



Expedition II TM

**INSTALLATION AND
OPERATION INSTRUCTIONS**



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WARNING!

USE THIS UNIT ONLY AS AN AID TO NAVIGATION. A CAREFUL NAVIGATOR NEVER RELIES ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION.

Never use this product while operating a vehicle.

CAUTION

When showing navigation data to a position (waypoint), this 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 travelling to a waypoint, but will also visually check to make certain a clear, safe path to the waypoint is always available.

The operating and storage temperature for your unit is from -4 degrees to +167 degrees Fahrenheit (-20 to +75 degrees Celsius). Extended storage temperatures higher or lower than specified will cause the liquid crystal display to fail. Neither this type of failure nor its consequences are covered by the warranty. For more information, consult the factory customer service department.

All features and specifications subject to change without notice.

Eagle Electronics may find it necessary to change or end our policies, regulations, and special offers at any time. We reserve the right to do so without notice.

All screens in this manual are simulated.

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INTRODUCTION

Welcome to the exciting world of GPS! Whether you're a first-time user or a professional navigator, you'll find the Expedition II is a full-featured GPS receiver at a price that was impossible just a few years ago. The Rockwell® receiver built inside has 12 channels that will track all of the satellites that are in view of your location. It's acquisition time and tracking ability are second to none in its class.

The Global Positioning System (GPS) was developed by the United States Department of Defense as a 24-hour a day, 365 days a year global navigation system for the military. Civilian availability was added with less accuracy using the same satellites. Twenty-four satellites orbit the Earth. Three of these satellites are spares, unused until needed. The rest virtually guarantee that at least four satellites are in view of anyplace on Earth at all times.

The system requires 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.) called a 3D fix.

Remember, the unit must have a clear view of the satellites in order to receive their signals. Unlike radio or television, GPS works at very high frequencies. The signals can be blocked easily by trees, buildings, even your body. Fortunately, they do travel through glass and plastic, so your receiver will work in the car, if it has a clear view of the satellites through the windshield or side windows. Let someone else drive if you use it in a car or other vehicle.

Never use this GPS receiver while operating a vehicle!

The first time you use this unit, walk outside and turn it on in your backyard, an open field or park. Once it locks onto the satellites, you can experiment with it around buildings and trees. This will give you some idea of its sensitivity to blockage.

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 it 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 speeds - it will. There will simply be more "wandering" of the data shown on the display.

S/A - What is it?

Another factor that greatly influences the receiver's ability to determine position is SA. The United States government intentionally degrades the satellites signal for civilian users. They introduce small errors into the satellite's signals that makes the GPS receiver less accurate. These errors are called selective availability, or SA. How bad is it? They guarantee that the position reported by a GPS receiver that meets their specifications is within 100 meters horizontally and 150 meters vertically 95% of the time. (The position can be better than that or worse than that the other 5% of the time.) In other words, the position shown on your receiver is within 100 meters of your actual position, 95% of the time. That's over 300 feet! Not exactly pinpoint accuracy, but then few people need positioning accuracy greater than this. However, if you do want better performance, (and who doesn't?) many manufacturers (including Eagle) sell a DGPS receiver that attaches to your GPS receiver. The DGPS system transmits correction signals that nullify the effects of SA. The DGPS receiver takes signals from these land-based transmitters and gives them to the GPS receiver which then uses them to show a more accurate position. The ironic part is the federal government implemented SA and is also operating many DGPS transmitters. (You can use the signals from all of the Coast Guard DGPS stations for free, by the way.) The downside to this is it requires another piece of electronic gear (the DGPS receiver) which usually isn't small enough to carry with you, but will work nicely on a vehicle. And you have to be close enough to a station to receive the DGPS signals.

Don't Get Lost

Generally, you find that using your GPS receiver without DGPS is both easy and amazingly accurate. It's easily the most accurate method of electronic navigation available to the general public today. Remember, however that this receiver is only a tool. Always have another method of navigation available, such as a chart or map and a compass. It's a good idea to carry spare batteries with you, especially if you're venturing into unknown territory.

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 camp, for example. It's up to you to safely navigate around obstacles, no matter how you're using this product.

GETTING STARTED

Power

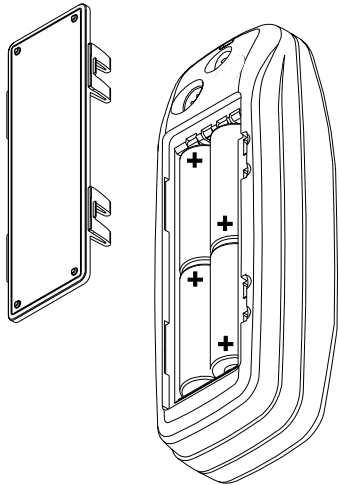
The Expedition operates from four AA batteries, or one DURACELL® NiMH rechargeable battery, or from 5 to 16 volts DC using the external power cable. If the power cable is used, the Expedition automatically switches to it if the external power is greater than the battery voltage. If for any reason the external power fails, the unit automatically switches to the batteries.

BATTERIES

The unit requires four AA batteries. We recommend you use alkaline batteries for the best trade-off between battery life and cost. However, you can use nickel-cadmium (ni-cad), or lithium batteries. You can also use rechargeable alkaline batteries such as RayOVac® Renewals®. With the exception of lithium, none of the above batteries will last as long as standard alkaline batteries. We recommend DURACELL® brand, but others will work. Do not use “heavy-duty” batteries or any type other than the ones listed above. Do not mix different types of batteries. (For example, don’t use both alkaline and ni-cad batteries at the same time.)

Battery Installation

First turn the unit so that its back is facing you. Push the two tabs to the left and remove the battery cover as shown at right. Install the batteries according to this diagram. (There’s a decal in the battery compartment showing the correct polarity, also.) Replace the battery compartment cover and the unit is ready for use.



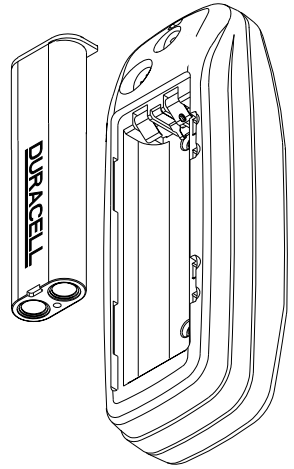
NiMH Battery

The DURACELL® DR-121 nickel-metal hydride (NiMH) battery replaces the four standard batteries. It is sold as an accessory, model BR-1 which includes a charger custom designed for the DR-121. The battery never needs to be removed from the unit, since the charger connects to the GPS receiver and charges the DR-121. You can even use the receiver while the battery is charging!

To install the NiMH battery, remove the battery cover and place the battery into the compartment as shown on the next page. It will only fit one way, so if it’s difficult to install, simply turn it over and drop it into place.

Replace the compartment cover and follow the charging instructions included with the BR-1.

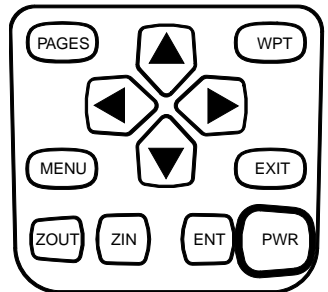
(Note: The DR-121 is the only battery that can be recharged in this unit! Using the external power cable alone does not charge the battery! You must use a charger supplied by Eagle in order to charge the battery. Also, this charger will only charge a DR-121. It will not charge any other type of battery, including nicads or rechargeable alkalines.)



OPERATION

Keyboard

There are 12 keys on the keyboard. You navigate through the menus, adjust the chart's cursor, and enter data using the arrow keys. The five major modes of operation are accessed using the PAGES key. Press the MENU key to select or adjust a feature from a list. The Z-IN and Z-OUT keys zoom-in or zoom-out the view on the plotter screen. The ENT and EXIT keys are used to enter or clear data or screens. Save and edit waypoints using the WPT key. The PWR key turns the unit on and off. Pressing it once while the unit is operating turns on the screen's backlight. To prevent an accidental shutdown, you must hold the PWR key down for a few seconds in order to turn the unit off.



Menus

Most of the unit's features are found on "menus". You can view the menus by pressing the MENU key. This product has "Intelligent Menus". There are many menus that pertain to only the plotter, for example. When you press the MENU key and the plotter is showing, menu items for the plotter

show in addition to the normal menus. If the navigation screen is showing, and you press the MENU key, plotter menu items won't show on the list. This helps you find the item you need without scrolling through unnecessary menus.

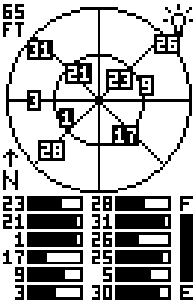
Turning Power On

To turn the unit on, simply press the PWR key. A screen similar to the one at right appears. Read the message on the screen, then press the EXIT key to erase it or wait a few seconds and it automatically clears. The screen shown below appears next.



Satellite Status Screen

This screen appears each time you turn the unit on. It shows a graphical view of the satellites that are in view. Each 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 you hold the unit facing north.



The GPS receiver is tracking satellites that are surrounded by a black box. If the satellite number is not surrounded by a box, then the receiver hasn't locked onto that satellite and it isn't being used to solve the position.

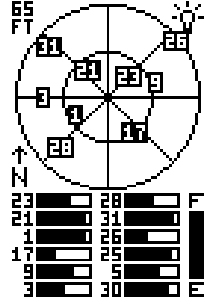
Beneath the graph are the bar graphs, one for each satellite in view. Although the unit has twelve channels, it dedicates one channel per visible satellite. Therefore, if only six satellites are visible, only six bar charts show at the bottom of the screen. The higher the bar on the graph, the better the unit is receiving the signals from the satellite.

The number in the upper left corner is the "expected horizontal position error" or expected error from a benchmark location. In other words, if the expected error shows 50 feet, then the position shown by the unit is estimated to be within 50 feet of the actual location. However, this number is only valid if you're using DGPS or if S/A is turned off. Due to S/A, the accuracy can only be less than 100 meters, 95% of the time, per U.S. government specifications. Although the expected error is not accurate unless you have a DGPS receiver, it does give you an indicator of the fix

quality the unit currently has. The smaller the expected error number, the better (and more accurate) the fix is.

If the expected error is flashing, then the unit has not locked onto the satellites, and the number shown is not valid.

A battery level indicator on the lower right side of the screen shows the approximately how much life is in the batteries. This runs from “F” (fully charged) to “E” (expired).



A light bulb indicator at the top right corner of the screen appears when the backlights are on.

You can press the EXIT key anytime to erase this screen. This automatically switches the unit to the last-used navigation, plotter, or window group screen.

Finding Your Position

Auto Search

To lock onto the satellites, the GPS receiver needs to know its current position, local time, and date. (Elevation (altitude) is also used in the equation, but it's rarely required to determine a position.) It needs this data so that it can calculate which satellites should be in view. It then searches for only those satellites. When your GPS receiver is turned on for the first time, it doesn't know what your position or elevation (altitude) is. It does know the current UTC time and date since these were programmed into it at the factory and an internal clock keeps the time while the unit is turned off. It begins searching for the satellites using the above data that it acquired the last time it was turned on. This probably was at the Eagle factory. Since it's almost certain that you're not at the Eagle factory, it's probably looking for the wrong satellites. If it doesn't find the satellites it's looking for after five minutes, it switches to the Quick Initialization screen. This lets you enter your location from a list of states and countries. If you simply press the EXIT key while the Quick Initialization screen is showing, after a few minutes the unit begins to search for any satellite. This is called "Auto Search". Due to advanced technology, the auto search time has shrunk to about five minutes, so the longest time you should ever have to wait is ten minutes from the time you turn the unit on until it locks onto the satellites and shows a position. Once the unit locks onto the satellites, it should take less than a minute to find your position the next time it's turned on, provided you haven't moved more than approximately 100 miles from the last location it was used.

Quick Initialization

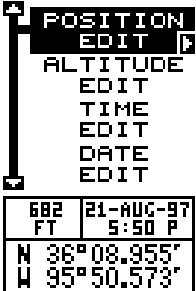
If you don't want to wait for the Auto Search, then you can speed up the initialization process by using the "Quick Initialization" feature. To do this, first turn the unit on, then press the MENU key. The screen shown at right appears. Now press the down arrow key until the "GPS SETUP" label is highlighted. Press the right arrow key. The "INIT GPS" (Initialize GPS) label is highlighted. Press the right arrow key. The Quick Initialization label is highlighted. Press the right arrow key. The screen at right appears. All of the states in America are listed, along with most of the countries in the world. Using the up or down arrow keys, highlight the state or country that is closest to your location, then press the right arrow key. The unit returns to the initialize GPS menu. Press the EXIT key three more times to erase the menus. The unit returns to the satellite status screen.



Using the quick initialization method loads a position that's close to yours into the GPS receiver. It should now have position, time, and date, thereby giving it the data it needs to determine which satellites are in view. Once the satellites are known, the receiver searches for only those satellites, making a lock much faster than an auto search method.

Full Initialization

There are occasions when you will want or need to manually initialize the unit by entering the position, elevation, time, and date. To do this, press the MENU key, Now press the down arrow key until the "GPS SETUP" label is highlighted. Press the right arrow key. The "INIT GPS" (Initialize GPS) label is highlighted. Press the right arrow key. Now highlight the "FULL INIT" label and press the right arrow key. The screen at right appears.

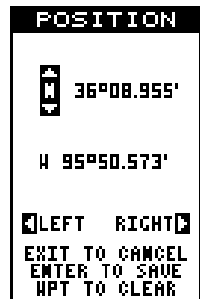


This is the full initialization screen. The position, altitude, time, and date the GPS receiver is currently using to find the satellites shows at the bottom of the screen. To update these settings to the current values, simply highlight the desired label using the up or down arrow keys, then press the right arrow key. The position label (see at the top of the next page) was selected in this example.

To change a number in the position, highlight it using the right arrow key, then use the up or down arrow key to change its value. The left arrow key acts as a backspace. When the position is correct, press the ENT key.

The unit returns to the full initialization screen.

