



Z-9500^{GPS}

INSTALLATION/OPERATION MANUAL



LITHO IN U.S.A.

988-0119-29

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WARNING!

USE THIS GPS RECEIVER ONLY AS AN AID TO NAVIGATION. A CAREFUL NAVIGATOR NEVER RELYS ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION.

CAUTION

This GPS receiver, (like all GPS navigation equipment) will show the shortest, most direct path to a 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.

NOTICE!

As of this writing, the Department of Defense (DOD) has not declared the GPS navigation system as operational. The system is still in a testing phase. Satellites can be turned off or accuracy can be degraded at will by the system operators. Remember that the Z-9500GPS, or any GPS receiver is only as accurate as the system it's using.

Features and specifications subject to change without notice.

All display screens in this manual are simulated.

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Z-9500GPS SONAR SPECIFICATIONS

Z-9500GPS Dimensions	6.6"H x 8.8"W x 3.9"D	
Input Voltage	10 - 15 vDC	
Current	750 ma (lights off) 850 mz (lights on)	
Transmitter		
Frequency	192 & 50kHz	
Output Power	2500 watts (peak-to-peak) (typical)	312 watts (RMS)
Display Size	3.25"H x 4"W	
Pixels	128 H x 160 W 20,480 Total	

Z-9500GPS GPS RECEIVER SPECIFICATIONS

GPS Module Dimensions	2.5"H x 4.1"W x 7" D
Channels	Five Parallel Four continuous for position All satellites in view tracked
Update rate	One second
Accuracy	Maximum accuracy achievable with Standard Positioning Service Position: 25 meters CEP Velocity: 0.25 meters/sec RMS Without SA PDOP<6.0

NMEA 0183 SENTENCES

RMB	Minimum Recommended Sentence, Part B
RMC	Minimum Recommended Sentence, Part C
GLL	Present Position - Latitude/Longitude
APA	Autopilot Steering Data
DBK	Water Depth
MTW	Water Temperature (°C)
VHW	Speed Through Water (KPH)
VLW	Distance Travelled/LOG (NM)



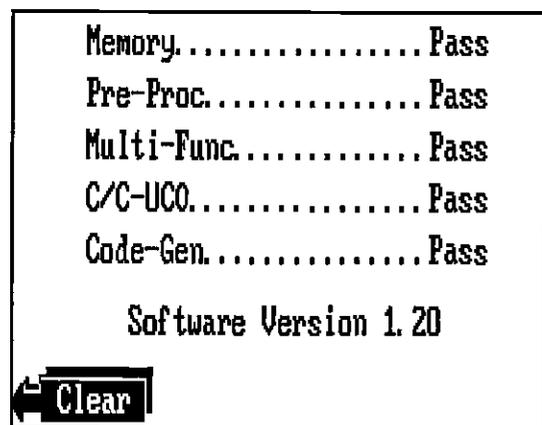
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GPS MODULE SELF-TEST

This feature tests the GPS module and returns a Pass/Fail message. There is a problem with the GPS module if any of the tests show the "Fail" message. Do not use the module if this happens. Contact the Factory Customer Service Department for repair information. The current software version number also appears at the bottom of the screen.

To use the self test feature, press the MENU key, then press the key adjacent to the "MORE" label until the menus shown on the previous page appear. Finally, press the key adjacent to the "PERFORM GPS MODULE SELF TEST" label. The screen shown below appears.

To exit from this screen, press the CLEAR key.



INTRODUCTION

The Z-9500GPS represents one of the best values in sportfishing sonar today. It rivals other combination sonar/GPS units costing much more in features and performance. The Z-9500GPS offers easy-to-use operation at the touch of a button. The wide screen shows the underwater world with high resolution and detail. It also displays digital depth, boat speed*, surface water temperature*, and distance* travelled (distance log).

Although the Z-9500GPS has many features and functions, the "soft key" menu system makes it easy to use. Above all, don't be afraid to try different features and functions on the unit. You can't hurt it by pressing buttons!

Read this manual and take it with you the first few times you use your unit. It makes a great reference should you need it. The more you know when you get to the water, the more your Z-9500GPS can do for you!

