATE | ENT.**
4. Press **→** to **NAVIGATE ROUTE | ENT.** The unit begins showing navigation information along the trail.

### **NOTE:**

If you are already located at or near the beginning of your trail, the arrival alarm will go off as soon as you hit Enter. Just press **EXIT** to clear the alarm.

5. Now, begin moving and let your Cuda 250 guide you.
6. When you reach your destination, be sure to cancel your navigation: press **MENU | MENU | ↓** to **CANCEL NAVIGATION | ENT.** The unit asks if you're sure. Press **←** | **ENT.**

Figure 1.

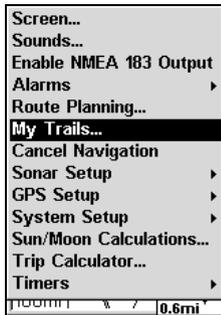


Figure 2.

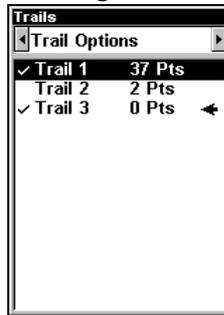


Figure 3.

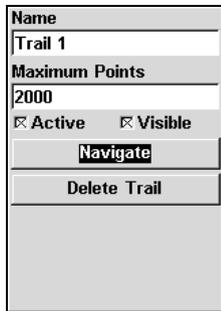
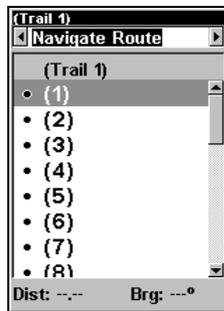
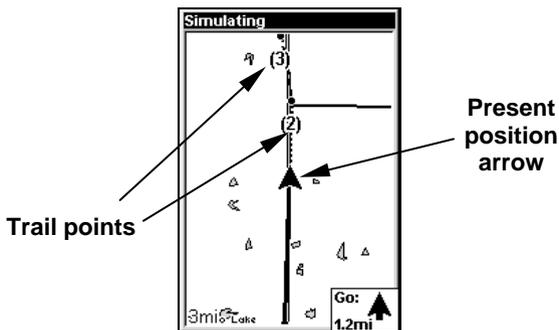


Figure 4.



Navigate a trail menu sequence: Fig. 1, My Trails command. Fig. 2, Trails Menu. Fig. 3, Edit Trail Menu. Fig. 4, Edit Route Menu with Navigate command highlighted for Trail 6. A trail is always converted to a route when you navigate the trail.

On the Map Page, the trail you are navigating is represented by a flashing line. The Navigation Page will also show the navigated trail as a flashing line. The bearing arrow on the compass rose points to the next waypoint on the trail. The arrival alarm will go off when you near a trail waypoint and the bearing arrow on the compass rose will swing around and point to the next waypoint. Press **EXIT** to clear the alarm.



Navigate trail: driver is headed north toward trail point (2).

### Navigate a Back Trail (backtrack, or reverse)

1. Press **MENU | MENU | ↓** to **MY TRAILS | ENT.**
2. Press **↓** to enter the Saved Trail list, then use **↑ ↓** to select the desired *Trail Name* | **ENT.**
3. Press **↓** to **DELETE TRAIL | →** to **NAVIGATE | ENT.**
4. Press **→** to **REVERSE ROUTE | ENT | ←** to **NAVIGATE ROUTE | ENT.** The unit begins showing navigation information along the trail, in reverse.

#### NOTE:

If you are located at or near the end of your trail, the arrival alarm will go off when you hit Enter. Press **EXIT** to clear the alarm.

5. Now, begin moving and let your Cuda 250 guide you.
6. When you reach your destination, be sure to cancel your navigation: press **MENU | MENU | ↓** to **CANCEL NAVIGATION | ENT.** The unit asks if you're sure. Press **← | ENT.**

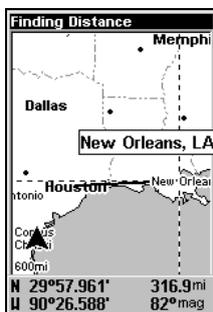
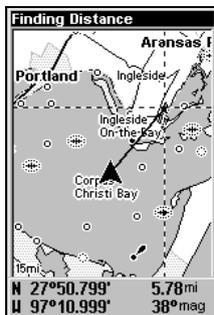
### Cancel Navigation

You can turn off any of the navigation commands after you reach your destination or at any other time by using the Cancel Navigation command. Press **MENU | MENU | ↓** to **CANCEL NAVIGATION | ENT | ←** to **YES | ENT.**

# Section 7: Advanced GPS Operations

## Find Distance from Current Position

1. While on the Map Page press **MENU** | ↓ to **FIND DISTANCE** | **ENT**.
2. Center the cursor crosshairs over the position you want to find the distance to. A rubber band line appears, connecting your current position to the cursor's location. The distance along that line will appear in the box at the bottom of the screen. The box also shows the bearing to the point to which you are measuring.
3. Press **EXIT** to return to regular operation.



The distance from the boat's current position to the cove is 5.78 miles (left). The distance from Houston to New Orleans is 316.9 miles (right).

## Find Distance from Point to Point

You can also measure distance between two other points on the map.

1. While on the Map Page press **MENU** | ↓ to **FIND DISTANCE** | **ENT**.
2. Move the cursor to the first position. A rubber band line appears, connecting your *current* position to the cursor's location. Press **ENT** to set the first point and the rubber band line disappears.
3. Move the cursor to the second position. The rubber band line reapp-

pears, connecting the first point you set to the cursor. The distance along that line will appear in the box at the bottom of the screen.

4. Press **EXIT** to clear the command and return to the page screen.

## Icons

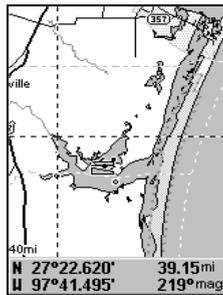
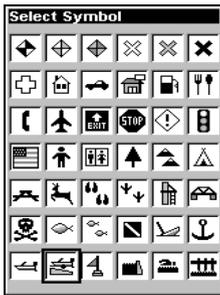
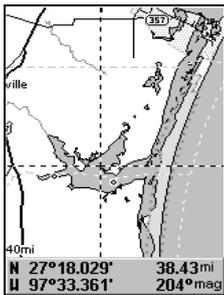
Icons are graphic symbols used to mark some location, personal point of interest or event. They can be placed on the map screen, saved and recalled later for navigation purposes. These are sometimes referred to as event marker icons. The Cuda has 42 different symbols you can pick from when creating an icon.

Icons are similar to waypoints, but they do not store as much information as waypoints do. You can not use a menu to navigate to icons as you can with waypoints. But, you *can* use the map cursor and navigate to any icon on the map.

An icon can be created at the cursor position on the map or at your current position while you are navigating.

### Create Icon on Map

1. Use the arrow keys to move the cursor to the place where you want to make an icon.
2. Press **ENT** and the screen shows the Select Icon Symbol menu.
3. Press ← or ↑ or → or ↓ to select the desired icon, then press **ENT**. The icon appears on the map.



Cursor selects icon location (left); Select Icon Symbol menu (center); Boat Ramp icon on map (right). (Cursor has been moved for clarity.)

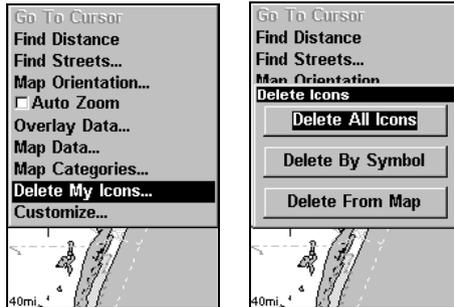
### Create Icon at Current Position

1. While you are traveling, press **ENT** and the screen shows the Select Icon Symbol menu.
2. Use ← or ↑ or → or ↓ to select your icon symbol, then press **ENT**. The icon appears on the map.

### Delete an Icon

You can delete all the icons at one time, all icons represented by a particular symbol or use the cursor to delete a selected icon from the map.

1. Press **MENU** | ↓ to **DELETE MY ICONS** | **ENT**.
2. Press ↓ to **DELETE ALL ICONS**, **DELETE BY SYMBOL** or **DELETE FROM MAP** and press **ENT**.



### Delete icons menu.

The Delete All Icons command will ask if you are sure. Press **←** to **YES|ENT**. All icons will be deleted from the map.

The Delete by Symbol command will launch the Select Symbol menu. Use **←** or **↑** or **→** or **↓** to select an icon to delete, then press **ENT**. A message will appear letting you know all icons with the selected symbol have been deleted.

The Delete From Map command will prompt you to move the cursor over an icon to select it. After selecting the icon, press **ENT** and it will disappear from the map.

### Navigate to an Icon

Use the Navigate to Cursor command and the cursor to select the desired icon on the map.

1. Center cursor crosshairs over the icon.
2. To navigate to the selected icon location press **MENU|ENT|EXIT**. Follow course line on the Map Page or the compass bearing arrow on the Navigation Page.

## Routes

A route is a series of waypoints, linked together in an ordered sequence to mark a course of travel. You can visualize a route as a string of beads. The beads represent waypoints and the string represents the course of travel connecting waypoint to waypoint.