Repeat this for each of the other settings until they're correct for your location and time. Note: The position doesn't have to be very accurate. If you enter a position within one degree of your actual location, the unit will be able to acquire the proper satellites.



Press the EXIT key to erase the full initialization menu. The unit will use the data you entered to find the satellites that are currently in view. The receiver should lock onto them and show a position within a few minutes.

Position Acquisition

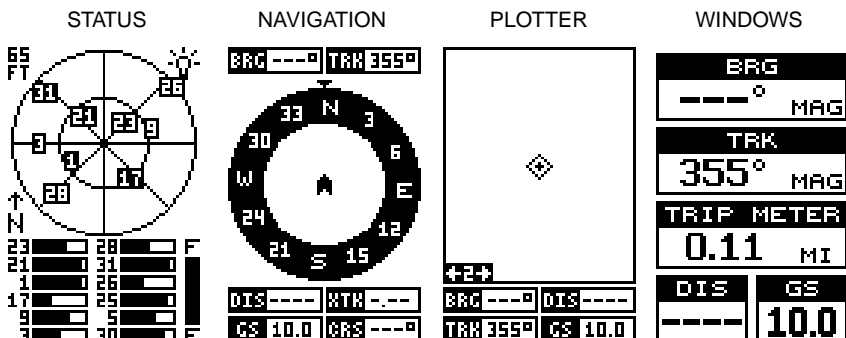
When the receiver locks onto and calculates a position, it shows the message "Position Acquired" on the screen. All position and navigation data flashes until the unit acquires a position. *Do not rely on any data that is flashing!* When the numbers are flashing, they represent the last known values when the unit lost its lock on the satellites.

(Note: The altitude data may still flash even if the unit shows a "Position Acquired" message and all other data is not flashing. The unit must be locked onto at least four satellites to determine altitude. It only takes three satellites to determine position. You can navigate with this unit if the altitude is flashing, simply ignore the altitude display until it quits flashing.)

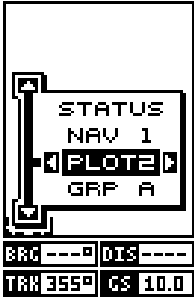
REMEMBER, DO NOT NAVIGATE WITH THIS UNIT UNTIL THE NUMBERS STOP FLASHING!

POSITION/NAVIGATION SCREENS

This unit has four modes: status, plotter, navigation, and window groups. Use the PAGES and arrow keys to switch between the different screens. The four screens that show by default are shown below.



To change modes, simply press the PAGES key. A screen similar to the one at right appears. Use the up or down arrow keys to change modes. (The windows mode is shown as “GRP” (groups); group “A” is the first windows group.)



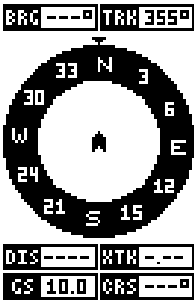
Press the right arrow key while the above menu is showing to switch between different versions of each mode. When the desired screen appears, press the EXIT key to erase the menu.

Navigation Screens

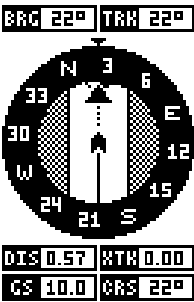
There are two different navigation screens. Nav screen number one shows a graphical view of your trip, Nav screen number 2 shows all navigation details in large digital numbers. You can also customize both navigation screens to show data other than the default. See the “Programming Boxes” section for more information.

Nav Screen #1

This screen has a compass rose that shows not only your direction of travel, but also the direction to a recalled waypoint. The navigation screen looks like the one at right when you’re *not* navigating to a waypoint. Your position is shown by an arrow in the center of the screen. Your trail history, or path you’ve taken is depicted by the line extending from the arrow. The arrow pointing down at the top of the compass rose indicates the current track (direction of travel) you are taking. This is also shown in the “TRK” (track) box in the upper right corner of the screen. On the example shown at right, the track is 355°. The current ground speed (GS) shows in the box in the lower left corner of this screen.

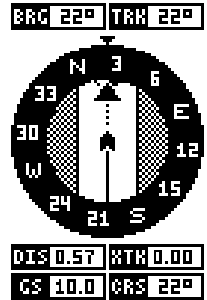


When navigating to a waypoint, Nav screen number one looks like the one at right. Bearing to the destination waypoint is in the box in the upper left corner. Bearing is also shown by the large arrow pointing up towards the compass, above the present position arrow. Distance from the present position to the waypoint (DIS) shows beneath the compass on the lower left side of the screen.

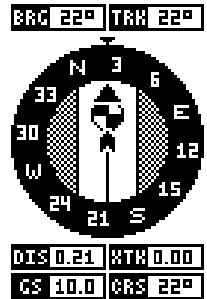


Lines on either side of the present position show the current cross track error range. Cross track error is the

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. It's shown on the screen as a vertical dotted line. The default for the cross track error range is 0.25 mile. For example, if the present position symbol touches the right cross track error line, then you are .25 mile to the right of the desired course. You need to steer left to return to the desired course. The cross track error is also shown in the "XTK" box. Beneath this box is the course (CRS) box showing the direction from your starting position to the waypoint. Remember, a course is a proposed path from the starting position to the destination. Track is your actual direction of travel.



A circle depicting your destination (waypoint) appears on the screen as you approach the waypoint as shown on the screen at right.



Nav Screen #2

This navigation screen shows all navigation information in large digital numbers. To view this screen, press the PAGES key, then press the up arrow key until the "NAV1" label is highlighted. While it's highlighted, press the right arrow key. The screen shown at right appears. Press the EXIT key to erase the menu.



This screen is composed of eight digital boxes. Track (TRK) and ground speed (GS) are all that show if you're not navigating to a waypoint. If you are navigating to a waypoint, then bearing (BRG), distance to waypoint (DIS), estimated time en route (ETE), course (CRS), cross track error (XTK), and the CDI also operate. See below for more information on the CDI.

Course Deviation Indicator (CDI)

Once navigation to a waypoint is established, the CDI shows your distance to the left or right of the desired course. The vertical line in the box shows both the direction you must steer to get back on course and the distance to the course line. For example, if you're travelling straight towards the destination, from the start, then the line stays



in the center. If you drift off course to the left, the line moves to the *right*. This signifies that you need to steer to the right to get back on course. This is called “chasing the needle”. If you steer towards the line (needle), you’ll always be heading in the correct direction to get back on course.

The CDI’s range shows in the upper right corner of the CDI box. You can adjust the range by selecting the “ALARMS/CDI” label on the main menu. The default is 0.25 mile. This is also shown by the dots at the far left and right side of the CDI. If the line is on either of these dots, then you are 0.25 mile off course. Remember, if the line moves to the left, then you are too far to the right of the desired course line and vice-versa. On the CDI shown above, the we are almost 0.125 mile to the left of the desired course.

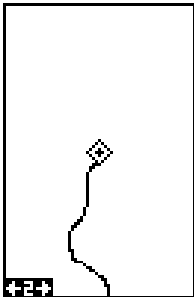
Plotter

The plotter shows your course and track from a “birds-eye” view. If you’re navigating to a waypoint, the plotter shows your starting location, present position, course line, and destination. You don’t have to navigate to a way-point, however, to use the plotter.

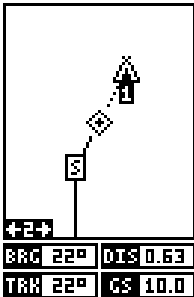
Using the plotter is as simple as pressing the PAGES key, then highlighting “PLOT 1”. A screen similar to the one below appears. The diamond flashing in the center of the screen is your present position. The solid line extending from the diamond is your plot trail, or path you’ve taken. The plotter’s range shows in the lower left corner of the screen. In this example, the plotter’s range is two miles from the left edge of the screen to the right.

There are three different plotter screens available. To view the other plotter screens, press the PAGES key, highlight the PLOT label, and press the right arrow key. Press the EXIT key to erase the menu. Plot-2 (shown at right) has navigation data added at the bottom of the screen, beneath the plotter. The data includes bearing to waypoint (BRG), distance to waypoint (DIS), ground speed (GS), and track (TRK).

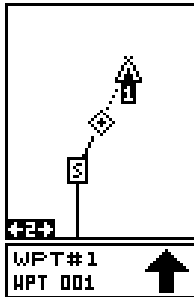
PLOT-1



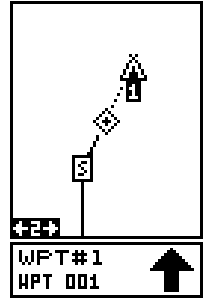
PLOT-2



PLOT-3



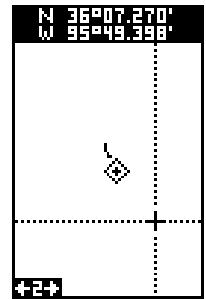
Plot-3 (see at the top of the next page) is similar to plot-2. The major difference is the steering arrow and waypoint information at the bottom of the screen. When you navigate to a waypoint, the waypoint's name and number show at the bottom of this screen. The steering arrow always points in the direction to the waypoint.



The Z-IN and Z-OUT keys zoom-in and out all plotters to enlarge or reduce their coverage area. The available ranges are: 0.1, 0.15, 0.2, 0.3, 0.4, 0.6, 0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 15, 20, 30, 40, 60, 80, 100, 150, 200, 300, 400, 600, 800, 1000, 1500, and 2000 miles. Pressing both the Z-IN and Z-OUT centers the cursor's position on the plotter screen.

Cursor

Pressing an arrow key turns on two dotted lines that intersect at the present position symbol. These lines are called a "cursor" and have a variety of uses.

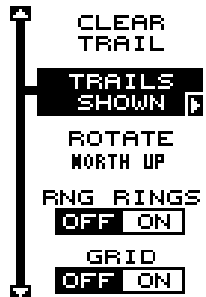


To turn the cursor on, simply press the arrow key in the direction you want the cursor to move. This lets you view areas on the plotter that are away from your present position. The cursor's latitude and longitude show at the top of plot-1's screen. The zoom-in and zoom-out keys work from the cursor's position when it's active - not the present position. You can zoom in on any detail, anywhere. The cursor can also place icons and waypoints.

Press the EXIT key to erase the cursor.

Plotter Options

This unit lets you customize the plotter using the plotter options menu. To use this menu, press the MENU key, then highlight the "Plotter Options" label. The screen at right appears.



Update Options

By default, the plotter places a dot on the screen every 3 seconds to create the plot trail. You can change this time from once per second to once every thirty minutes. The plot trail can also be updated by distance instead of by time. The distance update rate can be set from 0.01 to once every 10 miles.

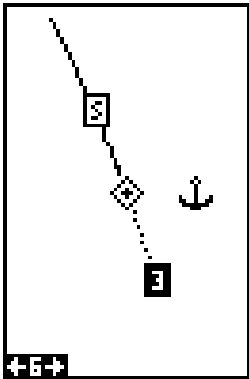
From the Plotter Options menu, choose Update Options to change the update rate or type. Select the option that you wish to change, use the left or right arrow keys to adjust it, then press the EXIT key to erase the menu.

Plotter Orientation

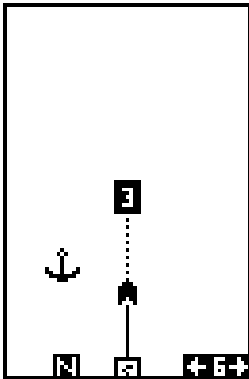
Normally, the plotter shows north at the top of the screen. This is the way most maps and charts are printed. This is fine if you're travelling northward. Waypoints on the plotter's left side should also be to your left, and so on. However, if you travel any other direction, the plotter doesn't line up with your view of the world.

To solve the problem, this unit has a track-up mode that orients the top of the display to your track, or direction of travel. It rotates the plotter as you turn. Thus, what you see on the left side of the plotter should always be on your left. The unit also has a course-up mode that locks the course to the top of the display.

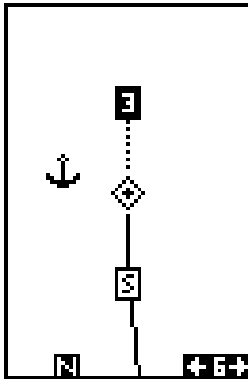
On the example screens shown below, we're travelling southward (about 150°). In the north-up view, the present position indicator appears to move toward the lower right corner of the screen. The anchor icon shown on the right side of the screen is actually on our left. North is always at the top of this screen.



NORTH-UP MODE



TRACK-UP MODE



COURSE-UP MODE

In the track-up view, the present position symbol (which has changed to an arrow) moves straight toward the top of the display. As you can see, the anchor icon is now shown in its proper orientation - to the left. A "N" shows to help see which direction north is when the track-up mode is on. Remember, in the track-up mode, the screen rotates as you change direction. It always keeps your direction of travel (track) headed towards the top of the screen.

The course-up mode locks the top of the screen into the original bearing to the waypoint when navigation was first started. (See the navigation section for more information on course, track, and waypoint navigation.)

To select a plotter orientation, highlight the "ROTATE" label on the "Plotter Options" menu. Press the right or left arrow keys until the desired mode appears. Press the EXIT key to erase the menu.

Plot Trails

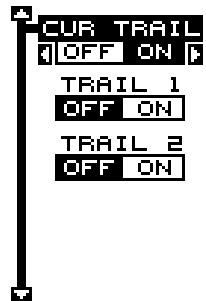
Save Trail

The line extending from the present position is your plot trail, or path you've taken. The unit automatically saves the current plot trail in memory when you turn it off. You can save two other trails in memory. To save your current plot trail in a specific memory location, choose "SAVE TRAIL" from the "Plotter Options" menu. The screen shown at right appears. Highlight the desired number that you wish to save the current trail, (i.e. "Trail 1 or Trail 2) and press the right arrow key. Your current trail is saved. Press the EXIT key to erase this menu.



View (Recall) Trail

Your current plot trail shows on the plotter by default. To place a saved trail onto the plotter, choose "TRAILS SHOWN" from the Plotter Options menu. The screen shown at right appears. Highlight the desired trail on this screen, then press the right arrow key to select it. Press the EXIT key to erase this menu. The plot trail you selected shows on the plotter.