MOUNTING - DISPLAY UNIT

Install the Z-9500GPS in any convenient location, provided there is clearance behind the unit when it is tilted for the best viewing angle. Holes in the bracket base allow wood screw or through-bolt mounting. You may need to place a piece of plywood on the back of thin fiberglass panels to secure the mounting hardware. Make certain there is enough room behind the unit to attach the power and transducer cables.

The smallest hole that will pass one power or transducer plug is one inch. After the hole is drilled, pass the transducer connector up through the hole first, then pass the power cable down through it.

After the cables have been routed, fill the hole with a good marine sealing compound. Offset the bracket to cover the majority of the hole.

POWER CONNECTIONS

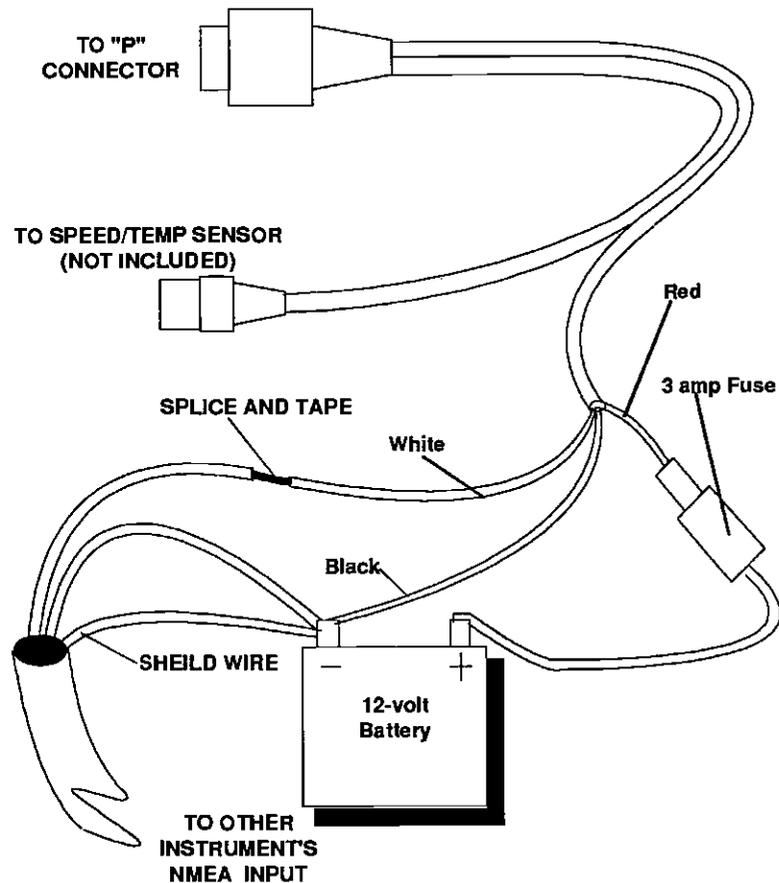
The Z-9500GPS works from a twelve-volt battery system only. You can attach the power cable to an accessory or power buss, however if you have problems with electrical interference, then attach the power cable directly to the battery.

*Requires optional ST-T
Speed/Temperature sensor.

If the cable is not long enough, splice #18 gauge wire onto it.

The power cable has three wires; red, white, and black. Red is the positive lead, black is negative or ground. Attach the in-line fuse holder to the red lead as close to the power source as possible. For example, if you have to extend the power cable to the battery or power buss, attach the fuse holder to the battery or power buss. This will protect both the unit and the power cable in the event of a short. The white wire is for a NMEA interface. The Z-9500GPS sends data for an autopilot or other electronic navigation devices through this wire. If the white wire is not used, tape the end so that it cannot short.

To connect a device to the Z-9500GPS' NMEA output, attach a shielded, twisted pair cable from the autopilot's NMEA input to the white wire on the Z-9500GPS' power cable. Solder the ground conductor of the twisted pair and the shield to the black



Using the unit in this manner lets you start a search pattern for the victim from a known location. Switching to the plotter on the .05 mile range makes it easier to see your position relative to the accident area.