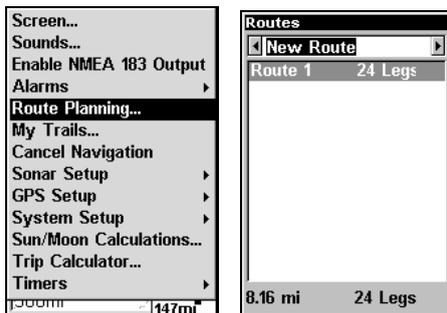
The course from one waypoint to the next is a leg. Routes are composed of one or more legs. The legs of all GPS routes are based on straight lines between waypoints.

A route provides the automatic capability to navigate through several waypoints without having to reprogram the unit after arriving at each waypoint. Once programmed into the GPS unit, a route gives users the option of navigating forward through the route waypoints or in reverse order. You can even begin navigating in the middle of a route!

### Create and Save a Route

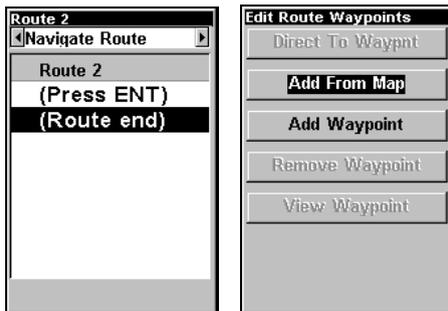
You can create a route by selecting existing waypoints from the waypoint list or you can set a series of route waypoints on the map with the cursor and Enter key. In this example, we create a route from the map.

1. From the **NAVIGATION PAGE**, press **MENU|ENT** or from the **MAP PAGE**, press **MENU|MENU|↓** to **ROUTE PLANNING|ENT**.



**Route Planning command on Main Menu (left)  
will open the Route List screen (right).**

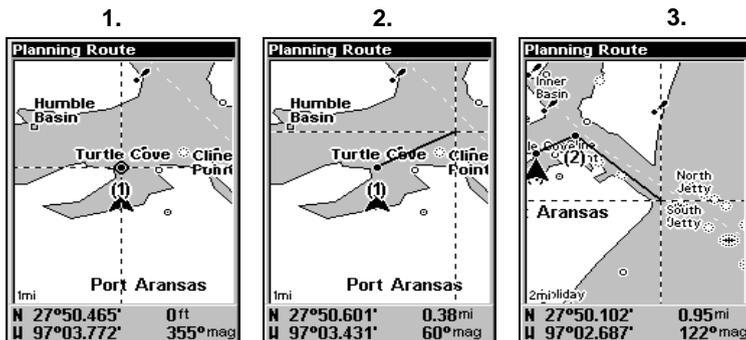
2. To add to an existing route, use ↓↑ to *route name*|ENT. Press ↓ to (ROUTE END)|ENT|↓ to **ADD FROM MAP**|ENT. The Map Page appears with the cursor showing. (If you wanted to create a new route, highlight **NEW ROUTE** at the top of the Route list window and press ENT.)



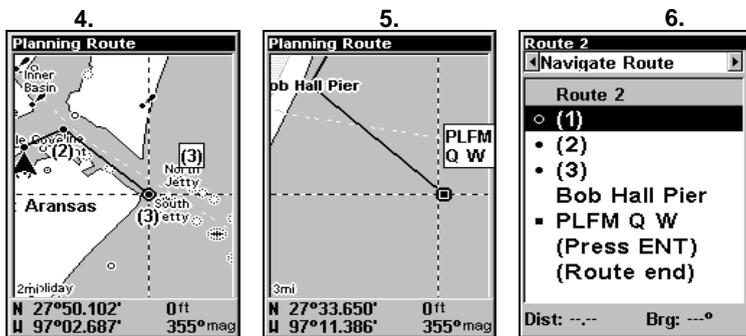
**Edit Route menu (left). Edit Route Waypoints menu (right), with Add From Map command selected.**

3. Use the Zoom keys and arrow keys to move the map and cursor until the cursor is centered on the spot where you want your route to begin. (If you are starting at your current position or the current cursor position, you are already at the starting spot.)

4. Set the first route waypoint and press **ENT**. In this example, we started our route at the entrance of the cove where our boat was docked to a promising fishing spot next to an oil platform.



Route creation sequence, from left: Fig. 1. Set route waypoint (1) at the cove entrance. Fig. 2. Move cursor northeast to set point (2) at channel entrance. Fig. 3. With point (2) set, move cursor southeast to mark channel exit with waypoint (3). In figures 2 and 3, notice the rubber band line extending from the previously set waypoint to the cursor. This line will become the course for the route.



Route creation sequence, continued: Fig. 4. Point (3) set at channel mouth. Fig. 5. Fourth waypoint set further south along the beach, at a recognizable landmark (Bob Hall Pier). Waypoint PLFM Q W ends the route at an oil platform some distance from the shore. Fig. 6. Press EXIT to save the route and you return to this screen.

5. Move the cursor to the next point in the route, a spot where you need to turn or change direction and press **ENT** to set the next waypoint.
6. Repeat step five until the route reaches your destination.
7. To save your route, press **EXIT**. The Cuda reverts to the Edit Route screen, with the route automatically named Route 1 and stored in the unit's internal memory.

You can edit the route and run other commands, but if you are finished with the route for now, return to the main page display by pressing **EXIT** repeatedly.

### **Delete a Route**

1. From the **NAVIGATION PAGE**, press **MENU|ENT** or from the **MAP PAGE** press **MENU|MENU|↓** to **ROUTE PLANNING|ENT**.
2. Press **↓** to *route name* | **ENT**.
3. Press **→** to **DELETE ROUTE|ENT|←** to **YES|ENT**.

### **Tip:**

You can also delete all routes at once:

1. From the **NAVIGATION PAGE**, press **MENU|ENT** or from the **MAP PAGE** press **MENU|MENU|↓** to **ROUTE PLANNING|ENT**.
2. Press **→** to **DELETE ALL|ENT|←** to **YES|ENT**.

### **Edit a Route**

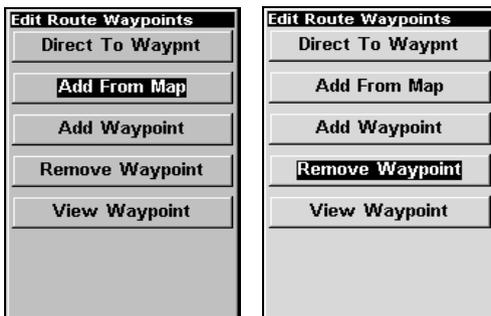
To edit a route name:

1. From the **NAVIGATION PAGE**, press **MENU|ENT** or from the **MAP PAGE** press **MENU|MENU|↓** to **ROUTE PLANNING|ENT**.
2. Press **↓** to *route name* | **ENT|→** to **EDIT ROUTE NAME|ENT**.
3. Use **↑↓** to change the first character, then press **→** to move the cursor to the next character and repeat until the name is correct. Press **ENT**. Return to the main page display by pressing **EXIT** repeatedly.

You can edit the route by adding and removing waypoints.

1. From the **NAVIGATION PAGE**, press **MENU|ENT** or from the **MAP PAGE** press **MENU|MENU|↓** to **ROUTE PLANNING|ENT**.

2. Press **↓** to *route name*|**ENT**|**↓** to **ROUTE WAYPOINTS LIST**. Use **↓↑** to select a waypoint, then press **ENT**.

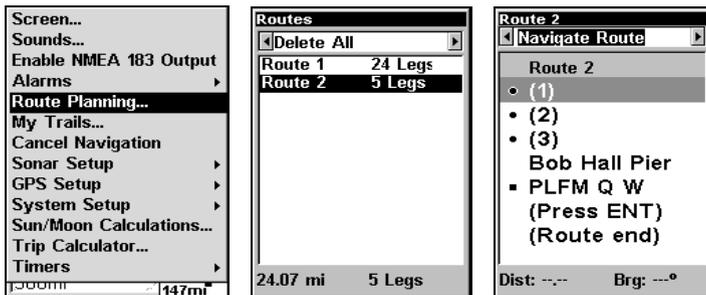


**Edit Route Waypoints menu with Add from Map selected (left) and Remove Waypoint selected (right).**

3. Use **↓↑** to select a command from the Edit Route Waypoints menu and press **ENT**. Add From Map lets you insert a waypoint in the route by clicking on a map location with the cursor. Add Waypoint calls up the Waypoint List so you can insert a waypoint from the list. Remove Waypoint will delete the selected waypoint from the route. View Waypoint will show you where the selected waypoint is on the map.

### Navigate a Route

1. From the **NAVIGATION PAGE**, press **MENU|ENT** or from the **MAP PAGE**, press **MENU|MENU|↓** to **ROUTE PLANNING|ENT**.



Route Planning command on Main Menu (left). Routes menu (center); Edit Route menu (right). Navigate Route command is selected.

2. Press  $\downarrow$  to select *route name* | ENT | ENT.

3. Upon arrival at your destination, cancel navigation: press MENU | MENU |  $\downarrow$  to CANCEL NAVIGATION | ENT |  $\leftarrow$  to YES | ENT.

The following figures show what the Navigation Page and Map Page look like while navigating a route.