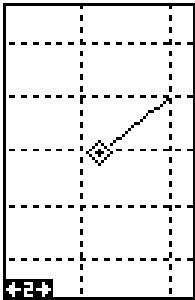


Clear Trail

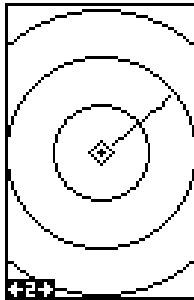
To erase the current plot trail from the screen, select Clear Trail from the Plotter Options menu. A message appears, asking if you really want to erase the plot trail. Follow the instructions on the screen. When the trail is erased, the unit returns to the plotter screen.

Range Rings/Grid Lines

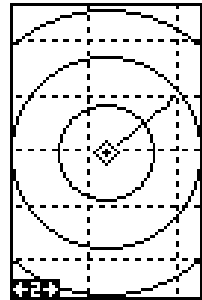
The plotter screen can be customized with rings that are 1/4 of the range and/or grids that divide the plotter into equal segments of latitude and longitude. From the Plotter Options menu, choose either Range Rings or Grid and press the right arrow key to turn it on. A sample screen of each type shows at the top of the next page.



GRIDS



RINGS



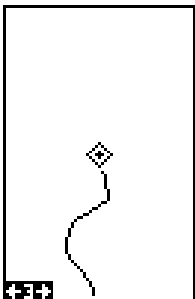
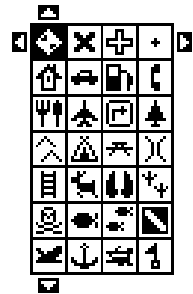
BOTH

ICONS

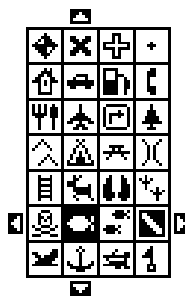
The plotter has 28 symbols or “icons” available that can be placed anywhere on the screen. They can be used to mark fishing or hunting locations, landmarks, boat ramps, and virtually any point of interest. An icon can be placed at your present position or at the cursor’s location.

Place Icon - Present Position

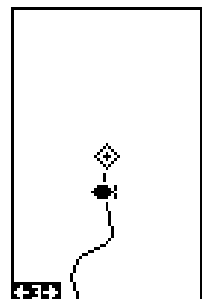
To place an icon at your present position, simply press the ENT key. The screen shown at right appears. Use the arrow keys to highlight the desired icon. Now press the ENT key again. The plotter screen reappears with the icon showing at the position you were at when the ENT key was pressed.



PLOT-1 SCREEN
PRESS ENT KEY



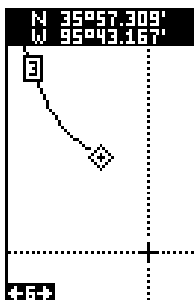
SELECT ICON
PRESS ENT KEY



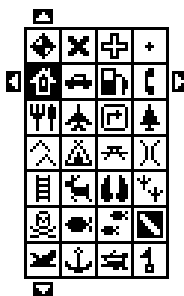
ICON IS PLACED
AT POSITION.

Place Icon - Cursor Position

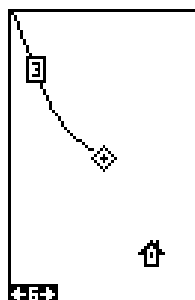
To place an icon at the cursor's position, first use the arrow keys to move the cursor to the location that you wish to place the icon. Next, press the ENT key. Now select the icon using the arrow keys. When it's highlighted, press the ENT key. The plotter screen reappears with the icon placed at the center of the cursor. Press the EXIT key to erase the cursor. On the screens shown below, the house icon was selected and placed at the cursor's location.



MOVE CURSOR
PRESS ENT KEY



SELECT ICON
PRESS ENT KEY



ICON IS PLACED
AT CURSOR POS.

Icon Options

Icons can be erased from the plotter individually, all of a specific type, or all at once. To delete an icon, press the MENU key, then choose Icon Options. The screen shown at right appears.

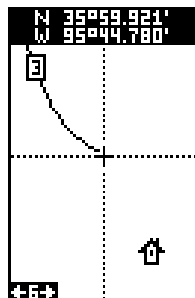
The first menu on this page "ICONS OFF/ON" simply turns all icon symbols off or on. This doesn't erase the icons, it simply "hides" the icons from the plotter. You can use this feature to temporarily de-clutter the display.



The DEL ALL ICONS selection does erase all of the icons from memory, Use this only if you want to erase all icons that have been placed on all plotter screens.

To erase only a certain type of icon, select the DEL ICON TYPE menu. The icon menu appears. Highlight the icon style that you want to erase from memory, then press the ENT key. The unit returns to the plotter screen with only the selected icons erased.

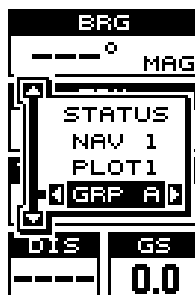
You can delete individual icons by selecting the DEL FROM PLOTTER menu from the Icon Options menu. Once this menu is selected, the unit returns to the plotter screen with the cursor activated as shown at right. Use the arrow keys to move the cursor to the icon that you want to erase. Once the crosshairs are on top of the icon, press the ENT key. The icon is immediately erased. When you're finished, press the EXIT key to erase the cursor.



WINDOWS

The windows feature provides fourteen different data screens chosen for their broad range of navigation information and ease of use.

To use the windows feature, press the PAGES key, then highlight the GRP A (Group A) label at the bottom of the screen. Group A is visible in the background when you switch to the windows group. Press the left or right arrow key to switch between all off the groups. When the desired group appears, press the EXIT key to erase the Pages menu. A summary of the groups follows. Note that many of the groups have navigation data that require navigation to a waypoint in order to show data. See the waypoint section for information on setting up the unit for waypoint navigation.



Group A

This screen has bearing (BRG), track (TRK), a trip meter, distance to go (DIS), and ground speed (GS). The trip meter logs the distance you have travelled since the unit began reporting a position. The trip meter is not erased when the unit is shut off. To reset the trip meter to zero, press the MENU key, then select "Tripmeter Reset" from the menu. The unit returns to group A with the trip meter reset.



Group B

Bearing, track, distance to go, and ground speed are all the same as group A. Two new windows appear - ETE and CDI. ETE is your Estimated Time En route, or an approximation of the time it will take to arrive at the waypoint you're navigating to. The CDI is a steering indicator. See page 10 for more information on the CDI.



Group C

This group consists of bearing, track, distance to go, and estimated time en route.

BRG
141° MAG
TRK
141° MAG
DIS
8.41 MI
ETE
0:25:14

Group D

Bearing, distance to go, track, ground speed, estimated time of arrival, estimated time en route, velocity made good (VMG), estimated time of arrival, and CDI show on this screen. Velocity made good is the speed you're making towards the waypoint. For example, if you're in a boat and travelling directly towards a waypoint at 30 miles per hour, but you're going against a 5 m.p.h. current, then your velocity made good is 25 miles per hour.

BRG	DIS
141°	8.37
TRK	GS
141°	20.0
ETE	VMG
0:25:07	20.0
ETA	CDI 0.25
6:24:39	· · ↑ · ·

Group E

This screen has bearing, track, distance to go, and velocity made good.

BRG
141° MAG
TRK
141° MAG
DIS
8.34 MI
VMG
20.0 MPH

Group F

A repeat of group E, except velocity made good is replaced with a large CDI.

BRG
141° MAG
DIS
8.31 MI
VMG
20.0 MPH
CDI
0.25 ↑ 0.25

Group G

This screen shows the present position, bearing, distance to go, track, and ground speed.

POSITION	
N 36°07.739'	W 95°49.783'
BRG	DIS
141°	8.27
TRK	GS
141°	20.0

Group H

Present position, a large CDI, distance to go, and estimated time en route show on this screen.

POSITION	
N 36°07.711'	W 95°49.760'
CDI	
0.25	↑ 0.25
DIS	ETE
8.23	0:24:42

Group I - Set Local Time

This screen includes a clock that shows your local time, estimated time of arrival, bearing, ground speed, distance to go, and the small CDI. The clock shows the time based upon the setting in the initialization. It's an offset from UTC, which is the time the GPS system uses. If this time is incorrect, you can reset it by pressing the MENU key, then highlight System Setup and press the right arrow key. Now highlight the Set Local Time label and press the right arrow key. The screen shown below appears.

CLOCK	
2:00:25P	
ETA	
2:38:00P	
BRG	GS
141°	20.0
DIS	CDI 0.25
12.5	..↑..

Use the left and right arrow keys to highlight the numbers that you need to change. Press the up or down arrow keys to change them. After setting the time, press the ENT key to save it.

LOCAL TIME	
02:20 P	
EXIT TO CANCEL ENTER TO SAVE	

Group J - Clock Alarm

This group has both estimated time of arrival and en route, plus the clock and a clock alarm. To set the clock alarm, press the MENU key while this group is showing, then highlight the Clock Alm Set label and press the right arrow key. The screen below right appears. Use the left and right arrow keys to highlight the numbers in the alarm's time. Press the up or down arrow keys to change the numbers. After setting the alarm, press the ENT key to save it. To turn the alarm on, select the Clock Alm on/off from the main menu and press the right arrow key. (Note: The unit must be on in order for the alarm to work. If you set the alarm, then turn the unit off, the alarm won't sound.) To silence the alarm, press the EXIT key.



Group K - Timers

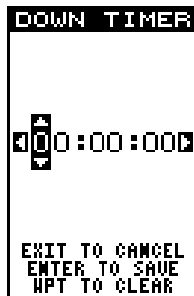
This group has two timers, an up timer and a down timer. The up timer starts at zero and counts up, the down timer starts at the time you put in until it reaches zero.



To set either timer, first press the MENU key, then highlight the desired timer set menu. In this example, we're setting the countdown timer, so the DWN TIMER SET label was selected. Now press the right arrow key. A screen similar to the one shown below appears.



Using the right and left arrow keys, highlight the first number in the time that you want to set. (The time is in hours, minutes, and seconds) Now press the up or down arrow keys until the desired number shows. Continue until the time shown in the display is correct, then press the ENT key. The unit returns to the main menu screen. To start the timer, highlight the "Dwn Timer Off On" label. Press the right arrow key to start the timer. Press the EXIT key to erase the menu. The time you set shows in the box at the bottom of group L. The timer continues counting until you stop it. When it reaches zero, an alarm sounds. Press the EXIT key to stop the alarm. (Note: When the countdown timer reaches zero, it begins counting *up* until you press the EXIT key. This tells you how long it's been since the alarm sounded.)

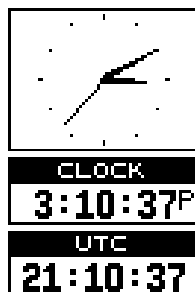


The up timer has an alarm that can be set to sound at a preset time. (For example, one hour from now, three hours, etc.) If you turn the up timer's alarm on (press the right arrow key when the Up ALM...Off/On label is highlighted, it sounds an alarm when it reaches the time you entered in the up timer set menu. Press the EXIT key to shut off the alarm.

You can reset either alarm by pressing the MENU key, then highlighting either the "Up Timer Reset" or "Dwn Timer Reset" label, then pressing the right arrow key.

Group L

This is a time screen. An analog clock shows at the top, followed by a digital clock showing your local time. UTC time shows at the bottom of this screen. (UTC is the time at the prime meridian. It used to be called GMT.)

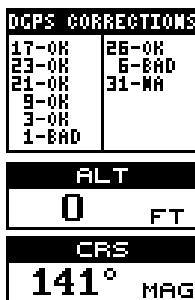


Group M and N

The group M and N screens show DGPS information. Other than the altitude and course information on group M, (shown at right) in order to use these screens, there must be a DGPS receiver connected to the unit.

The DGPS corrections at the top of the screen show the corrections the GPS receiver is using. The satellite's number is followed by an identifier showing its status. They are as follows:

- OK DGPS corrections are in use by GPS receiver and corrections are available.
- OLD Unit hasn't received corrections in last 60 seconds.
- BAD Corrections not usable.
- NA No correction available.



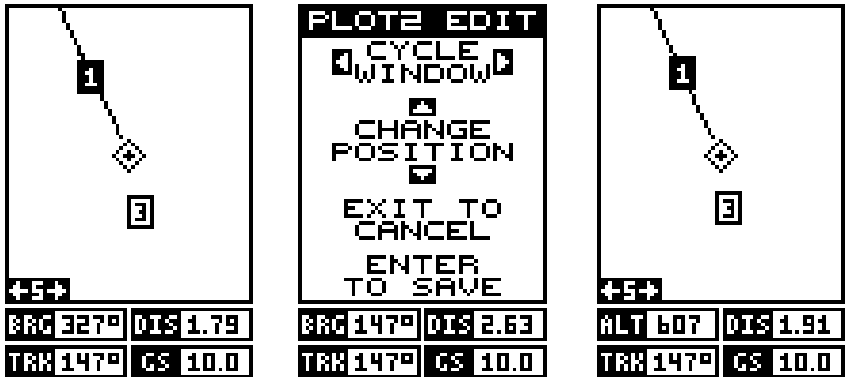
When a DGPS receiver is connected to this unit and is working correctly, its status is shown by group N. The DGPS station's ID number, plus frequency, baud rate, signal strength, signal to noise ratio (SNR), and time since the GPS receiver received the satellite corrections (AGE) all show on this screen.



Reprogram Boxes

The digital boxes on the PLOT-2 and both NAV screens can also be reprogrammed, using a method similar to the one used to reprogram the window groups.

To customize a screen, first switch to the screen that you want to customize. In this example, we'll change Plot-2. Next, press the MENU key, then highlight the "Reprogram Boxes" menu. Press the right arrow key. The screen shown below center appears.



This is the plot-2 edit screen. The "BRG" box near the left corner flashes, which means it's ready for change. If you don't want to change this box, simply press the up or down arrow key to move to the box that you want to change. In this example, we will change the BRG box to altitude (ALT). To do this, simply press the left or right arrow key while the box is flashing. The box changes each time the arrow key is pressed. When the desired box appears, then you can change another box or save your changes by pressing the ENT key. If you want to leave this screen without saving the changes, simply press the EXIT key. In this example, we simply changed the BRG to ALT, then pressed the ENT key. The screen on the far right on the previous page is the final version. Use this same method to change the NAV screens.