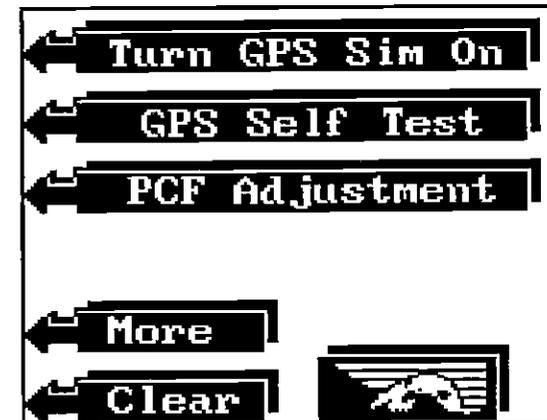
Remember, saving the victim is the primary goal. Try all options to rescue the person immediately after the accident happens. Training and education are also good accident preventatives. The Coast Guard has excellent safety courses. Instruct all members on board your boat on safety procedures before leaving the dock. Make certain all on board know what to do before any emergency occurs.

For more information on saving and recalling waypoints, see "How to Save a Waypoint" section in this manual.

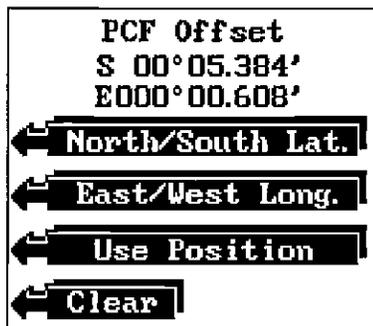
GPS SIMULATOR

This feature places position and navigation data on all screens, including the plotter. The unit "navigates" a closed course. It shows bearing and distance to go, course over ground, and other information. A recurring message appears, alerting you to the fact that the simulator mode is enabled. Don't navigate when the simulator is on!

To turn the simulator on, press the MENU key, next to the "MORE" label until the screen shown below appears. Press the key next to the "Turn GPS Sim ON" label. The simulator mode starts immediately. To turn the simulator off, either press the OFF key or repeat the above steps to get the menu shown below. The label now reads "Turn GPS Sim OFF". Press the key adjacent to that label.



the chart's location in latitude and longitude. After pressing the key adjacent to that label, the screen shown below appears.



If you need to switch the latitude from north to south, press the key adjacent to the "North/South Lat." label. Switch the longitude if necessary in the same manner by pressing the key next to the "East/West Long." label. If the offset shown at the top of the screen is correct, press the key adjacent to the "Use Position" label. The Z-9500GPS returns to the last used position, navigation, or plotter screen using the offset information you entered. To verify that PCF is in effect, switch to the position, navigation, or plotter screen. The letters "PCF" appear on these screens when PCF is enabled.

MAN OVERBOARD

One of boating's most terrifying events is having a friend or family member fall overboard. This situation can be deadly on any body of water, fresh or salt. It's particularly dangerous at night or if you're out of sight of land. Of course, the first thing to do is remain calm and try all standard safety measures to try and rescue the person. If you lose sight of the person, you can use the Z-9500GPS to initiate a search pattern.

Once you're back at the helm after initial rescue efforts have failed, press the Z-9500GPS's Waypoint Quicksave key. This instantly stores your present position in memory. Memorize the waypoint number that appears at the top of the screen! Now press the Waypoint Recall key. Press the key next to the "Dest. Waypt Num." near the bottom of the screen. A new menu appears. Enter the waypoint number that you just saved, then press the key adjacent to the "ENTER" label. This recalls the waypoint you stored, causing the Z-9500GPS to show navigation information back to that waypoint. The Arrival alarm will sound since you're within its radius, either ignore it or press the CLEAR key to silence it.

wire on the power cable. Do not connect the shield to the autopilot. See the other device's manual for wiring instructions.

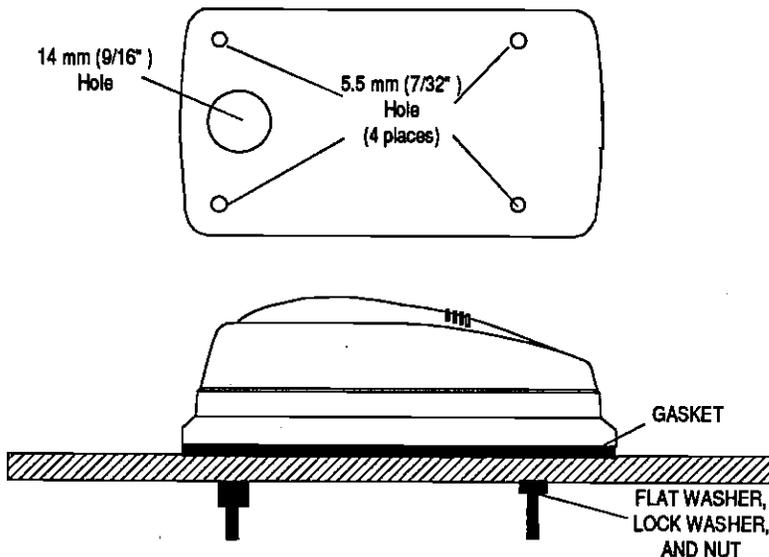
No other adjustments are required once the cable is connected. The Z-9500GPS automatically sends NMEA information out the white wire once it acquires and "locks on" to the satellites.