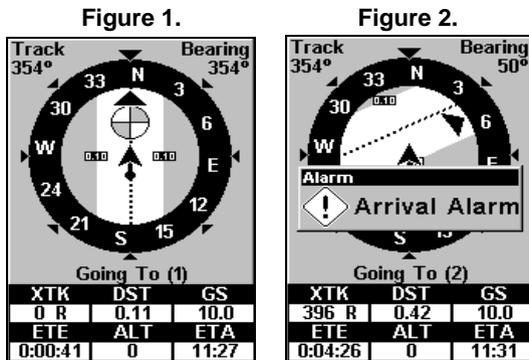


Fig. 1 shows the Navigation Page at the start of a route, heading straight for the first waypoint (Wpt 1). In Fig. 2, the traveler has arrived at Wpt 1; the arrival alarm has been triggered and the bearing arrow on the compass rose has turned to point toward Wpt 2, off to the northeast.

Figure 3.

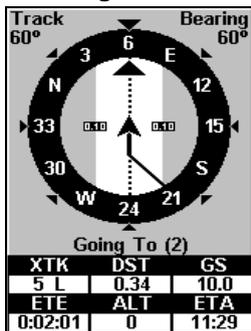
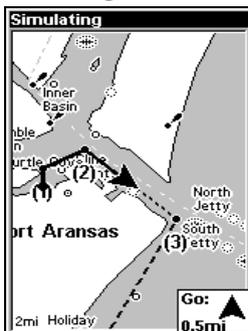


Figure 4.



In Fig. 3 the traveler has turned northeast on his new course and is heading straight for Wpt 2, which is 0.28 miles away. Fig. 4 shows route navigation on the Map Page. In this figure, the traveler has reached Wpt 2 and is starting on the leg between Wpts 2 and 3.

### Navigate a Route in Reverse

Here is how you run a route backward from the end waypoint to the beginning waypoint:

1. From the **NAVIGATION PAGE**, press **MENU|ENT** or from the **MAP PAGE**, press **MENU|MENU|↓** to **ROUTE PLANNING|ENT**.
2. Press **↓** to select *route name*|**ENT**|**→** to **REVERSE|ENT**|**←** to **NAVIGATE ROUTE|ENT**.
3. Upon arrival at your destination, cancel navigation: press **MENU|MENU|↓** to **CANCEL NAVIGATION|ENT**|**←** to **YES|ENT**.

## Trails

### Delete a Trail

This is the command used to erase or delete a trail: Press **MENU|MENU|↓** to **MY TRAILS|ENT**|**↓** to *trail name*|**ENT**|**↓** to **DELETE TRAIL|ENT**|**←** to **Yes|ENT**.

### **Tip:**

You can also delete all trails at once:

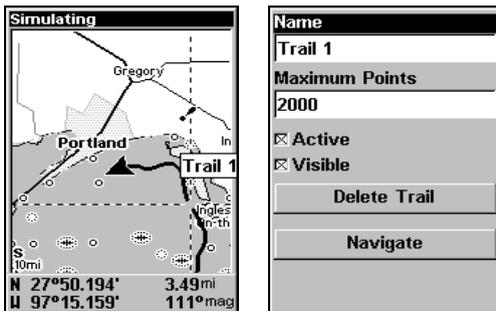
1. Press **MENU | MENU | ↓** to **MY TRAILS | ENT**.
2. Press **→** to **DELETE ALL | ENT | ←** to **YES | ENT**.

### **Edit a Trail Name**

To edit a trail name: press **MENU | MENU | ↓** to **MY TRAILS | ENT | ↓** to *trail name* | **ENT | ENT**. Press **↑** or **↓** to change the first character, then press **→** to the next character and repeat until the name is correct. Press **ENT** then **EXIT** repeatedly to return to the previous page display.

### **Tip:**

You can quickly call up the Edit Trail menu by selecting a trail on the map with the cursor. Move the cursor over a trail and a pop-up box appears. Press **WPT** and the Edit Trail menu opens.



Trail selected with map cursor (left). The box at the bottom of the screen shows distance and bearing from current position to the selected point on the trail. The Edit Trail menu (right).

## **Utilities**

Utilities are useful tools for traveling and outdoor activities.

### **Alarm Clock**

To get to the alarm clock menu press **MENU | MENU | ↓** to **TIMERS | ENT | ↓** to **ALARM CLOCK | ENT**.

## Sun/Moon Rise & Set Calculator

To get to the Sun/Moon menu press **MENU|MENU|↓** to **SUN/MOON CALCULATIONS|ENT**.

## Trip Calculator

To get to the Calculator menu press **MENU|MENU|↓** to **TRIP CALCULATOR|ENT**.

## Trip Down Timer

To get to the Down Timer menu press **MENU|MENU|↓** to **TIMERS|ENT|↓** to **DOWN TIMER|ENT**.

## Trip Up Timer

To get to the Up Timer menu press **MENU|MENU|↓** to **TIMERS|ENT|ENT**.

## Waypoints

### Delete a Waypoint

To delete a waypoint from the waypoint list press **WPT|ENT|ENT|↓** to *waypoint name*|**ENT|→** to **DELETE|ENT|←** to **YES|ENT**. To return to the main page display, press **EXIT|EXIT**.

To delete a waypoint from the map:

1. Select the waypoint with the cursor.
2. Press **WPT|→** to **DELETE|ENT|←** to **YES|ENT**. To return to the main page display, press **EXIT** repeatedly.

To delete all waypoints at one time press **MENU|MENU|↓** to **SYSTEM SETUP|ENT|↓** to **DELETE ALL MY WAYPOINTS|ENT|←** to **YES|ENT**. To return to the main page display, press **EXIT|EXIT**.

### Edit a Waypoint

#### Waypoint Name

To edit waypoint name:

1. Press **WPT|ENT|ENT|↓** to *waypoint name*|**ENT|→** to **EDIT NAME|ENT**.
2. Press **↑** or **↓** to change the first character, then press **→** to the next

character and repeat until the name is correct. Press **ENT**. To get back to the main page display, press **EXIT** repeatedly.

### **Waypoint Symbol**

To edit waypoint symbol:

1. Press **WPT|ENT|ENT|↓** to *waypoint name|ENT|* → to **EDIT SYMBOL|ENT**.

2. Use arrow keys to select desired symbol and press **ENT**. To return to the previous page, press **EXIT** repeatedly.

### **Waypoint Position**

To edit waypoint position:

1. Press **WPT|ENT|ENT|↓** to *waypoint name|ENT|* → to **EDIT POSITION|ENT**.

2. Latitude: press ↓ to **LATITUDE|ENT**. Press ↑ or ↓ to change the first character, then press → to the next character and repeat until the latitude is correct. Press **EXIT**.

3. Longitude: press ↓ to **LONGITUDE|ENT**. Press ↑ or ↓ to change the first character, then press → to the next character and repeat until the longitude is correct. Press **EXIT**.

4. When latitude and longitude are correct press **EXIT** repeatedly to return to the main page display.

### **Selecting a Waypoint**

To select a waypoint on the map (for navigating, editing, etc.,) use the arrow keys and center the cursor over the waypoint. A halo will appear around the waypoint.

### **Set a Waypoint by Average Position**

This feature sets a waypoint at the current position after averaging several position readings. This boosts waypoint position accuracy by helping to eliminate errors caused by atmospheric conditions and other factors.

1. Press **WPT** | → to **NEW** | **ENT**.
2. Press ↓ to **AVERAGE POSITION** | **ENT** | ↑ to **CREATE** | **ENT**.
3. Wait while the unit takes points to average the position. The greater the number of points, the greater the accuracy. When the desired number of points accumulate, press **ENT** to create and save the waypoint.
4. The Edit Waypoint menu appears. You can save the waypoint by pressing **EXIT** or you can edit the waypoint.

### Set a Waypoint by Projecting a Position

This feature sets a waypoint at a specific distance and bearing from a reference position. The reference position can be selected from your waypoint list, a map feature or from the Points of Interest list.

1. Press **WPT** | → to **NEW** | **ENT**.
2. Press ↓ to **PROJECTED POSITION** | **ENT** | ↑ to **CREATE** | **ENT**.
3. Press ↓ to **SET REFERENCE** | **ENT**, which will launch the Select Point menu with three options: My Waypoints, Map Places and Highway Exits. Highlight the desired category and press **ENT**. The Find By menu will appear. Choose the desired option: Find by Nearest or Find By Name and press **ENT**. Use ↑ ↓ to select a waypoint or map feature. When the point has been selected, press **ENT** | **ENT** and its position appears as the reference position.
4. Press ↑ to **DISTANCE** | **ENT**. Use ↑ ↓ to change the first character, then press → to the next character and repeat until the distance is correct. Press **ENT**.
5. Press ↓ to **BEARING** | **ENT**. Use ↑ ↓ to change the first character, then press → to the next character and repeat until the bearing is correct. Press **ENT**.
6. Press ↓ to **PROJECT** | **ENT**. The Edit Waypoint menu appears. You can save the new projected waypoint by pressing **EXIT** or you can edit the waypoint. Press **ENT** to navigate to the new waypoint.

# Notes

# Section 8: GPS Setup Options

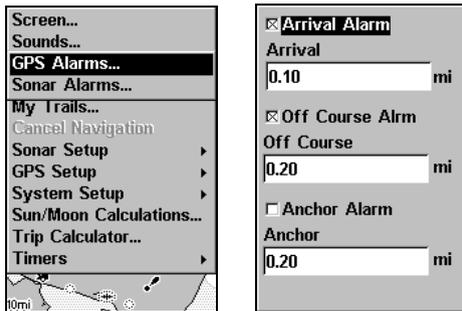
## Alarms

This unit has several GPS alarms. The default setting has all the alarms turned on. You can turn the alarms off and on and change their distance settings.