RESET GROUPS

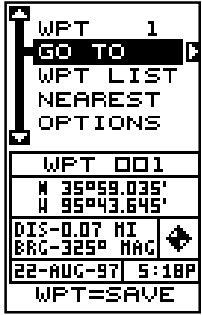
To restore all boxes on the navigation and plotter screens to their factory settings, first press the MENU key, then highlight the "System Setup" label and press the right arrow key. Now highlight the "Reset Groups" label on this menu. Press the right arrow key. A message appears, asking if you really want to do this. Press the right arrow key to continue, or the left arrow key to exit without resetting the groups.

WAYPOINTS

This GPS receiver gives you the ability to create your own database of locations, called "waypoints". You can save your present position, cursor position, or enter a coordinate and save it as a waypoint. For example, you may wish to store the location of your parked car as a waypoint before starting on a hike. When you want to return to the car, all you have to do is recall the waypoint and the unit will show distance and bearing from your present position to the car. This unit will store up to 750 waypoints.

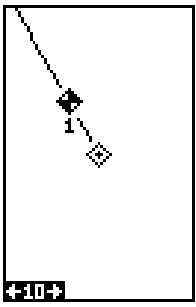
Waypoint Menu

With few exceptions, in order to save, modify, or recall a waypoint, you will use the waypoint menu, shown at right. The current waypoint number shows at the top of the screen. Its name appears near the center of the screen, right above its position. Beneath this is the distance and bearing from your present position to the waypoint. Its icon shows just to the right of the distance and bearing. The date and time the waypoint was saved is at the bottom of this screen. In short, all of the detail about the waypoint shows on this screen.



Saving Your Present Position as a Waypoint (Quick Save Method)

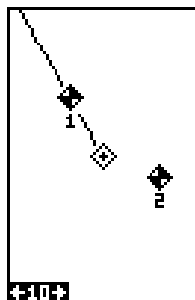
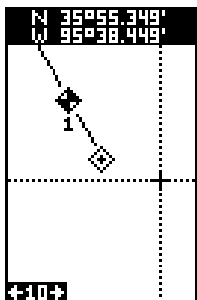
To save your present position, simply press the WPT key twice. Your current position is placed into the first available waypoint number on the list. A message appears on the display telling you the waypoint number it just used. This also momentarily places you in the waypoint menu. Anytime this menu is showing, simply press the WPT key once and the unit will store your present position on the waypoint list.



Every time you save a waypoint, the date and time are logged along with the position data. Its icon is also placed on the plotter as shown above. In this case, waypoint number one was assigned when the position was saved.

Saving The Cursor Position as a Waypoint

When the cursor is showing on the plotter and you press the WPT key twice, the cursor's position is placed into the first available waypoint number. In the example screen shown below, the cursor is placed at the desired location. Pressing the WPT twice causes waypoint number two to be placed at the cursor's crosshairs. (Waypoint 2 was the next available waypoint number.) A message appears on the display telling you the waypoint number it just used. Wait a few seconds and the menu will clear automatically. Press the EXIT key to erase the cursor.

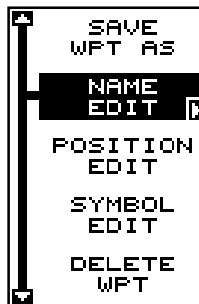
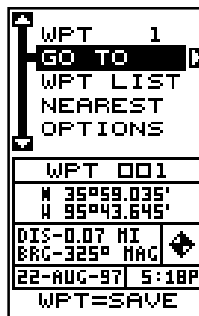


Saving Your Present Position as a Waypoint (Select Number Method)

The method shown previously doesn't let you choose the waypoint number. You can pick the waypoint number, (see below on waypoint selection) then save your present or cursor position. To do this, first press the WPT key once. A screen similar to the one at right appears.

Highlight the "WPT" label at the top of the screen. Press the right or left arrow keys until the desired waypoint number appears that you wish to save your present (or cursor) location under. When it does, highlight the "Options" label and press the right arrow key. The screen shown at right appears.

Highlight the "Save WPT As" label (shown at the top of the menu) and press the right arrow key. This saves your present position (or cursor position) under the waypoint number you selected on the first page.



SELECTING A WAYPOINT

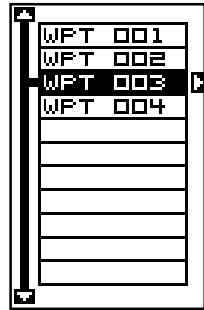
In order to edit or navigate to a waypoint, you must first select it. There are three ways to do this: by waypoint number, waypoint list, or nearest. All waypoint selection methods are on the main waypoint menu shown at the top of this page.

Waypoint Number

To select a waypoint by its number, simply highlight the “WPT” label at the top of the waypoint menu, then press the left or right arrow keys until the desired waypoint number appears.

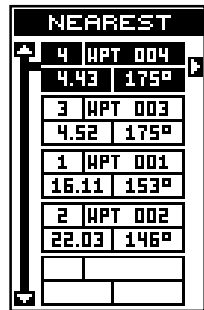
Waypoint List

The waypoint number selection method forces you to scroll through all waypoint numbers, whether there’s a location saved in them or not. The waypoint list is composed only of saved waypoints. To use the list, select “WPT LIST” from the waypoint menu. The screen shown at right appears. The names of all waypoints stored in memory show on this list. Simply highlight the desired waypoint and press the right arrow key to select it. The waypoint list screen is erased and the waypoint menu reappears.



Nearest Waypoint

You can select the nearest waypoint to your present position by choosing “Nearest” from the waypoint menu. The screen shown below right appears. Up to five waypoints show on this screen. The highlighted waypoint at the top of the screen is nearest to your present position, the next one is farther, the one after that even farther, and so on.



Each waypoint is shown by its number, name, distance and bearing from your present position to the waypoint. Use the up or down arrow keys to scroll through the list of waypoints. When the desired waypoint is highlighted, press the right arrow key to select it. The unit returns to the waypoint menu.

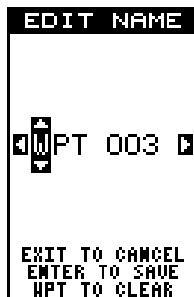
EDITING A WAYPOINT

You can customize a waypoint by giving it a name or change it’s position or icon. To do this, first press the WPT key. The waypoint screen appears. Now highlight the OPTIONS label and press the right arrow key. Follow the instructions on the next page for each item.

Edit Name

You can assign a name to each waypoint. The name can have up to eight characters. To do this, first select Name Edit from the Options menu. A screen similar to the one at right appears.

Press the up or down arrow keys to select the first letter in the name. Press the right arrow key to highlight the next position in the name. Repeat this sequence until you've entered all of the letters in the waypoint name. Press the ENT key to accept this name, the WPT key to erase all characters in the name, or the EXIT key to leave this screen without saving any changes.



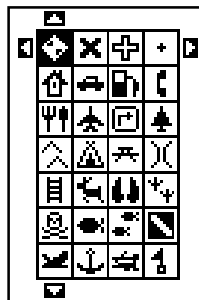
Edit Position

Any latitude/longitude can be assigned to any waypoint by manually entering it using the keyboard. First select the waypoint number that you want to save a position under from the waypoint menu. Next, highlight the "Options" menu and press the right arrow key. Now highlight the Position Edit menu and press the right arrow key. The screen shown at right appears. Using the left and right arrow keys, highlight each number in the position and change it using the up and down arrow keys. When you're ready to save this position and return to the waypoint screen, press the ENT key. Press the EXIT key to erase the menus and return to the navigation, plotter, or windows screen. Note: You can also use this method to change the position of an existing waypoint.



Edit Icon

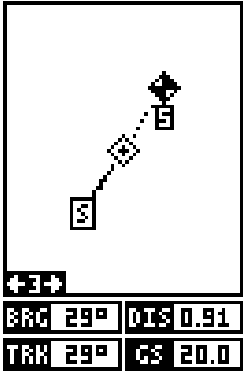
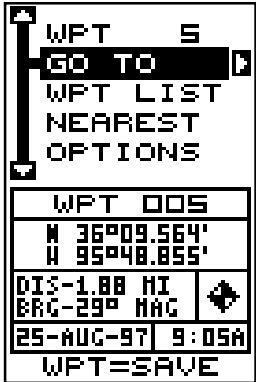
To change the icon assigned to a waypoint, first select the waypoint, then choose OPTIONS from the waypoint menu. Now select the Symbol Edit menu. The screen at right appears. Use the arrow keys to select the icon that you want to assign to the waypoint, then press the ENT key. The waypoint now has the new icon.



WAYPOINT NAVIGATION

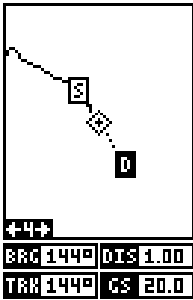
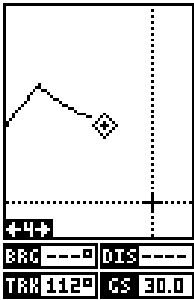
The Expedition II makes it easy to navigate to any waypoint. All you have to do is select the waypoint (see page 26), then highlight the "GO TO" label on the waypoint screen and press the right arrow key. The unit immediately shows navigation information to the waypoint on all navigation, plotter, and windows screens.

In this example, waypoint number 5 was recalled. Switching to a plotter number two screen (shown at right) shows the starting location "S", the recalled waypoint "5", the plot trail from the starting location to the present position, and the present position.



Navigating to a cursor location

This unit lets you navigation to a location without storing it in the waypoint database by using the plotter and cursor. To do this, first switch to a plotter screen. Now move the cursor to the location that you want to navigate to. Next, press the MENU key. A new, highlighted menu appears on the list: "Go To Cursor". Press the right arrow key. It now shows navigation data to the cursor location (shown as "D" on the plotter). See the screens below.



Navigating to a Waypoint using the Plotter

The unique “birds-eye” view used by the plotter gives you an easy way to navigate to a waypoint. On the plotter screen shown above, the diamond with a cross in it is your present position. The box with the “S” in it was your starting location when you recalled the waypoint. The dotted line is called a track line and is the shortest path from the starting location to the destination. The number “1” is waypoint number one, which is the recalled waypoint and the destination. The “D” on the plotter screen at the top of this page is the cursor destination, when the cursor position is used as a destination. If you follow the track line, you’ll reach the destination, covering the shortest distance in the least time.

CAUTION!

This product does NOT take land features, restricted or prohibited areas, or any other feature into account when it projects the track line on the screen. Use caution when navigating to a location. Make certain there are no obstructions in your path.

OTHER WAYPOINT OPTIONS

Move a Waypoint

You can move all information from one waypoint number to another to help organize the waypoints. In this example, we’ll move all of the information in waypoint number 1 to waypoint number 9. To do this, highlight the waypoint options label on the waypoint screen and press the right arrow key. Now highlight the “Move WPT” label. Press the right arrow key. The screen shown at right appears. The “From” label is highlighted at the top of the screen. Press the right arrow key until the waypoint number that you want to move appears. In this example, we selected waypoint number 1. Now press the down arrow key once to highlight the “To” label. Press the left or right arrow key until the number that you want to move the waypoint to ap-

MOVE WAYPOINT	
FROM	1
TO	1
WPT 001	
N 35°59.035'	
W 95°43.645'	
WPT 001	
N 35°59.035'	
W 95°43.645'	
ENT=MOVE EXIT=CANCEL	

MOVE WAYPOINT	
FROM	1
TO	9
WPT 001	
N 35°59.035'	
W 95°43.645'	
ENT=MOVE EXIT=CANCEL	

MOVE WAYPOINT	
FROM	1
TO	9
WPT 009	
N 35°59.035'	
W 95°43.645'	
ENT=MOVE EXIT=CANCEL	

pears. Again, in this example, we chose to move waypoint number 1 to waypoint number 9, so we pressed the right arrow key until "9" appeared. As you can see on the screen below, waypoint number 1 is showing in the "From" box. Now press the ENT key. The "From" box is now empty and the "To" box has waypoint number 9.

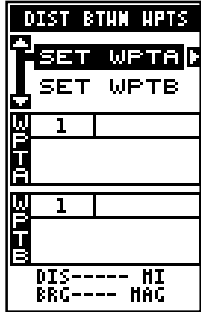
Note: The names in the "From" and "To" boxes are not the waypoint numbers - they are the waypoint names.

Press the EXIT key to erase this menu.

DISTANCE BETWEEN WAYPOINTS

This unit can easily give you the distance between two waypoints. To do this, first press the WPT key, highlight the Options menu and press the right arrow key, then highlight the Dist Btwn WPTS label and press the right arrow key. The screen at right appears.

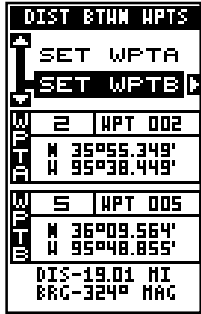
You must now select the first waypoint, which is called waypoint "A" on this screen. Highlight the "Set WPT A" label, and press the right arrow key. A screen similar to the one shown at right appears.



This screen is virtually identical to the waypoint screen. Select a waypoint using the waypoint number, from the waypoint list, or the nearest waypoint list. After selecting the waypoint, highlight the "SET WPT A" label and press the right arrow key. The unit returns to the distance between waypoints screen.



Once the first waypoint shows on the screen, then you need to choose the other waypoint. Highlight the "Set WPT B" label. Now select the second waypoint. The unit returns to the distance between waypoints screen. Both waypoints are shown on this screen. At the bottom of the screen are the distance and bearing from the first waypoint "A" to the second waypoint "B". You can select more waypoints to measure at this time or press the EXIT key to erase this screen.



Project a Waypoint

You can save a waypoint even if you don't know it's position or location on the plotter. This unit lets you project the location of a waypoint from a known waypoint using only bearing and distance from the known waypoint. This is useful if you don't know the latitude/longitude of a location, but you do know the distance and bearing from a saved waypoint or your own position.