You can set an arrival alarm to flash a warning message and sound a tone when you cross a preset distance from a waypoint. For example, if you have the arrival alarm set to 0.1 mile, then the alarm will flash a message when you come within 0.1 mile of the recalled waypoint.

The off course alarm warns you when your track drifts too far to the right or left of the course line to the waypoint. For example, if the alarm is set to 0.1 mile, then the alarm flashes a message if you drift 0.1 of a mile or more to the right or left of the line to the waypoint.

The anchor alarm is triggered when you drift outside of a preset radius. Again, using the 0.1 mile as an example, if you are anchored and your boat moves more than 0.1 mile, the alarm will flash a message and sound a tone.



**Alarms command (left); GPS alarm menu (right) with Arrival Alarm and Off Course Alarm turned on (checked).**

To change alarm settings:

1. Press **MENU | MENU | ↓** to **ALARMS | ENT**. Select **GPS ALARMS | ENT**.
2. Use **↓ ↑** to select an alarm category and press **ENT**, which will turn on (check) or turn off (uncheck) the alarm.
3. To change distance settings, scroll **↓ ↑** to the desired alarm distance dialog box and press **ENT**. Use **↑ ↓** to change the first character, then press **→** to the next character and repeat until the distance is correct.
4. When your adjustments are finished, return to the main page display by repeatedly pressing **EXIT**.

## Auto Satellite Search

To lock onto the satellites, the GPS receiver needs to know its current position, UTC time and date. (Elevation (altitude) is also used in the equation, but it is rarely required to determine a position.) It needs this data so that it can calculate which satellites should be in view. It then searches only for those satellites.

When your GPS receiver is turned on for the first time, it does not know what your position or elevation (altitude) is. It does know the current UTC time and date since it has an internal clock that keeps time while the unit is turned off. If the time and/or date are incorrect, you can set it using the Set Local Time menu. The unit begins searching for the satellites using the above data that it acquired the last time it was turned on. This probably was at the factory. Since you almost certainly are not at our factory, it is probably looking for the wrong satellites.

If it does not find the satellites it is looking for after one minute, the unit will switch to Auto Search. The receiver looks for any satellite in the sky. Due to advanced technology, the auto search time has shrunk significantly from the early days of GPS.

Once the unit locks onto the satellites, it should take less than a minute to find your position the next time it is turned on, provided you haven't moved more than 100 miles from the last location it was used.



### GPS Auto Search on the Satellite Status Menu.

You can force the unit to immediately kick into auto search mode.

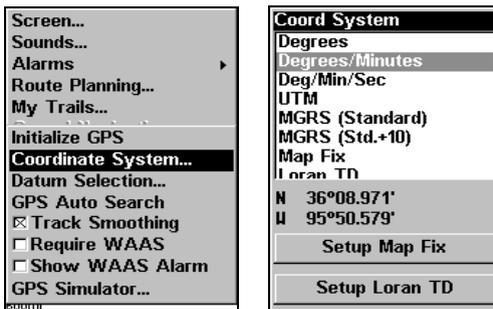
1. Press **PAGES** | ← to **MAP** | ↓ to **SATELLITES**.
2. Press **MENU** | ↓ to **GPS AUTO SEARCH** | **ENT** | ← to **YES** | **ENT**.

## Coordinate System Selection

The Coordinate System Menu lets you select the coordinate system to use when displaying and entering position coordinates.

To get to Coordinate System Selection:

1. Press **MENU** | **MENU** | ↓ to **GPS SETUP** | **ENT**.
2. Press ↓ to **COORDINATE SYSTEM** | **ENT**.



**Menus for changing coordinate system used to display positions.**

This unit can show a position in degrees (36.14952°); degrees, minutes and thousandths of a minute (36° 28.700'); or degrees, minutes, seconds and tenths of a second (36° 28' 40.9"). It can also show position in: UTM (Universal Transverse Mercator) projection; MGRS (Standard); MGRS (Standard + 10); Map Fix; Loran TD; British, Irish, Finnish, German, New Zealand, Swedish, Swiss, Taiwan, Greek and Military grids.

UTM's are marked on USGS topographic charts. This system divides the Earth into 60 zones, each 6 degrees wide in longitude.

British, Irish, Finnish, German, New Zealand, Swedish, Swiss, Taiwan, and Greek grid systems are each the national coordinate system used only in their respective countries. In order to use these grid systems, you must be in the respective country. This unit will pick the matching datum for you when you select the grid. See the entry on Map Datum Selection for more information.

The military grid reference system (MGRS) uses two grid lettering schemes, which are referred to as standard and standard + 10 MGRS on this unit. Your position and datum in use determines which one to use. If you use standard, and your position is off significantly, then try the alternate.

**NOTE:**

When the position format is changed, it affects the way all positions are shown on all screens. This includes waypoints.

To change the coordinate system, press **ENT** while **COORD SYSTEM** is highlighted at the top of the Coordinate System menu. Use  $\uparrow$   $\downarrow$  arrow keys to select the desired format and press **ENT**.

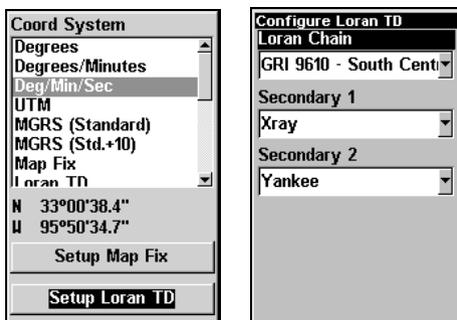
**To setup Loran TD:**

1. From the Coordinate System menu, press  $\downarrow$  to **SETUP LORAN TD** and press **ENT**.

**NOTE:**

If the Loran TD conversion is chosen, you must enter the local Loran chain identification for the master and slaves.

2. To access the Loran Chain, Secondary 1 or Secondary 2 menus, highlight the category and press **ENT**. Use the  $\uparrow$   $\downarrow$  keys to choose the desired setting and press **ENT**. Press **EXIT** to close the menu.



Setup Loran TD highlighted on Coordinate System menu (left). Configure Loran TD menu (right).

## Map Fix

Map Fix is used with charts or maps. This system asks for a reference position in latitude/longitude, which you take from a marked location on the map. It then shows the present position as distance on the map from that reference point.

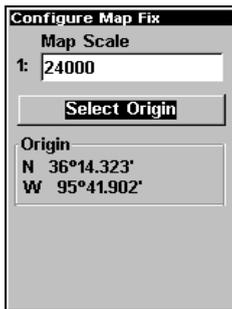
For example, if it shows a distance of UP 4.00" and LEFT 0.50", you then measure up four inches and to the left a half-inch from the reference point on the map to find your location.

### To configure a map fix:

To use setup a map fix, follow these steps in order. Take your map of the area and determine a reference latitude/longitude. (Please note that in order for this system to work, the latitude/longitude lines must be parallel with the edge of the map. USGS maps are parallel, others may not be. Also, this works better with smaller scale maps.) The reference position can be anywhere on the map, but the closer it is to your location, the smaller the numbers will be that you will have to deal with. Once you have decided on a reference position, you can save it as a waypoint. See the waypoint section for information on saving a waypoint. Save the reference position as a waypoint. Exit from the waypoint screens.

1. Press **MENU | MENU | ↓ to GPS SETUP | ENT.**
2. Press ↓ to **COORDINATE SYSTEM | ENT.**
3. Press ↓ to **SETUP MAP FIX | ENT.**

The following screen appears and **MAP SCALE** is highlighted. Press **ENT** and enter the map's scale. This is generally at the bottom of the paper map. It is shown as a ratio, for example 1:24000. Press **EXIT** and the unit returns to the Configure Map Fix screen.



**Configure a map fix so the Cuda can find your position on a printed chart or topographical map.**

Press  $\downarrow$  to **SELECT ORIGIN|ENT|ENT|ENT** to bring up the waypoint list. Select the waypoint you saved the reference point under and press **ENT**. The unit displays a waypoint information screen with the command **SET AS ORIGIN** selected. Press **ENT** and the unit returns to the Configure Map Fix menu. Press **EXIT** to close this menu. Now press  $\uparrow$  to **COORD SYSTEM|ENT**, select **MAP FIX** from the list and press **ENT**. Press **EXIT** repeatedly to get back to the main page display, where all position information will be shown as a distance from the reference point you chose.

## Customize Page Displays

The Position, Navigation and Map pages can be customized to allow you to display will be on displayed each page.

### Customize Position Page

While on the Position Page, press **MENU| $\downarrow$  to CUSTOMIZE|ENT**. The display box in the top left corner begins flashing. Use the arrow keys to select a display box containing data you would like to change. With the display box highlighted and flashing, press **ENT** to open a list of data options. Use  $\uparrow$   $\downarrow$  to select a different display option, then press **ENT**, which will check or uncheck the box next to the data option. After all options are set, press **EXIT** to return to the Position page display.

Repeat these steps to change other data boxes. If do not want to change any other data boxes, press **EXIT**.

## Customize Map or Navigation Page

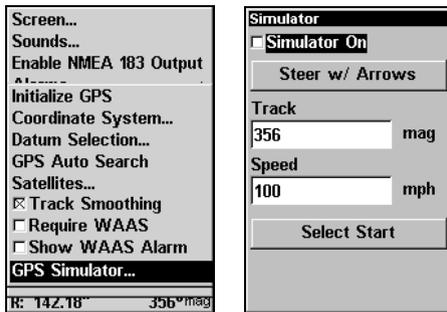
While on the Map or Navigation pages, press **MENU** | ↓ to **CUSTOMIZE** | **ENT**. Use ↓ ↑ to select a data option you would like to see on the page. With the data option highlighted, press **ENT** to check or uncheck the box next to it. When you are satisfied with the options you selected, press **EXIT** to return to the main page display. Digital Data boxes at the bottom of the screen display the customized data.

## GPS Simulator

The GPS simulator lets you simulate outdoor navigation. It is a great way to practice using your unit. You can set the starting location by entering latitude/longitude or from a stored waypoint or map place location. You can navigate and change speed on the map by using the arrow keys — **STEER WITH ARROWS** — or by setting the track and speed in the dialog boxes on the simulator menu screen.

### To get to the GPS Simulator:

1. Press **MENU** | **MENU** | ↓ to **GPS SETUP** | **ENT**.
2. Press ↓ to **GPS SIMULATOR** | **ENT**. The GPS Simulator Menu appears.



GPS Setup Menu (left) with GPS Simulator menu (right).

Input the desired settings, then turn on the simulator by highlighting the **SIMULATOR ON** box and pressing **ENT**. Press **EXIT** repeatedly to get back to the main page display. A message will appear periodically, warning you the simulator is on. To turn the simulator off, repeat the steps above or turn off the unit.

To use the **STEER WITH ARROWS** option, highlight **STEER WITH ARROWS** on the GPS simulator menu and press **ENT**. You will be directed to the map page display. Press **EXIT** to turn off the option without affecting the simulation.

### **Simulating Trail or Route Navigation**

In Simulator mode, your unit can automatically follow a trail or route without manual steering if you use these steps:

1. From the Map Page, go to the simulator menu. Pick a **STARTING POSITION** at or near the beginning of your trail/route. Enter an approximate **TRACK** (shown in compass degrees) that will point you toward the start of the trail/route.
2. Set **SPEED** to zero. Select **STEER WITH ARROWS** command and press **ENT**, which turns on the simulator and returns you to the Map Page.
3. Begin navigating along the trail/route. (If you are close enough to the first waypoint, the arrival alarm will usually go off as soon as navigation begins. Press **EXIT** to clear the alarm.) When navigation starts, press **↑** to increase speed to the desired setting.
4. Press **EXIT** to turn off the steering and speed boxes. The unit will now automatically steer along the trail or route. When you arrive at your destination, cancel navigation as you normally do.

#### ***Tip:***

You can pick any spot on the map to begin your simulation by using the Initialize GPS command.

## Initialize GPS

In simulator mode, this command allows the unit to operate as if you are somewhere other than your current location. You could be located in Kansas City, but practice navigating in the ocean off Islamorada, Florida.

1. Press **MENU | MENU | ↓** to **GPS SETUP | ENT | ENT**.
2. A message appears, telling you to move the cursor near the desired location and press **ENT**. When the message automatically clears, follow the instructions.
3. In a moment, your present position marker arrow appears on the map in the location you selected with the cursor. The unit will consider that spot its last known position until it actually locks on to a satellite or until you initialize the GPS in another location.

## Map Auto Zoom

This receiver has an auto zoom feature that eliminates much of the button pushing common with other brands of GPS receivers. It works in conjunction with the navigation feature.

First, start navigation to a waypoint. (See the waypoint section for more information on navigating to a waypoint.) Then, with the auto zoom mode on, the unit zooms out until the entire course shows, from the present position to the destination waypoint. As you travel toward the destination, the unit automatically begins zooming in — one zoom range at a time — always keeping the destination on the screen.

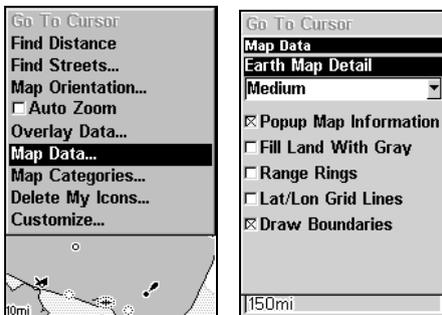
To turn on this feature from the **MAP PAGE**, press **MENU | ↓** to **AUTO ZOOM | ENT**, which will turn on (check) or turn off (uncheck) the feature. Press **EXIT** to return to the map page display.

## Map Data

This menu lets you turn the map off (which turns the map screen into a GPS plotter), turn off or on the pop-up map info boxes or fill land areas with gray. You can also turn on or off Map Overlays, which display latitude and longitude grid lines and range rings.

### To get to Map Data:

From the Map Page, press **MENU** | ↓ to **MAP DATA** | **ENT**.



Map Data highlighted on Map Menu (left). Map Data Menu (right).

### Earth Map Detail

From the Map Page, press **MENU** | ↓ to **MAP DATA** | **ENT**. Press **ENT** to select from four levels of map detail: Off, Low, Medium and High. After the option is set, press **EXIT**.

### Pop-up Map Info

From the Map Data menu, press ↓ to **POPUP MAP INFORMATION**. With the option highlighted, press **ENT** to turn on (check) or turn off (uncheck) the feature.

### Fill Water With White

From the Map Data menu, press ↓ to **FILL LAND WITH GRAY**. With the option highlighted, press **ENT** to turn on (check) or turn off (uncheck) the feature.

## Map Overlays (Range Rings; Lat/Long Grid)

The map screen can be customized with four range rings and/or grids that divide the plotter into equal segments of latitude and longitude.

Range rings are handy for visually estimating distances on the map. The ring diameters are based on the current zoom range. For example: at the 100-mile zoom, the screen will show two rings with your current position in the center. The large ring touching the left and right sides of the screen is 100 miles in diameter, the same as the zoom range. The second smaller ring is 50 miles in diameter — always 1/2 the zoom range.

The distance from your current position to the smaller ring, the ring's radius, is 25 miles — always 1/4 the zoom range. With the arrow keys and map cursor, you can move around the map to see the third and fourth rings. In this example, the distance to the third ring is 75 miles and distance to the fourth ring is 100 miles.

**To set range rings:** From the Map Data menu, press ↓ to **RANGE RINGS**. With the range rings highlighted, press **ENT** to turn on (check) or turn off (uncheck) the option.

**To set Lat/Long Grid:** From the Map Data menu, press ↓ to **LAT/LON GRID LINES**. With Lat/Lon Grid Lines highlighted, press **ENT** to turn on (check) or turn off (uncheck) the option. After the option is set, press **EXIT|EXIT** to return to the map page display.

## Map Datum Selection

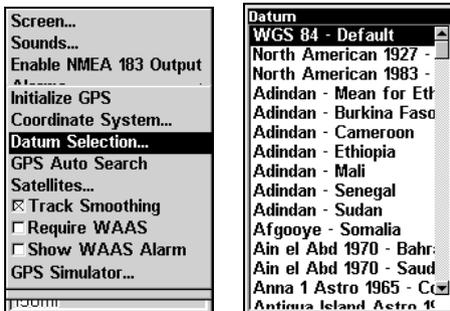
Maps and charts are based on a survey of the area covered by the map or chart. These surveys are called Datums. Maps created using different datums will show the same latitude/longitude in slightly different locations.

The GPS system is based on the WGS-84 datum, which covers the entire world. Other datums also may cover the entire world or just a small portion of it.

By default, your position is shown using the WGS-84 datum. It, however, can show your position using any of 191 different datums. To change the datum:

1. Press **MENU | MENU | ↓** to **GPS SETUP | ENT | ↓** to **DATUM SELECTION | ENT**.
2. Use **↓ ↑** to select the desired datum, then press **ENT**.
3. To return to the main page display, press **EXIT** repeatedly.

A list of the datums used by this unit is in the back of this manual.



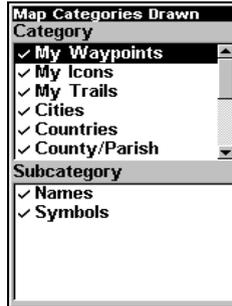
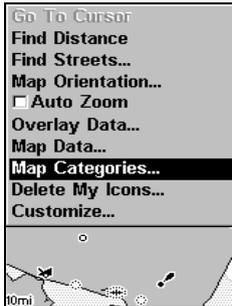
GPS Setup Menu (left) with Map Datum Menu (right).

## Map Detail Category Selection

This menu determines which mapping features are shown on the screen. This includes waypoints, trails, icons, cities, highways, etc. You can selectively turn on or off any of these items, customizing the map to your preferences.

### To get to Map Categories:

1. From the Map Page, press **MENU | ↓** to **MAP CATEGORIES | ENT**.
2. Use **↑ ↓** to select a category, then press **→** to cycle through available subcategories. Press **ENT** to turn the selected category or subcategory on (check) or off (unchecked).
3. To return to the main page display, press **EXIT | EXIT**.

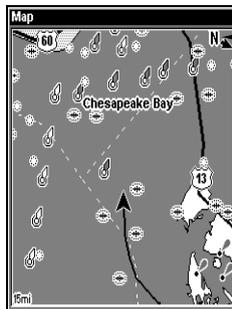
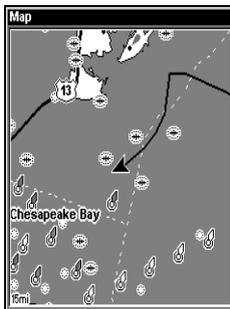


Map Menu (left). Map Categories Drawn Menu (right).