(Note: To project a waypoint from your present position, you must first save your present position as a waypoint.)

To use this feature, press the WPT key, then select a waypoint number that you want to save the projected waypoint under. Now select Project WPT from the Options menu. The screen shown at right appears.

The unit needs a starting location to project the new waypoint from. Highlight the "REF WPT" label on the Project WPT menu and press the right arrow key. The screen at the top of the next page appears. Select a waypoint from either the waypoint number, newest, or waypoint list. When you've chosen the waypoint, highlight the "USE REF" label and press the right arrow key. The unit returns to the Project WPT screen. The starting waypoint you chose shows in the middle of this screen. Now set the distance from the starting waypoint to the projected waypoint by highlighting the "SET DIST" label and pressing the right arrow key. Use the arrow keys to set the distance, then press the ENT key when you're finished. The unit returns to the Project WPT screen. Now enter the bearing from the starting waypoint to the projected waypoint by selecting "SET BRG" from the Project WPT screen. Once you've entered the bearing, the unit returns to the Project WPT screen with the distance and bearing showing at the bottom of the screen, as shown at right. Now press the ENT key. The unit saves the projected location under the waypoint number that you picked at the beginning.

PROJECT WPT	
REF WPT	C
SET DIST	
SET BRG	
1	
DIS-0.00 MI	
BRG-0° MAG	
ENTER TO PROJECT	
EXIT TO CANCEL	

WPT	1	C
USE REF		
WPT LIST		
NEAREST		
WPT 001		
N 35°57.778'		
W 95°36.379'		
DIS-0.55 MI		
BRG-324° MAG		
25-AUG-97 10:07A		

PROJECT WPT	
REF WPT	
SET DIST	
SET BRG	C
1	WPT 001
N 35°57.778'	
W 95°36.379'	
DIS-5.00 MI	
BRG-20° MAG	
ENTER TO PROJECT	
EXIT TO CANCEL	

Position Averaging

The effects of Selective Availability, described in the Introduction, can be minimized or virtually eliminated using position averaging. You can only save a waypoint using this method, however the location saved can be much more accurate than any other method without using DGPS. The downside to this method is twofold-It only works to save a waypoint and the unit must be in the location that you want to save, preferably for an hour.

This method works by taking an extremely large number of position reports and averaging them. This results in a surprisingly accurate position. The longer you leave the unit in the location, the better the position should be.

To save a waypoint using position averaging, first select a number that you wish to save the waypoint under. Next, select "Average WPT" from the OPTIONS menu on the waypoint menu. The screen shown at right appears. When you're ready to save the waypoint, press the ENT key. The position is saved under the waypoint number you selected.

```
AVERAGING
N 35°55.978'
W 95°35.024'

POINTS
TAKEN
  5

PRESS EXIT
TO CANCEL
  ENT
  TO SAVE
```

Delete a Waypoint

To erase all of the information in a waypoint, first press the WPT key, then select the waypoint you want to erase. Now highlight the "Options" label and press the right arrow key. Finally, highlight the "Delete WPT" label and press the right arrow key. A message appears, asking if you really want to delete this waypoint. Press the right arrow key to delete it, the left to exit without deleting the waypoint.

Delete All Waypoints

You can remove all of the waypoints from the unit's memory. To do this, press the MENU key, then highlight the System Setup menu and press the right arrow key. Now highlight the DEL ALL WPTS label. The unit removes all waypoints from memory. Note: This also removes all routes from memory.

ROUTES

You can connect several user waypoints together to form a route. When you recall the route, the unit shows navigation information to the first waypoint in the route, then when you reach that waypoint, it switches to the next waypoint, and so on until you reach the last waypoint in the route.

Create a Route

To create a route, first press the MENU key, highlight the “PLAN/EDIT ROUTES” label, and press the right arrow key. The screen shown at right appears.

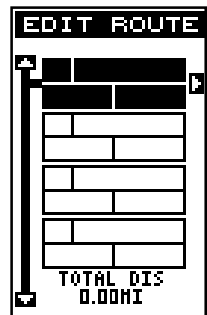
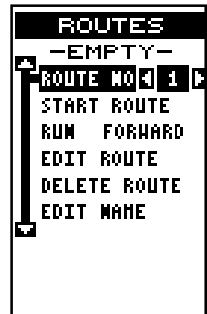
This unit can store up to 50 routes. Route number one shows on this page. If you wish to create a route using a different number, simply press the left or right arrow keys until the desired route number appears. In this example, however, we’ll use route number one.

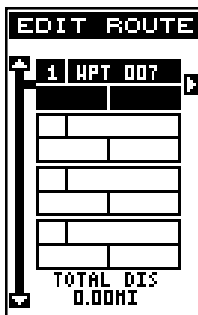
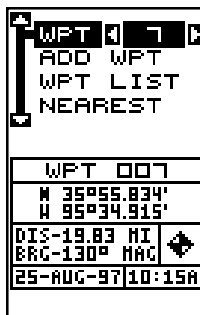
At the bottom of this menu is the “Edit Name” label. If you wish to name the route, highlight that label, then press the right arrow key. Use the arrow keys to name the route, (you can use up to eight characters in the name) then press the ENT key when you’re finished.

To add waypoints to the route, highlight the “Edit Route” label and press the right arrow key. The screen shown at right appears. This is the waypoint list screen. This shows all of the waypoints that form the route. The first waypoint is highlighted at the top of the screen. To select the first waypoint in the route, simply press the right arrow key. A new menu appears as shown below.

This menu lets you go to the waypoint selection menu, delete a waypoint from the route, or see details about any waypoint in the route. Since we want to add a waypoint to the route, press the right arrow key on the “ADD WPT” label. The screen shown at the top left on the next page appears.

This screen is virtually identical to the waypoint screen. Select a waypoint either using the waypoint number, from the waypoint list, or the nearest waypoint list. After selecting the waypoint, highlight the “ADD WPT” label and press the right arrow key. The unit returns to the waypoint list screen with the first waypoint at the top. Highlight the next waypoint location beneath the first waypoint and press the right arrow key. Now select the second waypoint for your route. After selecting the second waypoint, the





unit returns to the waypoint list screen. The second waypoint shows beneath the first one, with bearing and distance from the first waypoint in the route to the second showing under the second waypoint's name. The total route distance shows at the bottom of the screen. Continue selecting waypoints in this manner until all of the waypoints in the route are on the list. Press the EXIT key to return to the Route menu. Your route is now saved in memory. Press the EXIT key to erase the menus.

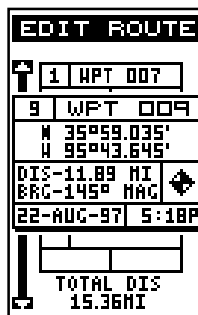
Delete a Waypoint

To remove a waypoint from a route, first select the route, then highlight the waypoint from the route list that you want to delete and press the right arrow key. Highlight the "Delete" label on this menu and press the right arrow key. The unit returns to the route list with the waypoint removed from the list. (Note: This doesn't delete the waypoint from the database, it only removes it from the route.)

Waypoint Detail

To view the position, bearing, distance, and other information about a waypoint saved in a route, first select the route, then highlight the desired waypoint from the route's list. Now press the right arrow key. Highlight the "Detail" label and press the right arrow key. The screen at right appears.

This screen shows the waypoint's name, number, creation time and date, icon, position, distance, and bearing from your present position. When you're finished, press the EXIT key to erase it.

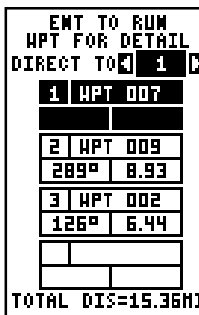


Following a Route

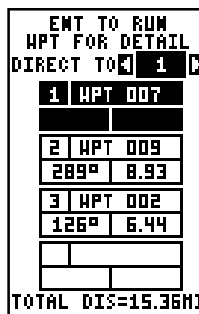
Before starting the route, you'll need to decide if you want to start at the beginning and travel forward or start at the last waypoint in the route and travel backwards (reverse) to the first waypoint. The default is forward. To change it, press the MENU key, then select the "PLAN/EDIT ROUTES" label and press the right arrow key. The screen shown at right appears. To run a route from the end to the beginning, highlight the "RUN" label, then press the right arrow key to change it.



To follow a route, first select the route number that you wish to follow by highlighting the "Route No" label, and pressing the left or right arrow keys until the desired route number appears. In this example we're using route number one. Now highlight the "START ROUTE" label and press the right arrow key. The screen shown at right appears.



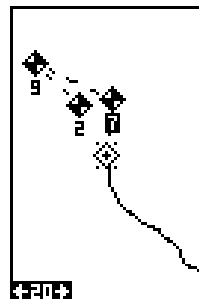
The "Start RTE Auto" label is highlighted. This starts the navigation along the leg of the route that is closest to your present position. On the screen shown at right, waypoint number 7 is the closest to the present position. If you want to start the route with a different waypoint press the right arrow key until the desired waypoint number appears.



If you want to see details about the highlighted waypoint, press the WPT key.

When you have everything on this screen set as desired, press the ENT key to start the unit navigating to the first waypoint on the route.

As you travel to the first waypoint, the unit shows navigation data to the waypoint. The plotter draws a dotted line from your starting position, and a dashed line from the first waypoint to each of the other waypoints in the route. When you enter the radius set by the arrival alarm, the unit automatically switches to the next waypoint on the list, showing navigation data to that waypoint, and so on until the last waypoint on the route list has been reached. (Note: The arrival alarm does not have to be turned on in order to use the route feature.)



Delete a Route

To erase a route, first press the MENU key, then highlight the “Plan/Edit Routes” label and press the right arrow key. Now select the route you want to erase at the top of the screen, then highlight the “Delete Route” label and press the right arrow key. A message appears, asking if you really want to erase the route. If you press the right arrow key, the route will be erased. If you select “Yes” (by pressing the right arrow key) the unit then asks if you want to erase the waypoints used in the route from memory also. Press the right arrow key again to erase them, or the left arrow key to leave the waypoints in memory. The unit returns to the routes menu. Press the EXIT key to erase the menu.

CANCEL NAVIGATION

This unit continues to navigate to a recalled waypoint, the last waypoint in a route, or the cursor position until you stop it.

To stop the navigation function, press the MENU key, then press the up or down arrow keys until the “Cancel Navigation” label is highlighted. Press the right arrow key. The unit stops showing navigation information.

Navigation Notes

If you are navigating with this unit, either to a waypoint or in a route and shut it off, it will preserve the current waypoint number that it is navigating to. It also saves the current route (if it is in use) and the route’s forward or reverse order. When you turn the unit on, it will show navigation data to the waypoint as soon as it locks onto the satellites as if it had never been turned off.

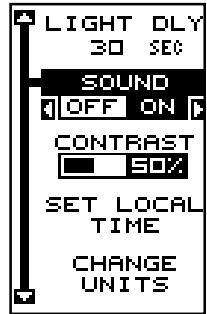
SYSTEM SETUP

Many features are listed under the “System Setup” label on the main menu. These commands affect the basic operation of the unit. To use them, press the MENU key, then highlight the “System Setup” label. Press the right arrow key. The screen shown at right appears.

Backlight

The display has lights that can be turned on for night use. To turn the lights on, simply press the PWR key. To turn them off, press the PWR key again. An indicator on the satellite status screen shows when the lights are on.

The lights automatically turn off after 30 seconds to preserve the battery power. It will do this even if the external power is applied to the unit.



The time delay is adjustable from 5 to 240 seconds by selecting Light Dly from the System Setup menu . You can also turn the lights on continuously from this menu. Highlight this menu, then press the right arrow key to increase the time the lights are on, the left arrow key to decrease it.

Sound

To turn the speaker off, highlight the “SOUND” label as shown above, then press the left arrow key. Note: This turns the speaker completely off. The unit will not sound a tone when a key is pressed, nor will any alarm sound. The alarm messages will still flash on the screen, however.

Contrast

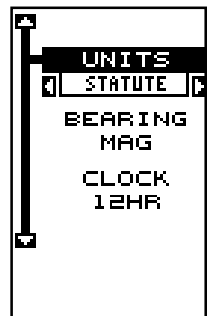
To adjust the display’s contrast, highlight the “Contrast” label on the “System Setup” menu. Press the right or left arrow keys until the screen’s contrast is best for the lighting conditions.

Units of Measure

You can view data in three different formats: statute, nautical, and metric. The default is statute. The chart below shows the settings for each.

	Statute	Nautical	Metric
Distance	miles	nautical miles ...	kilometers
Speed	miles per hour	knots	kilometers per hour
Altitude	feet	feet	meters

The unit will also show bearing in degrees true or magnetic, and the clock in 12 hour (a.m./p.m.) or 24 hour formats. To change a unit of measure, first select Change Units from the System Setup menu. Highlight the desired selection, then press the left or right arrow key. You can change any or all of the settings on this page. When you’re finished, press the EXIT key.



NMEA / DGPS

This product transmits data through the power/data port in the back of the unit using NMEA 0183 format, version 1.5 or 2.0. The data is used by other electronic devices such as marine autopilots for position and steering information.

DGPS on the other hand, is a data input. DGPS is an acronym for Differential Global Positioning System. Currently, it relies on a system of ground-

based transmitters that send correction signals to small DGPS receivers. DGPS gives you more accurate positions than is otherwise possible.

All wiring connections to the Expedition II are made through the power cable. See the sample wiring diagrams on the next page for general wiring procedures. Read your other product's owner's manual for more wiring information.

Once the cables are wired, turn the unit on, press the menu key, and select NMEA / DGPS CONFIG from the System Setup menu. A screen similar to the one shown below appears.

NMEA Output

To turn the NMEA output on, highlight the "NMEA OUTPUT" menu (shown at right), then press the right arrow key. If your other equipment works, then no setup will need to be performed. If your other equipment doesn't recognize the NMEA data being sent by the Expedition II and the wiring is correct, then you may need to change the NMEA or the serial communication settings.

Configure NMEA Output

Highlight the "Configure NMEA Output" menu, then press the right arrow key. The screen shown below appears.