## Map Orientation

By default, this receiver shows the map with north always at the top of the screen. This is the way most maps and charts are printed on paper.

**In Track Up mode, map shows "N" and arrow to indicate north.**



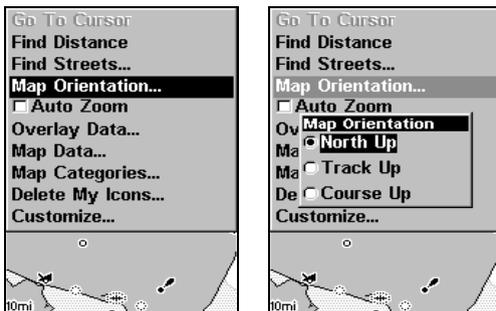
Map orientation is shown in north up (left) and in track up (right).

This is fine if you are always traveling north. What you see to your left corresponds with the left side of the map and what is on your right is shown on the right side of the map and so on. If, however, you travel any other direction, the map does not line up with your view of the world.

To correct this problem, track-up mode rotates the map as you turn. What you see on the left side of the screen should always be to your left, and so on.

Another option is course-up mode, which keeps the map at the same orientation as the initial bearing to the waypoint. When either track-up or course-up mode is on, an "N" shows on the map screen to help you see which direction is north.

To change map orientation from the Map Page, press **MENU** | **↓** to **MAP ORIENTATION** | **ENT**. Use **↑** **↓** to select the desired mode, then press **ENT**. Press **EXIT** | **EXIT** to return to the main page display.



Map Orientation selected on Map Menu (left).

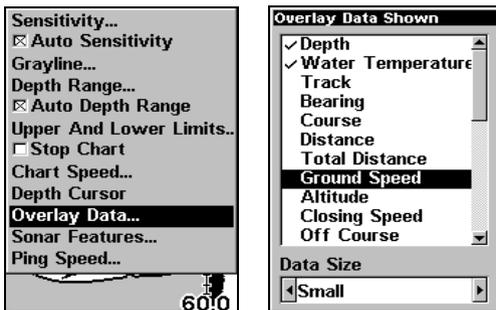
North Up option selected on Map Orientation menu (right).

## Overlay Data

To change the digital data shown on the Map, Sonar or Map with Sonar pages, press **PAGES**, then use **↓** **↑** to select the Full Map, Sonar or Map with Sonar page and press **EXIT**.

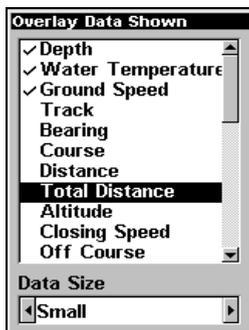
**To select data for display:**

1. From the Map, Sonar or Map with Sonar pages, press **MENU** | **↓** to **OVERLAY DATA** | **ENT**.
2. Use **↓** **↑** to select a *Data Type*, then press **←** **→** to turn the data option on (check) or off (unchecked).



Overlay Data command on the Sonar Menu (left). Overlay Data Shown selection menu (right). In this example, we scrolled down the data list to highlight Ground Speed.

When selected, the data type shifts to the top of the data list and a check mark appears beside the data type. If you want, you may use ↓ ↑ to select other Data Types for display.



Data list showing Ground Speed selected to display on Map Page.

3. To return to the previous page, press **EXIT**.

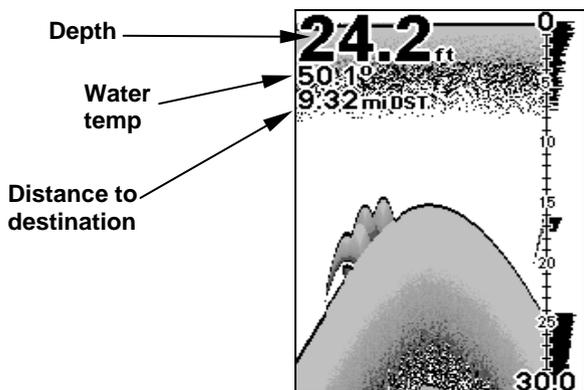
**To turn off displayed data:**

1. From the Map, Sonar or Map with Sonar page, press **MENU** | ↓ to **OVERLAY DATA** | **ENT**.

2. Use ↓ ↑ to select a *Data Type*, then press ← → to turn off (uncheck) the data option. The selected data type disappears from the top of the list and reverts to its previous, unchecked position. If you wanted, you could use ↓ ↑ to select other data types.
3. To return to the previous page, press **EXIT**.

**To change displayed data font size:**

1. From the Map, Sonar or Map with Sonar page, press **MENU** | ↓ to **OVERLAY DATA** | **ENT**.
2. Use ↓ ↑ to select *Data Type*, then press ← → turn on (check) the data type and modify the data size. Use ← → to scroll through four data size options: Small, Medium, Large and Enormous. After you are satisfied with the data size, press **EXIT**. The selected data type will be displayed in the new size. To change the font size for another Data Type, press **ENT** and repeat these steps, beginning with step two above.
3. To return to the previous page, press **EXIT**.

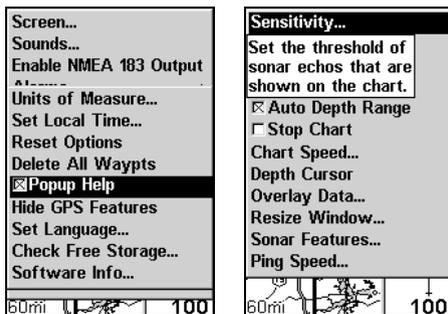


**Sonar Page with Overlay Data turned on. This example shows Depth, Water Temperature and Distance to the next waypoint.**

## Pop-up Help

Help is available for most all menu items in this unit. By leaving a menu item highlighted for a few seconds, a pop-up message appears that describes its function. This feature is on by default.

**To set up Popup Help:** Press **MENU | MENU | ↓** to **SYSTEM SETUP | ENT | ↓** to **POPUP HELP**. With the option highlighted, press **ENT** to turn it on (check) and turn it off (uncheck). After the option is set, press **EXIT | EXIT** to return to the main page display.



**System Setup Menu (left) with Pop-up Help highlighted. The Pop-up Help message for the Sensitivity command (right).**

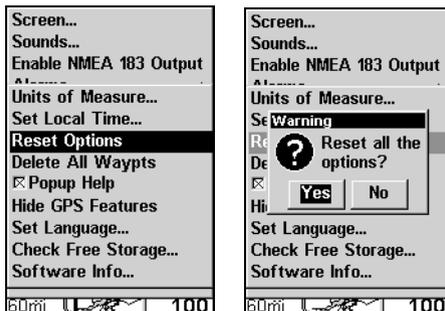
## Reset Options

To reset all features to factory defaults:

Press **MENU | MENU | ↓** to **SYSTEM SETUP | ENT | ↓** to **RESET OPTIONS | ENT | ←** to **YES | ENT**.

### NOTE:

Reset Options does *not* erase any waypoints, routes, icons, plot trails or sonar logs.



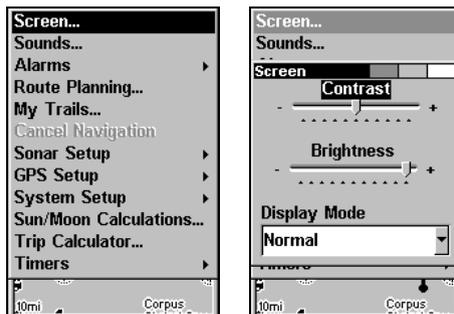
System Menu with Reset Options selected (left).  
Reset Options confirmation message (right).

## Screen Contrast and Brightness

To access the Screen menu, press **MENU | MENU | ENT**.

To adjust the display's contrast:

The **CONTRAST** slider bar is already selected. Press **← →** to move the bar. The left end of the scale is minimum contrast. The right end is maximum contrast.



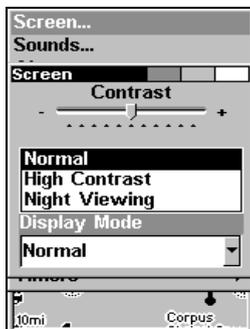
Screen command highlighted (left). Screen Menu with Contrast bar selected (right).

## To adjust the display's brightness:

From the screen menu, press ↓ to **BRIGHTNESS**. Press ← → to move the bar. The left end of the scale is minimum contrast. The right end is maximum contrast.

## To adjust the screen's display mode:

From the screen menu, press ↓ to **DISPLAY MODE** | **ENT** | press ↑ or ↓ to select *mode* | **EXIT**.



Display Mode menu.

## Set Language

This unit's menus are available in 10 languages: English, French, German, Spanish, Italian, Danish, Swedish, Russian, Dutch and Finnish. To select a different language:

1. Press **MENU** | **MENU** | ↓ to **SYSTEM SETUP** | **ENT**.
2. Press ↓ to **SET LANGUAGE** | **ENT**.
3. Use ↓ ↑ to select the desired language and press **ENT**. All menus now appear in the language you selected.

## Set Local Time

Using the local time setting is handy when estimating arrival time. The time and date are saved when a waypoint is created.

To access the Set Local Time menu, acquire your position, then press **MENU | MENU | ↓** to **SYSTEM SETUP | ENT | ↓** to **SET LOCAL TIME | ENT**.

**To set Local Time:** Press **ENT**. Press **↑ ↓** to change the first character, then press **→** to move the cursor to the next character. Repeat until the time is correct and press **ENT**.

**To set the Day:** Press **→** to **DAY | ENT**. Use **↑ ↓** to select the day and press **ENT**.

**To set the Month:** Press **↓** and **←** to **MONTH | ENT**. Use **↑ ↓** to select the month and press **ENT**.

**To set the Year:** Press **→** to **YEAR | ENT**. Press **↑ ↓** to select the year and press **ENT**.

**To set Time Format:** Press **↓** to **TIME FORMAT | ENT**. Use **↑ ↓** to select the desired Time Format and press **ENT**.

**To set Date Format:** Press **↓** to **DATE FORMAT | ENT**. Use **↑ ↓** to select the desired Date Format and press **ENT**.

In the center of the local time menu is **CONFIG DST**. It allows your unit to automatically make the adjustment for Daylight Savings. You may select which set of rules matches DST in your region or accept the default. Once you are satisfied with the time settings, press **EXIT** repeatedly to get back to the main page display.

## Show WAAS Alarm

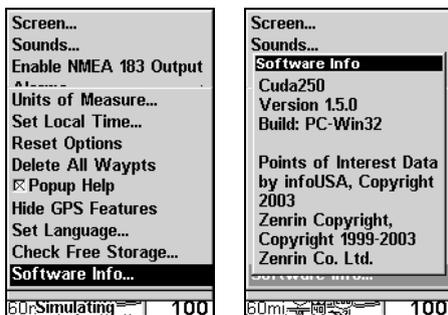
When the signal is available, your unit will automatically use WAAS to boost the accuracy of a position fix. When the WAAS signal is lost or acquired, an alarm message appears. Since the U.S. government is still developing the WAAS system, it is not unusual for a GPS/WAAS receiver to frequently lose and reacquire its lock on a WAAS satellite. That can result in the alarm going off repeatedly. If you want, you can turn off the WAAS Acquired/Lost alarm without affecting how the unit uses WAAS.

## To turn off WAAS alarm:

1. Press **MENU | MENU | ↓** to **GPS SETUP | ENT | ↓** to **SHOW WAAS ALARM**.
2. With the option highlighted, press **ENT** to turn it on (check) or turn it off (uncheck). After the option is set, press **EXIT | EXIT** to return to the main page display.

## Software Version Information

From time to time, Eagle updates the operating system software in some of its products. These software upgrades are usually offered to customers as free downloads from our web site, [www.eaglesonar.com](http://www.eaglesonar.com). These upgrades make the unit perform better or introduce a new feature or function. You can find out what software version is running in your Cuda by using the Software Information command.

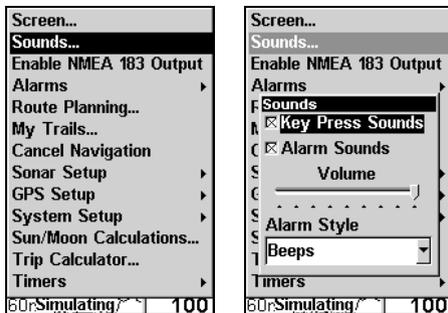


Main Menu with Software Information selected (left).  
The Software Information screen (right).

1. Press **MENU | MENU | ↓** to **SYSTEM SETUP | ENT | ↓** to **SOFTWARE INFO | ENT**.
2. Read the information displayed on the screen.
3. To return to the main page display, press **EXIT** repeatedly.

## Sounds and Alarm Sound Styles

To access Sounds menu: press **MENU** | **MENU** | ↓ to **SOUNDS** | **ENT**.



Sounds command (left). The Sounds menu (right).

**To set Key Press Sounds:** With the option highlighted, press **ENT** to turn it on (check) or turn it off (uncheck).

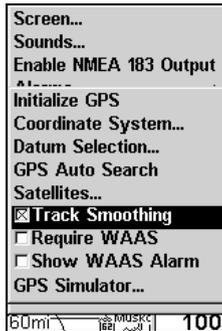
**To set Alarm Sounds:** Press ↓ to **ALARM SOUNDS**. With the option highlighted, press **ENT** to turn it on (check) or turn it off (uncheck).

**To set Alarm Volume:** Press ↓ to **VOLUME**. Press ← → to move the bar. The left end of the scale is low volume. The right end is high volume.

**To set Alarm Style:** Press ↓ to **ALARM STYLE** | **ENT**. Press ↑ ↓ to change the alarm style, then press **ENT**. After the option is set, press **EXIT** | **EXIT** to return to the main page display.

## Track Smoothing

This is a factory setting on the GPS Setup menu that *should always be left on*. When stopped or traveling at a slow speed — like walking or trolling — Track Smoothing prevents trails from wandering.



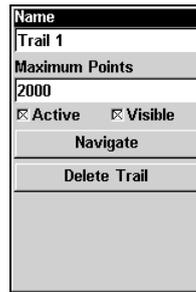
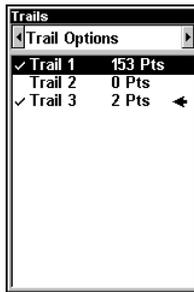
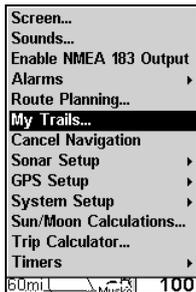
Track Smoothing option.

## Trail Options

There are several options you can use with trails. Some affect all trails. Other options can be applied to a particular trail. You can display or hide trails, create a new trail, delete a trail or change the way trails are updated.

### To access the Trails Menu:

Press **MENU | MENU | ↓** to **MY TRAILS | ENT**.



Main Menu (left). Trails Menu (center). Trail Options (right).

## Delete All Trails

To remove all of the trails from memory: from the Trails Menu, press → to **DELETE ALL** | **ENT** | ← to **Yes** | **ENT**.

## To Update Active Trail

From the Trails Menu, press → to **TRAIL OPTIONS** | **ENT**. With **UPDATE TRAIL** highlighted, press **ENT** to turn it on (check) or turn it off (uncheck).

## WARNING:

If you *uncheck* the Update Trail option, automatic trail creation and recording will be turned *off*. You must turn it back on to record trails. The default setting is on.

## Update Trail Criteria

There are three options for updating trails: automatic, time or distance. When it is in default mode (automatic), the unit does not update the plot trail while you are traveling in a straight line. Once you deviate from a straight line, the unit drops a plot point onto the trail. This conserves plot trail points. If a plot trail uses all of the available points allotted to it, the beginning points are taken away and placed at the end of the trail.

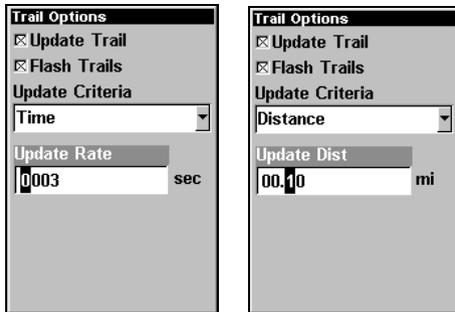
From the Trails Menu, press → to **TRAIL OPTIONS** | **ENT** | ↓ to **UPDATE CRITERIA** | **ENT**. Use ↑ ↓ to select *criteria type* | **ENT**. If you selected Time, the Update Rate data entry box appears on the menu. If you selected Distance, the Update Distance data entry box will appear.

## Trail Update Rate (Time, Distance)

You can update a trail by time with a range of 1 to 9999 seconds. The default is 3 seconds. There is a range of 0.01 mile/nm/km to 9.99 mile/nm/km if you update by distance. The default is 0.10 miles.

With one of the Update Criteria — Time or Distance — selected, highlight the update criteria data entry box and press **ENT**.

Press  $\uparrow$   $\downarrow$  to change the first character, then press  $\rightarrow$  to the next character and repeat until the entry is correct, the press **EXIT**.

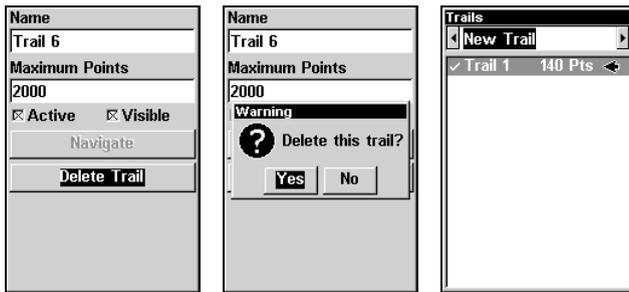


Trail Options menu with Update Rate setting (left) and Update Distance setting (right).

## Specific Trail Options

### Delete Trail

To delete a specific trail: From the Trails Menu, press  $\downarrow$  to *Trail Name* | **ENT**. The Edit Trail menu appears as seen in the following figure. Press  $\downarrow$  to **DELETE TRAIL** | **ENT** |  $\leftarrow$  to **YES** | **ENT**.



Edit Trail menu (left) with Delete Trail highlighted. Delete Trail confirmation message (center). New Trail selected on Trails menu (right).

## New Trail

To manually start a new trail in the Trails Menu, make sure **NEW TRAIL** is selected and press **ENT**. You will be directed to the Edit Trail screen.