NMEA 0183 Version

There are two versions of the NMEA data, 1.5 and 2.0. If your other equipment requires 2.0, press the right arrow key to select it.

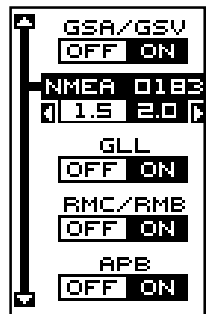
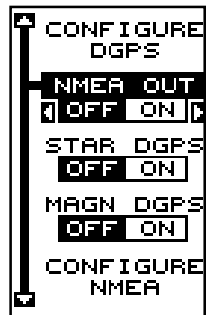
GLL, RMC/RMB, APB, GGA, GSA/GSV

Sentences

Some equipment requires different sentence. The default setting for these sentences is on. In other words, it automatically sends these sentences when NMEA is turned on. To turn any of these off, move the black box to the desired menu and press the left arrow key. Press the EXIT key when everything on this screen is the way you want it.

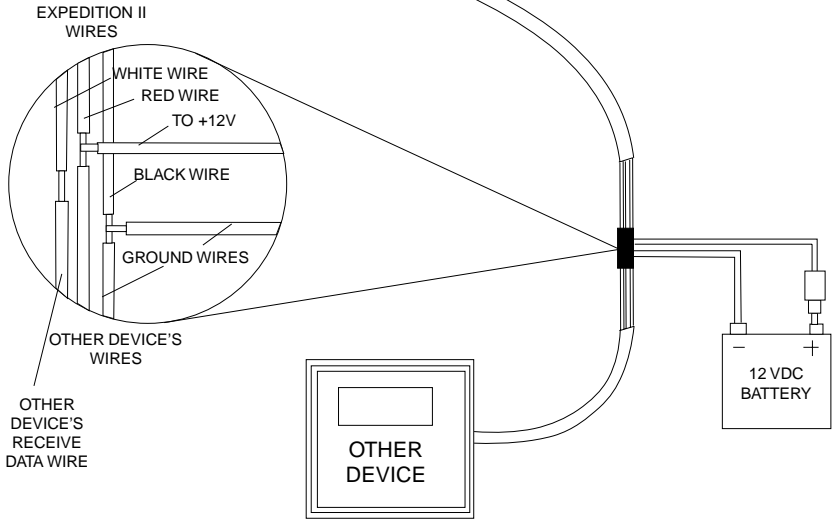
DGPS

This unit will recognize Starlink® and Magnavox® automatic DGPS receivers. If you have either one of these receivers, simply highlight the "Star DGPS" or "Magn DGPS" on the NMEA / DGPS menu and press the right



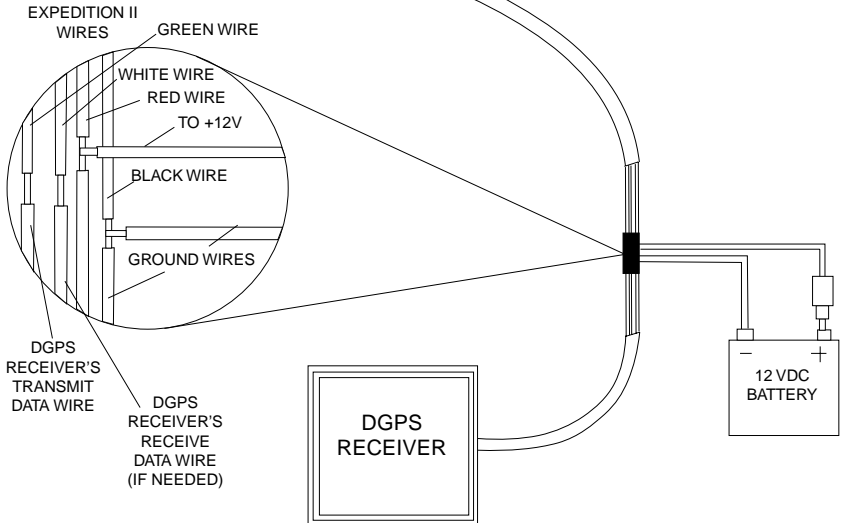
TO EXPEDITION II

EXPEDITION II TRANSMITTING NMEA DATA TO ANOTHER DEVICE



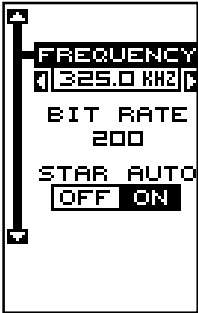
TO EXPEDITION II

EXPEDITION II RECEIVING DATA FROM A DGPS RECEIVER



arrow key to turn it on. (Note: If you have a Magnavox DGPS receiver connected, the Expedition II can't send NMEA data.) With the exception of serial communications, typically no other setup needs to be made with these receivers.

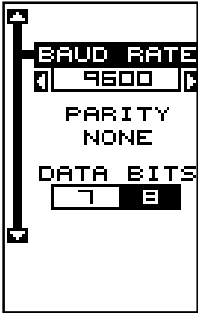
If you have any other Magnavox or Starlink compatible DGPS receiver connected to the Expedition II, you may need to change the settings. To do this, move the black box to the "Configure DGPS" label and press the right arrow key. A screen similar to the one at right appears.



These menus select the beacon receiver's frequency and bit rate (in bits per second). To change one of these settings, simply highlight the menu item you wish to change, then press the right or left arrow key until the desired number appears. Press the EXIT key when you're finished.

Serial Communication Setup

To set the data port, select Com Port Setup on the System Setup menu. Press the right arrow key. The screen shown at right appears.



Check your DGPS receiver's manual for the proper data settings. Highlight the menu item you need to change. Press the left or right arrow keys to change them. The serial port defaults are 4800 baud, no parity, and 8 data bits. Press the EXIT key to erase this menu.

Reset Options

To return the unit to the original factory settings, highlight the "Preset Options" menu on the System Setup screen. Now press the right arrow key. A message appears, asking if you want to restore the original options. Press the right arrow key if you do, the left arrow key to quit.

If you restore the unit to the factory settings, all options such as contrast, alarms, and other system choices are returned to their default values. However, no waypoints, routes, or icons are erased.

Reset Groups

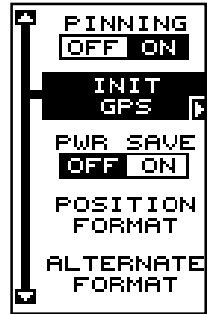
To return all window groups and boxes on the navigation and plot-2 screens to their factory defaults, select Reset Groups on the System Setup menu. Finally, press the right arrow key. All window groups and digital boxes are reset to their factory settings.

System Info

The system information screen shows the release date and the software's version number. To view this screen, highlight the System Info label on the System Setup menu. Now press the right arrow key. Press the EXIT key when you're finished reading this screen.

GPS SETUP

Items found under the GPS Setup menu include initialization, (covered at the beginning of this manual), position format, power save, datums, and more. To use any of these features, first press the MENU key, highlight GPS Setup and press the right arrow key. The screen shown at right appears.



Position Format

The Expedition II can show the position in 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, British, Irish, Swedish, Swiss, Finnish, New Zealand, and Military Grid.

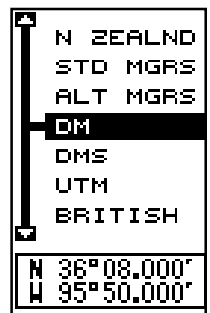
UTM's are marked on USGS topographic charts. This system divides the Earth into 60 zones, each 6 degrees wide in longitude.

British, Irish, Swedish, Swiss, New Zealand, and Finnish grid systems are 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 Datums section for more information.

The military grid reference system (MGRS) uses two grid lettering schemes, which are referred to as standard and alternate MGRS on the Expedition II. Your position and datum in use determines which one to use. If you use the standard, and your position is off significantly, then try using 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 format, highlight the "Position Format" label on the "GPS Setup" menu, then press the right arrow key. A screen similar to the one at right appears.



Press the up or down arrow keys to highlight the desired format. Press the EXIT key to erase the position format menu.

DATUM

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

All datums are named. The GPS system is based on the WGS-84 datum, which covers the entire world. Other datums may also cover the entire world, or just a small portion. By default, your position shows using the WGS-84 datum. However, it can show your position using one of 191 different datums.

To change the datum, first press the MENU key, then highlight the "GPS Setup" label and press the right arrow key. Now highlight the "Select Datum" label. Finally, press the right arrow key again. A screen similar to the one at right appears.



The WGS-84 label is highlighted. To change it, simply press the up or down arrow keys to highlight the desired datum, then press the ENT key. This selects the datum and erases the select datum menu. To erase the menu without changing the datum, simply press the EXIT key.

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

PCF (Position Correction Factor)

Another method used to make your display match a chart or map is called "PCF" or Position Correction Factor. This unit gives you the capability to move or offset the position shown on the display to match one on the chart. The unit will add this offset to all position and navigation displays at all times.

Remember, the position error on any radio navigation system is very dynamic and the PCF offset should never be used in an attempt to cancel the error.

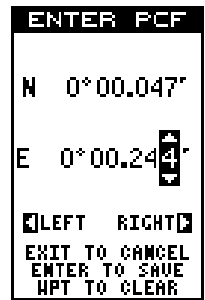
In general terms, PCF should only be used if your map indicates what the possible error is. **PCF should always be reset to zero when you're finished with the chart.**

For example, suppose you are stopped at a location that is accurately marked on a chart. Your unit shows a longitude position that is .244 minutes east of the one on the chart and .047 minutes north latitude. Using the PCF feature, you can make the Expedition II match the chart you're using. If you move, the unit will continuously add the change to all position, navigation, and mapping displays. This makes it more closely match the datum used by the chart. For this reason, you should be careful when entering the PCF offset. It's saved in memory and doesn't change when the unit is turned off. However, resetting the unit does erase the PCF offset.



To change the PCF offset, first press the MENU key, then highlight the "GPS Setup" label and press the right arrow key. Now highlight the "Set PCF Offset" label. Finally, press the right arrow key again. A screen similar to the one above right appears.

Now enter the correction for your location. Remember, this is the difference between the location shown on the present position display and the position shown on the chart. In this example, we entered 0 degrees, 0.047 minutes north latitude and 0 degrees, 0.244 minutes east longitude. That is the difference between the present position shown by the Expedition II and the one on our chart.



After you've entered the latitude/longitude correction, press the ENT key to accept it. The Expedition II erases the PCF entry screen and returns to the navigation or mapping screens with the correction factor applied.

POSITION PINNING

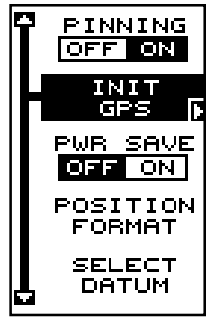
When using a GPS receiver at extremely low speeds, it can have trouble determining your course over ground, or direction you're travelling. This is due in large part to SA, or selective availability. SA is small inaccuracies purposefully put into the GPS satellite's signal by the government. This cause wide variations in the track display and other navigation displays when using the unit at slow speeds.

If you're using this receiver without DGPS and stop, the position pinning feature locks the present position indicator on the plotter until you've moved a short distance or exceed a very slow speed. This prevents the "wandering" plot trail seen when you're stopped with position pinning turned off.

This also affects the navigational displays.

The easiest way to see the effects of S/A is to stand still with the GPS receiver turned on and watch your plot trail with position pinning turned off. You'll see the present position change, speed increase and decrease, and a random plot trail on the plotter's screen.

If you wish to turn the position pinning feature off, press the MENU key, then highlight the "GPS Setup" label and press the right arrow key. Now highlight the "Pinning" label. Finally, press the left arrow key.



POWER SAVE

This GPS receiver has an important power save software upgrade that significantly improves battery life. However, this feature does affect the receiver's performance. If you are using it under heavy cover, such as trees or around tall buildings, the receiver can lose its lock on the satellites easier when the power save feature is enabled. The power save feature changes the position update rate. We recommend you test the power save feature in known surroundings and determine its capabilities before venturing into unknown territory.

To turn the power save feature on, press the MENU key, then highlight the "GPS SETUP" label and press the right arrow key. Now highlight the "PWR SAVE" label and press the right arrow key to turn it on. Press the EXIT key to erase the menu.

The letters "PS" for "Power Save" show on the satellite status screen whenever the power save mode is on. You can also verify the power save mode status by viewing the GPS Setup menu.

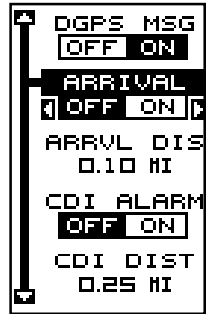
To turn the power save mode off, simply return to the GPS Setup menu as described above, highlight the "PWR SAVE" label, and press the left arrow key.

ALARMS

The Expedition II has several alarms. You can set an arrival alarm to flash a warning message when you cross a preset distance from a waypoint. For example, if you have the arrival alarm set to .1 mile, then the alarm will flash a message when you come within .1 mile of the recalled waypoint. The course deviation indicator alarm (CDI) can warn 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 .1 mile, then the alarm flashes a message

if you drift .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 .1 mile as an example, if you're anchored and your boat moves more than .1 of a mile, the alarm will flash a message.

To use any of these alarms, first press the MENU key, then select the "ALARMS/CDI" menu. A screen similar to the one shown at right appears. Press the up or down arrow key to move the black box to the desired alarm, then press the right arrow key to turn it on.



To adjust an alarm's distance, move the black box to the alarm's "DIST" menu item, then press the right or left arrow keys to increase or decrease the alarm's distance.

When you're finished, press the EXIT key to erase this menu.

Important Alarm Notes:

Anchor Alarm - Since civilian users don't receive the accuracy given to military users, the anchor alarm may be triggered even when you're sitting still. This typically happens when using small (less than .05 mile) anchor alarm ranges. If you have a DGPS beacon receiver connected to the Expedition II, smaller ranges may be usable.

Arrival Alarm - If you set the arrival alarm's distance to a small number, and you run a route (see the routes section), the Expedition II may not show navigation data to the next waypoint, once you arrive at the first one, since you may not be able to come close enough to the first waypoint to trip the arrival alarm.

MESSAGES

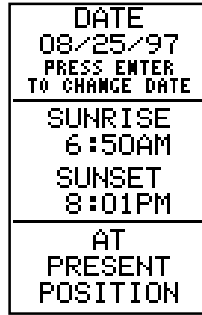
The position and DGPS message selections are found on the Alarms/CDI menu. When turned on, the position message appears for a few seconds whenever the unit locks onto the satellites and shows a position. It also appears when the unit loses the lock onto the satellites and cannot navigate. Pressing the EXIT key erases these messages.

The DGPS message appears whenever the unit begins or stops using DGPS data to help determine your position.

The default setting for these messages is "on". To turn either message off, select the "Setup Alarms" menu from the main menu, then highlight the desired message and press the left arrow key.

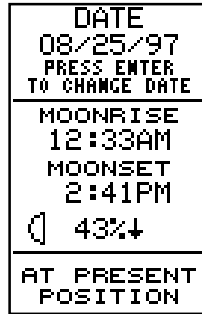
SUNRISE/SET MOONRISE/SET CALCULATOR

This unit has a sunrise/sunset and moonrise/moonset calculator that shows this information anywhere or anytime in the world. To use it, press the MENU key, then highlight the Sun/Moon Calc label and press the right arrow key. Highlight either the sun or moon calculator and press the right arrow key. The screen shown at right appears if you chose the sunrise calculator. (Both calculators work identically. We'll concentrate on the sunrise/sunset calculator for this example.) The sunrise and sunset for today's date appear in the center of the screen. Today's date shows at the top of the screen. If you want to know the sunrise/sunset for a different date, press the ENT key, then enter the new date. The unit returns to the sunrise/sunset calculator screen with the sunrise and sunset times shown for the date you entered.



The sunrise and sunset show for your present position. If you move the plotter's cursor to a different position before using this calculator, it will show the sunrise/sunset for the cursor's location.

The moonrise/moonset calculator works identically to the sunrise/sunset calculator. It looks like the screen at right. A moon symbol shows near the bottom of the screen, showing the approximate phase of the moon. The arrow next to the symbol shows if it is moving towards a full moon (up) or a new moon (down).



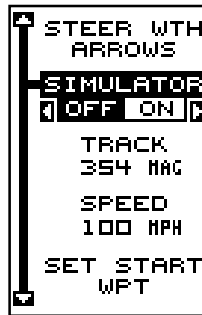
Press the EXIT key to erase this screen.

SIMULATOR

A simulator is built into this unit that has several options. You can use nearly all of the unit's features - even save and recall waypoints. This is useful for trip planning.

To use the simulator, press the MENU key, then press the up or down arrow keys until the "Simulator Setup" menu is surrounded by the black box. Now press the right arrow key. The screen shown at right appears.

If you simply press the right arrow key, turning the simulator on, the Expedition II will start from your present position and follow a track of 355° at 100 miles per hour.



To change either the track or speed, highlight the one you want to change, then press the right or left arrow key. When the numbers are correct, press the EXIT key.

Starting Position

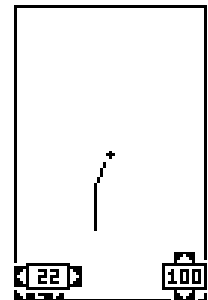
Normally, the starting position for the simulator is your present position. If you want to change the starting position, highlight the “Set Starting Waypoint” label on the Simulator Setup menu, then press the right arrow key. The screen shown at right appears.



You can select any waypoint as the simulator’s starting point. Select the starting point by pressing the right arrow key on the “WPT#” label until the desired starting waypoint number appears. Now highlight the “Start At” label and press the right arrow key. The Expedition II returns to the Simulator Setup menu using the waypoint you specified as the starting waypoint.

Use Arrow Keys to Steer

This option lets you change both the course and speed on the screen as the simulator is running. To do this, highlight the “Steer With Arrows” label on the Simulator Setup screen, then press the right arrow key. The screen shown at right appears. Use the up and down arrow keys to increase or decrease the speed. Use the right and left arrow keys to change the track. Press the EXIT key to erase these menus.



When you’re finished changing the track and speed, press the EXIT key to erase the menus.

To turn the simulator off, press the MENU key, then move the black box to the “Simulator Setup” label. Finally, press the left arrow key.

DEFINITION OF TERMS/ABBREVIATIONS

Due to space considerations, the digital displays use abbreviations for some names. They are as follows:

- ALT Altitude - Your height above sea level.
- BRG Bearing - The direction from your present position to a waypoint.
- CLOCK Your local time.
- TRK Track - The direction you're travelling.
- DIS Distance - Distance remaining between your present position and a waypoint.
- DNT/UPT Countdown timer (DNT) and Count up timer (UPT)
- ETE Estimated Time En route
- FIX A measure of your receiver's position quality. A fix of 1 is bad, 9 is the best.
- ICON A symbol you can place on the map, representing a landmark.
- POSITION Your present position.
- GS Ground Speed - Your actual speed.
- TTG Time To Go - Time remaining at your present speed until you reach a waypoint.
- UTC Coordinated Universal Time - Time at the prime meridian at Greenwich, England. Formerly known as GMT.
- VOLTS Electrical system voltage.
- VMG Velocity Made Good - Your ground speed towards a recalled waypoint, airport, etc.
- CDI Course Deviation Indicator - Shows your distance to the side of the desired course line.

DATUMS

WGS 84	WGS 1984	ARC 1960	Arc 1960 - Mean for Kenya,
DEFAULT	Default	MEAN	Tanzania
ADINDAN	Adindan	ASCENSION	Ascension Island 1958 -
MEAN	Mean for Ethiopia, Sudan	ISLAND	Ascension Island
ADINDAN	Adindan	ASTRO BEACON ..	Astro Beacon E 1945 - Iwo Jima
BURKINA	Burkina Faso	E 1945	
FASO		IWO JIMA	
ADINDAN	Adindan	ASTRO DOS 714 ..	Astro DOS 71/4 - St Helena Island
CAMEROON	Cameroon	ST HELENA	
ADINDAN	Adindan	ISLAND	
ETHIOPIA	Ethiopia	ASTRO TERN	Astro Tern Island (FRIG) 1961 -
ADINDAN	Adindan	ISLAND	Tern Island
MALI	Mali	1961	
ADINDAN	Adindan	ASTRONOMICAL ..	Astronomical Station 1952 -
SENEGAL	Senegal	STATION '52	Marcus Island
ADINDAN	Adindan	MARCUS ISLE	
SUDAN	Sudan	AUSTRALIAN	Australian Geodetic 1966 -
AFGOOYE	Afgooye	GEODETC	Australia & Tasmania
SOMALIA	Somalia	1966	
AIN EL ABD	Ain el Abd 1970	AUSTRALIAN	Australian Geodetic 1984 -
1970	Bahrain	GEODETC	Australia & Tasmania
BAHRAIN		1984	
AIN EL ABD	Ain el Abd 1970	AYABELLE	Ayabelle Lighthouse - Djibouti
1970 SAUDI	Saudi Arabia	LIGHTHOUSE	
ARABIA		DJIBOUTI	
ANNA 1 ASTRO	Anna 1 Astro 1965	BELLEVUE	Bellevue (IGN) - Efate &
1965 COCOS	Cocos Islands	(IGN) EFATE	Erromango Islands
ISLANDS		ERRAOMANGO	
ANTIGUA	Antigua Island Astro 1943	BERMUDA	Bermuda 1957 - Bermuda
ISLAND	Antigua (Leeward Islands)	1957	
ASTRO 1943		BISSAU	Bissau - Guinea-Bissau
ARC 1950	Arc 1950	GUINEA	
MEAN	Mean for Botswana, Lesotho,	BOGOTA	Bogota Observatory - Colombia
	Malawi, Swaziland, Zaire, Zambia,	OBSERVATORY	
	Zimbabwe	COLOMBIA	
ARC 1950	Arc 1950 - Botswana	BUKIT RIMPAH	Bukit Rimpah - Indonesia (Bangka
BOTSWANA		INDONESIA	& Belitung Islands)
ARC 1950	Arc 1950 - Burundi	CAMP AREA	Camp Area Astro - Antarctica
BURUNDI		ASTRO	(McMurdo Camp Area)
ARC 1950	Arc 1950 - Lesotho	ANTARCTICA	
LESOTHO		CAMPO	Campo Inchauspe - Argentina
ARC 1950	Arc 1950 - Malawi	INCHAUSPE	
MALAWI		ARGENTINA	
ARC 1950	Arc 1950 - Swaziland	CANTON ASTRO ..	Canton Astro 1966 - Phoenix
SWAZILAND		'66 PHOENIX	Islands
ARC 1950	Arc 1950 - Zaire	ISLANDS	
ZAIRE		CAPE	Cape - South Africa
ARC 1950	Arc 1950 - Zambia	SOUTH	
ZAMBIA		AFRICA	
ARC 1950	Arc 1950 - Zimbabwe	CAPE	Cape Canaveral - Bahamas,
ZIMBABWE		CANAVERAL	Florida
		BAHAMAS FL	

CARTHAGE	Carthage - Tunisia	EUROPEAN	European 1950
TUNISIA		1950 ITALY	Italy (Sardinia)
		(SARDINIA)	
CH-1903	Switzerland	EUROPEAN	European 1950
CHATHAM	Chatham Island Astro 1971	1950 ITALY	(Sicily)
ISLAND ASTRO	New Zealand (Chatham Island)	(SICILY)	
NEW ZEALAND		EUROPEAN	European 1950
CHUA ASTRO	Chua Astro	1950	Malta
PARAGUAY	Paraguay	MALTA	
CORREGO	Corrego Alegre	EUROPEAN	European 1950
ALEGRE	Brazil	1950 SPAIN	Portugal, Spain
BRAZIL		PORTUGAL	
DABOLA	Dabola	EUROPEAN	European 1979
GUINEA	Guinea	1979	Mean for Austria, Finland,
		MEAN	Netherlands, Norway, Spain,
			Sweden, Switzerland
DJAKARTA	Djakarta (Batavia)	FORT THOMAS	Fort Thomas, 1955
(BATAVIA)	Indonesia (Sumatra)	1955 NEVIS	Nevis, St. Kitts
INDONESIA		ST. KITTS	(Leeward Islands)
DOS 1968	DOS 1968	GAN 1970	Gan 1970
NEW GEORGIA	New Georgia Islands	REPUBLIC OF	Republic of Maldives
ISLANDS	(Gizo Island)	MALDIVES	
EASTER	Easter Island 1967	GEODETIC	Geodeic Datum 1949
ISLAND	Easter Island	DATUM 1949	New Zealand
1967		NEW ZEALAND	
EUROPEAN	European 1950	GRACIOSA	Graciosa Base SW 1948
1950 MEAN	Mean for Austria, Belgium,	BASE SW	Azores (Faial, Graciosa, Pico,
WESTERN	Denmark, Finland, France,	1948 AZORES	Sao Jorge, Terceira)
	West Germany, Gibraltar, Greece,		
	Italy, Luxembourg, Netherlands,	GUAM	Guam 1963
	Norway, Portugal, Spain, Sweden,	1963	Guam
	Switzerland	GUNUNG	Gunung Segara
EUROPEAN	European 1950	SEGARA	Indonesia (Kalimantan)
1950 MEAN	Mean for Austria, Denmark,	INDONESIA	
CENTRAL	France, West Germany,	GUX 1 ASTRO	GUX 1 Astro
	Netherlands, Switzerland	GUADALCANAL	Guadalcanal Island
		ISLAND	
EUROPEAN	European 1950	HERAT NORTH	Herat North
1950 MEAN	Mean for Iraq, Israel, Jordan,	AFGHANISTAN	Afghanistan
MIDDLE EAST	Lebanon, Kuwait,	HJORSEY	Hjorsey 1955
	Saudi Arabia, Syria	1955	Iceland
EUROPEAN	European 1950	ICELAND	
1950	Cyprus	HONG KONG	Hong Kong 1963
CYPRUS		1963	Hong Kong
EUROPEAN	European 1950	HU-TZU-SHAN	Hu-Tzu-Shan
1950	Egypt	TAIWAN	Taiwan
EGYPT		INDIAN	Indian
EUROPEAN	European 1950	BANGLADESH	Bangladesh
1950 GREAT	England, Channel Islands, Ireland,	INDIAN	Indian
BRITAIN	Scotland, Shetland Islands	INDIA NEPAL	India, Nepal
EUROPEAN '50	European 1950	INDIAN 1954	Indian - 1954
FINLAND	Finland, Norway	THAILAND	Thailand, Vietnam
NORWAY		VIETNAM	
EUROPEAN	European 1950	INDIAN 1975	Indian - 1975
1950	Greece	THAILAND	Thailand
GREECE			
EUROPEAN	European 1950		
1950	Iran		
IRAN			

IRELANDIreland 1965
1965 Ireland

ISTS 061ISTS 061 Astro 1968
ASTRO 1968 South Georgia Islands
S GEORGIA

ISTS 073ISTS 073 Astro 1969
ASTRO 1969 Diego Garcia
DIEGO GARCIA

JOHNSTONJohnston Island 1961
ISLAND Johnston Island
1961

KANDAWALAKandawala
SRI LANKA Sri Lanka

KERGUELENKerguelen Island 1949
ISLAND Kerguelen Island
1949

KERTAU 1948Kertau 1948
W MALAYSIA West Malaysia & Singapore
SINGAPORE

KUSAIE ASTRO ...Kusaie Astro 1951
CAROLINE 1951 Caroline Islands
ISLANDS

L C 5 ASTROL.C. 5 Astro 1961
1961 CAYMAN Cayman Brac Island
BRAC ISLAND

LEIGONLeigon
GHANA Ghana

LIBERIALiberia 1964
1964 Liberia

LUZONLuzon
PHILIPPINES Philipines
(Excluding Mindanao)

LUZONLuzon
PHILIPPINES Philipines (Mindanao)
MINDANAO

MAHE ISLANDMahe 1971
1971 Mahe Island

MASSAWAMassawa
ETHIOPIA Ethiopia (Eritrea)
(ERITREA)