## Trail Visible/Invisible and Other Trail Options

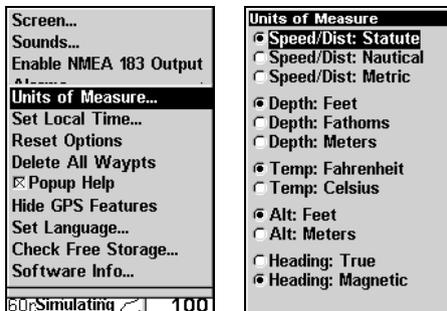
The name, active and visible settings and maximum number of points in the trail, all are accessed on the Edit Trail menu. The Active setting determines whether or not the unit is recording new points for a particular trail. On the Edit Trail menu, press  $\downarrow \uparrow$  to highlight the section you want to change, then press **ENT**. Make your changes, then press **EXIT** to close this menu.

## Units of Measure

This menu sets the units of measure used for Speed and Distance, Depth, Temperature, Altitude and Heading.

### To change units of measure:

Press **MENU | MENU |  $\downarrow$  to SYSTEM SETUP | ENT | ENT**.



Units of Measure on System Setup menu (left).

Units of Measure Menu (right).

**To set Units of Measure:** Press  $\downarrow$  to the desired units, then press **ENT** to turn a unit on or off. After all options are set, press **EXIT | EXIT** to return to the main page display.

# FCC Compliance

This device complies with Part 15 of the U.S. Federal Communications Commission (FCC) Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

## **Note:**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the factory customer service department for help.

## EAGLE DATABASES LICENSE AGREEMENT

THIS IS A LEGAL AGREEMENT BETWEEN THE END-USER WHO FIRST PURCHASES THIS PRODUCT AS A CONSUMER ITEM FOR PERSONAL, FAMILY, OR HOUSEHOLD USE ("YOU") AND EAGLE ELECTRONICS, A DIVISION OF LEI, THE MANUFACTURER OF THIS PRODUCT ("WE", "OUR", OR "US"). USING THE PRODUCT ACCOMPANIED BY THIS LICENSE AGREEMENT CONSTITUTES ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT ACCEPT ALL TERMS AND CONDITIONS, PROMPTLY RETURN THE PRODUCT WITHIN 30 DAYS OF PURCHASE. PLEASE RETURN USING THE ENCLOSED UPS SHIPPING LABEL AND INCLUDE: PROOF OF PURCHASE, NAME, ADDRESS, AND PHONE NUMBER. YOUR PURCHASE PRICE AND ANY APPLICABLE TAXES WILL BE REFUNDED. PLEASE ALLOW 4-6 WEEKS TO PROCESS YOUR REFUND.

1. This License Agreement applies to the one or more databases that your product may contain. We refer to these singly as a "Database" and together as the "Databases." Your product may thus include the "WBS Database" which contains worldwide background surface mapping data, the "SmartMap Database" which contains inland mapping data, or other Databases.
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6. This License Agreement shall be governed by the laws of the State of Oklahoma and comprises the complete and exclusive understanding between you and us concerning the above subject matter.

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"We", "our", or "us" refers to Eagle Electronics, a division of LEI, the manufacturer of this product. "You" or "your" refers to the first person who purchases the product as a consumer item for personal, family, or household use. The Databases Limited Warranty applies to the one or more databases that your product may contain. We refer to each of these as a "Database" or together as the "Databases." Your product may thus include the "WBS Database" which contains worldwide background surface mapping data, the "SmartMap Database" which contains inland mapping data, or other Databases.

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Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty does NOT apply in the following circumstances: (1) when the product has been serviced or repaired by anyone other than us, (2) when the product has been connected, installed, combined, altered, adjusted, or handled in a manner other than according to the instructions furnished with the product, (3) when any serial number has been effaced, altered, or removed, or (4) when any defect, problem, loss, or damage has resulted from any accident, misuse, negligence, or carelessness, or from any failure to provide reasonable and necessary maintenance in accordance with the instructions of the owner's manual for the product.

We reserve the right to make changes or improvements in our products from time to time without incurring the obligation to install such improvements or changes on equipment or items previously manufactured.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

Your remedies under this warranty will be available so long as you can show in a reasonable manner that the defect occurred within one (1) year from the date of your original purchase, and we must receive your warranty claim no later than 30 days after such 1-year period expires. Your claim must be substantiated by a dated sales receipt or sales slip.

**EAGLE ELECTRONICS**  
**FULL ONE-YEAR WARRANTY**

"We," "our," or "us" refers to EAGLE ELECTRONICS, a division of LEI, the manufacturer of this product. "You" or "your" refers to the first person who purchases this product as a consumer item for personal, family, or household use.

We warrant this product against defects or malfunctions in materials and workmanship, and against failure to conform to this product's written specifications, all for one (1) year from the date of original purchase by you. WE MAKE NO OTHER EXPRESS WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER CONCERNING THIS PRODUCT. Your remedies under this warranty will be available so long as you can show in a reasonable manner that any defect or malfunction in materials or workmanship, or any non-conformity with the product's written specifications, occurred within one year from the date of your original purchase, which must be substantiated by a dated sales receipt or sales slip. Any such defect, malfunction, or non-conformity which occurs within one year from your original purchase date will either be repaired without charge or be replaced with a new product identical or reasonably equivalent to this product, at our option, within a reasonable time after our receipt of the product. If such defect, malfunction, or non-conformity remains after a reasonable number of attempts to repair by us, you may elect to obtain without charge a replacement of the product or a refund for the product. THIS REPAIR, OR REPLACEMENT OR REFUND (AS JUST DESCRIBED) IS THE EXCLUSIVE REMEDY AVAILABLE TO YOU AGAINST US FOR ANY DEFECT, MALFUNCTION, OR NON-CONFORMITY CONCERNING THE PRODUCT OR FOR ANY LOSS OR DAMAGE RESULTING FROM ANY OTHER CAUSE WHATSOEVER. WE WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO ANYONE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, OR OTHER INDIRECT DAMAGE OF ANY KIND.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty does NOT apply in the following circumstances: (1) when the product has been serviced or repaired by anyone other than us; (2) when the product has been connected, installed, combined, altered, adjusted, or handled in a manner other than according to the instructions furnished with the product; (3) when any serial number has been effaced, altered, or removed; or (4) when any defect, problem, loss, or damage has resulted from any accident, misuse, negligence, or carelessness, or from any failure to provide reasonable and necessary maintenance in accordance with the instructions of the owner's manual for the product.

We reserve the right to make changes or improvements in our products from time to time without incurring the obligation to install such improvements or changes on equipment or items previously manufactured.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

REMINDER: You must retain the sales slip or sales receipt proving the date of your original purchase in case warranty service is ever required.

**EAGLE ELECTRONICS**  
**PO BOX 669, CATOOSA, OK 74015**  
**(800) 324-1354**

# **How to Obtain Service...**

## **...in the USA:**

We back your investment in quality products with quick, expert service and genuine Eagle replacement parts. If you're in the United States and you have technical, return or repair questions, please contact the Factory Customer Service Department. Before any product can be returned, you must call customer service to determine if a return is necessary. Many times, customer service can resolve your problem over the phone without sending your product to the factory. To call us, use the following toll-free number:

**800-324-1354**

8 a.m. to 5 p.m. Central Standard Time, M-F

*Eagle Electronics may find it necessary to change or end our shipping policies, regulations, and special offers at any time. We reserve the right to do so without notice.*

## **...in Canada:**

If you're in Canada and you have technical, return or repair questions, please contact the Factory Customer Service Department. Before any product can be returned, you must call customer service to determine if a return is necessary. Many times, customer service can resolve your problem over the phone without sending your product to the factory. To call us, use the following toll-free number:

**800-661-3983**

**905-629-1614 (not toll-free)**

8 a.m. to 5 p.m. Eastern Standard Time, M-F

## **...outside Canada and the USA:**

If you have technical, return or repair questions, contact the dealer in the country where you purchased your unit. To locate a dealer near you, visit our web site, [www.eaglesonar.com](http://www.eaglesonar.com) and look for the Dealer Locator.

# Accessory Ordering Information for all countries

To order Eagle accessories such as power cables or transducers, please contact:

1) Your local marine dealer or consumer electronics store. Most quality dealers that handle marine electronic equipment or other consumer electronics should be able to assist you with these items.

To locate an Eagle dealer near you, visit our web site, [www.eaglesonar.com](http://www.eaglesonar.com) and look for the Dealer Locator. Or, you can consult your telephone directory for listings.

2) U.S. customers: LEI Extras Inc., PO Box 129, Catoosa, OK 74015-0129

Call 1-800-324-0045 or visit our web site [www.lei-extras.com](http://www.lei-extras.com).

3) Canadian customers can write:

Lowrance/Eagle Canada, 919 Matheson Blvd. E. Mississauga, Ontario L4W2R7  
or fax 905-629-3118.

## Shipping Information

If it becomes necessary to send a product for repair or replacement, you must first receive a return authorization number from Customer Service. Products shipped without a return authorization will not be accepted. When shipping, we recommend you do the following:

1. Please do not ship the knobs or mounting bracket with your unit.
2. If you are sending a check for repair, please place your check in an envelope and tape it to the unit.
3. For proper testing, include a brief note with the product describing the problem. Be sure to include your name, return shipping address and a daytime telephone number. An e-mail address is optional but useful.
4. Pack the unit in a suitable size box with packing material to prevent any damage during shipping.
5. Write the Return Authorization (RA) number on the outside of the box underneath your return address.
6. For your security, you may want to insure the package through your shipping courier. Eagle does not assume responsibility for goods lost or damaged in transit.

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Eagle Pub. 988-0152-101

Printed in USA 113005

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