MERCHICHMerchich
MOROCCO Morocco

MIDWAY ASTRO ...Midway Astro 1961
1961 Midway Islands

MINNAMinna
CAMEROON Cameroon

MINNAMinna
NIGERIA Nigeria

MONTSERRATMontserrat Island Astro 1958
ISLAND Montserrat
ASTRO 1958 (Leeward Islands)

M'PORALOKOM'Poraloko
GABON Gabon

NAHRWANNahrwan
OMAN Oman (Masirah Island)

NAHRWANNahrwan
SAUDI ARABIA Saudi Arabia

NAHRWANNahrwan
UNITED ARAB United Arab Emirates
EMIRATES

NAPARIMA BWINaparima BWI
TRINIDAD AND Trinidad & Tobago
TOBAGO

N AMERICANorth American 1927
1927 MEAN Mean for Antigua, Barbados, Barbuda,
CARRIBEAN Caicos Islands, Cuba, Dominican
Republic, Grand Cayman, Jamaica,
Turks Islands

N AMERICANorth American 1927
1927 MEAN Mean for Belize, Costa Rica,
CENTRAL AMER El Salvador, Guatemala, Honduras,
Nicaragua

N AMERICANorth American 1927
1927 MEAN Mean for Canada
CANADA

N AMERICANorth American 1927
1927 MEAN Mean for CONUS
CONUS (Continental United States)

N AMERICANorth American 1927
1927 MEAN Mean for CONUS (East of Mississippi
CONUS EAST River) including Louisiana, Missouri,
Minnesota

N AMERICANorth American 1927
1927 MEAN Mean for CONUS
CONUS WEST (West of Mississippi River)

N AMERICANorth American 1927
1927 ALASKA Alaska

N AMERICANorth American 1927
1927 BAHAMAS Bahamas
(NO SAN SALV) (Except San Salvador Island)

N AMERICANorth American 1927
1927 BAHAMAS Bahamas (San Salvador Island)

N AMERICANNorth American 1927
1927 CANADA Canada (Alberta, British Columbia)
(WEST)

N AMERICANNorth American 1927
1927 CANADA Canada (Manitoba, Ontario)
(CENTRAL)

N AMERICANNorth American 1927
1927 CANADA Canada (New Brunswick,
EAST Newfoundland, Nova Scotia, Quebec)

N AMERICANNorth American 1927
1927 CANADA Canada (Northwest Territories,
NORTH Saskatchewan)

N AMERICANNorth American 1927
1927 CANADA Canada (Yukon)
YUKON

N AMERICAN North American 1927	PITCAIRN Pitcairn astro 1967
1927 CANAL Canal Zone	ASTRO Pitcairn Island
ZONE	1967
N AMERICAN North American 1927	POINT 58 Point 58
1927 CUBA Cuba	BURKINA Mean for Burkina Faso & Niger
N AMERICAN North American 1927	FASO NIGER
1927 Greenland (Hayes Peninsula)	POINTE NOIRE Pointe Noire 1948
GREENLAND	1948 CONGO Congo
N AMERICAN North American 1927	PORTO SANTO Porto Santo 1936
1927 MEXICO Mexico	1936 MADEIRA Porto Santo, Madeira Islands
	ISLANDS
N AMERICAN North American 1983	PROVISIONAL Provisional S. American 1956
1983 ALASKA Alaska, Canada, CONUS	S AMERICA Mean for Bolivia, Chile, Colombia,
CANADA CONUS	1956 MEAN Ecuador, Guyana, Peru, Venezuela
N AMERICAN North American 1983	PROVISIONAL Provisional S. American 1956
1983 CENTRAL Central America, Mexico	S AMERICA Bolivia
AM MEXICO	1956 BOLIVIA
OBSERVATORIA ... Observaorio Metereo 1939	PROVISIONAL Provisional S. American 1956
METEREO Azores (Corvo & Flores Islands)	S AMERICA Chile (Northern, Near 19°S)
1939 AZORES	1956 N CHILE
OLD EGYPTIAN Old Egyptian 1907	PROVISIONAL Provisional S. American 1956
1907 EGYPT Egypt	S AMERICA Chile (Southern, Near 43°S)
OLD HAWAIIAN Old Hawaiian	1956 S CHILE
MEAN Mean for Hawaii, Kauai,	PROV S AMER Provisional S. American 1956
Maui, Oahu	1956 Colombia
OLD HAWAIIAN Old Hawaiian	COLOMBIA
HAWAII Hawaii	PROVISIONAL Provisional S. American 1956
OLD HAWAIIAN Old Hawaiian	S AMERICA Ecuador
KAUAI Kauai	1956 ECUADOR
OLD HAWAIIAN Old Hawaiian	PROVISIONAL Provisional S. American 1956
MAUI Maui	S AMERICA Guyana
OLD HAWAIIAN Old Hawaiian	1956 GUYANA
OAHU Oahu	PROVISIONAL Provisional S. American 1956
OMAN Oman	S AMERICA Peru
Oman	1956 PERU
ORD SURVEY Ordinance Survey	PROVI S AMER Provisional S. American 1956
G BRITAIN Great Britain 1936 - Mean for	1956 Venezuela
1936 MEAN England, Isle of Man, Scotland,	VENEZUELA
Shetland Islands, Wales	PROVISIONAL Provisional S. American 1956
ORD SURVEY Ordinance Survey	S CHILEAN Chile (South, Near 53°S) (Hito XVIII)
G BRITAIN Great Britain 1936 - England	1963 S CHLIE
1936 ENGLAND	PUERTO RICO Puerto Rico
ORD SURVEY G ... Ordinance Survey	VIRGIN Puerto Rico, Virgin Islands
BRITAIN 1936 Great Britain 1936 - England,	ISLANDS
ENGLND WALES Isle of Man, Wales	QATAR Qatar National
ORD SURVEY G ... Ordinance Survey	NATIONAL Qatar
BRITAIN 1936 Great Britain 1936 - Scotland,	QORNOQ Qornoq
SCOTLAND Shetland Islands	GREENLAND Greenland (South)
ORD SURVEY Ordinance Survey	(SOUTH)
G BRITAIN Great Britain 1936 - Wales	REUNION Reunion
1936 WALES	MASCARENE Mascarene Islands
PICO DE Pico de las Nieves	ISLANDS
LAS NIEVES Canary Islands	ROME 1940 Rome 1940
CANARY ISLES	ITALY Italy (Sardinia)
	(SARDINIA)

RT 90Sweden

SANTO (DOS)Santo (DOS)
 '65 ESPIRITO 1965 Espirito Santo Island
 SANTO ISLAND

SAO BRAZSao Braz
 AZORES Azores (Sao Miguel,
 Santa Maria Islands)

SAPPER HILLSapper Hill 1943
 1943 EAST East Falkland Island
 FALKLAND ISLE

SCHWARZECKSchwarzeck
 NAMIBIA Nambia

SELVAGEM Selvagem Grande
 GRANDE Salvage Islands
 SALVAGE ISLE

SOVIETSGS 85
 GEODETIC Soviet Geodetic System 1985
 SYSTEM 1985

S AMERICANSouth American 1969
 1969 MEAN Mean for Argentina, Bolivia,
 Brazil, Chile, Colombia, Ecuador,
 Guyana, Paraguay, Peru,
 Trinidad & Tobago, Venezuela

S AMERICANSouth American 1969
 1969 ARGENTINA Argentina

S AMERICANSouth American 1969
 1969 BOLIVIA Bolivia

S AMERICANSouth American 1969
 1969 BRAZIL Brazil

S AMERICANSouth American 1969
 1969 CHILE Chile

S AMERICANSouth American 1969
 1969 COLOMBIA Colombia

S AMERICANSouth American 1969
 1969 ECUADOR Ecuador

S AMERICANSouth American 1969
 1969 GALAPAGOS Ecuador (Baltra, Galapagos)

S AMERICANSouth American 1969
 1969 GUYANA Guyana

S AMERICANSouth American 1969
 1969 PARAGUAY Paraguay

S AMERICANSouth American 1969
 1969 PERU Peru

S AMERICANSouth American 1969
 1969 TOBAGO Trinidad & Tobago
 AND TRINIDAD

S AMERICANSouth American 1969
 1969 VENEZUELA Venezuela

SOUTH ASIASouth Asia

SINGAPORESingapore

TANANARIVETananarive Observatory 1925
 OBSERVATORY Madagascar
 1925
 MADAGASCAR

TIMBALAITimbalai 1948
 1948 BRUNEI Brunei, East Malaysia
 E MALAYSIA (Sabah, Sarawak)

TOKYOTokyo
 MEAN Mean for Japan, Korea, Okinawa

TOKYOTokyo
 JAPAN Japan

TOKYOTokyo
 KOREA Korea

TOKYOTokyo

OKINAWAOkinawa

TRISTAN DATristan Astro 1968
 CUNHA Tristan da Cunha
 ASTRO 1968

VITI LEVUViti Levu 1916
 1916 FIJI Fiji (Viti Levu Island)

WAKEWake

ENIWETOK '60Eniwetok 1960

MARSHALL ISLMarshall Islands

WAKE ISLANDWake Island Astro 1952
 ASTRO 1952 Wake Atoll

WGS 1972WGS 1972
 GLOBAL Global Definition
 DEFINITION

YACAREYacare
 URUGUAY Uruguay

ZANDERIJZanderij
 SURINAME Suriname

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 year (1) 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, 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

Eagle's UPS Return Service - U.S.A. Only

Eagle Electronics and United Parcel Service (UPS) are proud to offer all of our customers free shipping for all units sent to us for repair or service. If you have to send this unit to the factory, and you are in the continental United States, use the enclosed UPS shipping label for easy, free shipping to our factory customer service department. There are six easy steps:

1. Call Eagle at the toll-free number on the back of this manual for a Return Authorization (RA) number and instructions about what accessories to return. **Do not return a product to the factory without a Return Authorization (RA) Number!**
2. Pack your unit and any accessories in the original shipping container, if possible. **Be sure to include proof of purchase for warranty verification!**
3. Write a brief note detailing the problem you're having with the unit. Please include your name, address, and daytime telephone number.
4. Please include payment for non-warranty repairs. Check, money order, Visa, or MasterCard may be used.
5. Fill in your name, address, zip code, date, and RA number in the blanks provided on the UPS form included with your unit.
6. Attach the label to the shipping box, tear off the tab for your receipt and give the package to any UPS driver or take the package to any UPS Customer Center. You will not be charged for this shipment.

That's it! Your unit will be shipped to Lowrance's customer service department at no charge to you. Units under warranty will be returned to you at no charge.

NOTE!

Eagle will pay UPS surface shipping charges both to and from the factory for this unit in the event it needs repair. Your unit is insured against loss or shipping damage when you use the enclosed UPS label.

This UPS shipping offer is good only in the continental United States (excludes Alaska and Hawaii).

**KEEP THIS LABEL!
YOU WILL NEED IT IF YOU EVER NEED TO RETURN YOUR UNIT TO
THE FACTORY FOR REPAIR.**

Accessory Ordering Information

To order accessories such as power cables, please contact:

1) Your local marine dealer. Most quality dealers that handle marine electronic equipment should be able to assist you with these items. Consult your local telephone directory for listings.

2) LEI Extras, Inc. P.O. Box 129 Catoosa, OK 74015-0129
or call
800-324-0045
(USA orders only.)

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.

How to Obtain Service (Canadian Customers Only)

We back your investment in quality products with quick, expert service and genuine Eagle replacement parts. If you need service or repairs, contact the Eagle Factory Customer Service Department at the toll-free number listed below. A technician may be able to solve the problem and save you the inconvenience of returning your unit. You will be asked for your unit's serial number.

800-324-1356

Canada Only. Monday through Friday 8:00 A.M. - 8:00 P.M. Central Time.

When sending a product for repair, please do the following:

1. Always use the original shipping container and filler material the product was packed in when shipping your product.
2. Always insure the parcel against damage or loss during shipment. Eagle does not assume responsibility for goods lost or damaged in transit.
3. For proper testing, repair, and service, send a brief note with the product describing the problem. Be sure to include your name, return shipping address, and a daytime telephone number.

How to Obtain Service (International Customers Only - Except Canada)

If you need service or repairs, contact the dealer in the country you purchased your unit.

**WARRANTY REPAIR WILL BE HONORED ONLY IN THE
COUNTRY UNIT WAS PURCHASED.**

Please follow the shipping instructions shown below on this page if you have to mail your unit to the dealer. For proper testing, repair, and service, send a brief note with the product describing the problem. Be sure to include your name, return shipping address, and a daytime telephone number.

Accessory Ordering Information - All Countries

To order accessories such as power cables or transducers, please contact:

1. Your local dealer. Most quality dealers that handle GPS navigation equipment should be able to assist you with these items. Consult your local telephone directory for listings.
2. Canadian customers only can write:
Eagle/Eagle Canada, 919 Matheson Blvd., E. Mississauga, Ontario L4W2R7
or fax 416-629-3118

How to Obtain Service - U.S.A. Only

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 questions, please contact the Factory Customer Service Department using our toll-free number listed below. You must send the unit to the factory for warranty service or repair. Please call the factory before sending the unit. You will be asked for your unit's serial number. Use the following toll-free number:

800-324-1354

U.S.A. only. Monday through Friday 8:00 A.M. - 8:00 P.M. Central time, except holidays.

Your unit is covered by a full one-year warranty. (See page 53 inside this manual for complete warranty details.) If your unit fails and the failure is not covered by the original warranty, Eagle has a flat-rate repair policy that covers your unit and accessories packed with the unit at the factory. There is a 180-day warranty on all non-warranty repairs from the factory, which is similar to the original warranty, but is for 180 days rather than one year. For further details, please call us at the above number.

Eagle also gives you free UPS shipping from anywhere in the continental United States both to and from the factory for all warranty repairs. You can also use the enclosed UPS shipping label for non-warranty shipments. See page 54 for more information. Remember, non-warranty repairs are subject to Eagle's published flat-rate charges and 180-day warranty.