GPS MODULE INSTALLATION

The GPS module can be installed on a flat surface or (with the supplied adapter) on a pole. Mount the module in an area that guarantees a clear view of the sky at all times. In order for the module to receive the signals from the satellites, it must not be obstructed. An ideal location is on a cabin roof, or deck. The gunnels also make a good location. Attaching the pole mounting adapter lets you install the module on a one inch mast. A high location is preferred. However, for lightning protection, the antenna shouldn't be the highest part of the boat.

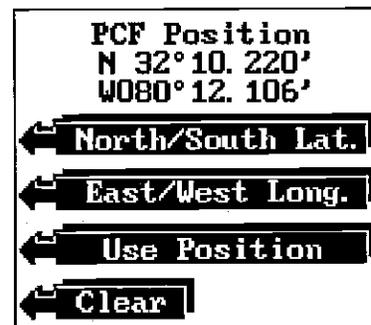
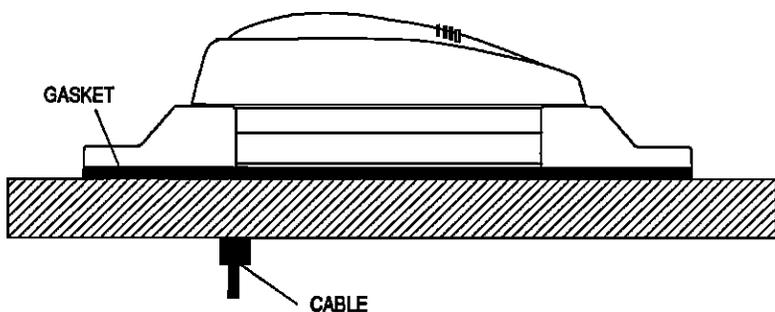
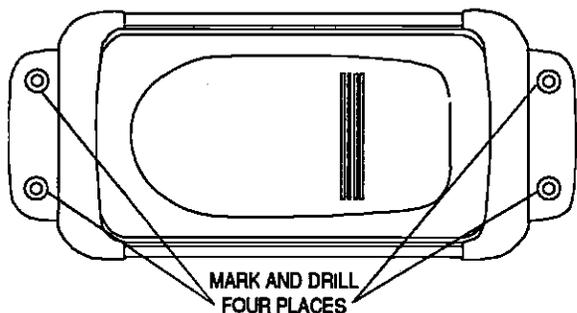
Surface Mounting - With Access

If you have access underneath the mounting surface, use the gasket supplied with the GPS module as a template. Mark and drill four 5.5 mm (7/32") holes for the mounting screws and one 14 mm (9/16") hole for the module's cable. Attach the cable to the module and pass it down through the hole in the gasket and the mounting surface. Use the 5 mm "all thread" screws and flat washers, lock washers, and nuts included with the unit to fasten the GPS module to the mounting surface. Route the 25' GPS cable to the Z-9500GPS.



Surface Mounting - Without Access

If you don't have access to the back side of the mounting surface, use the "cleats" supplied with the Z-9500GPS. (Note: This is assuming you can "snake" the module's cable to a location that is accessible. A hole will still need to be drilled in the mounting surface for the cable.) Using the gasket as a template, mark and drill the 14 mm (9/16") hole for the cable. Attach the cable to the module and drop the other end of the cable through the gasket and down the hole. Place the module on the gasket. Slide the "cleats" onto each end of the module and (using the cleats as templates) mark four holes for 5 mm (#10) mounting screws. Drill the holes, then replace the cleats on the module and fasten them to the mounting surface with the screws. Route the cable to the Z-9500GPS.



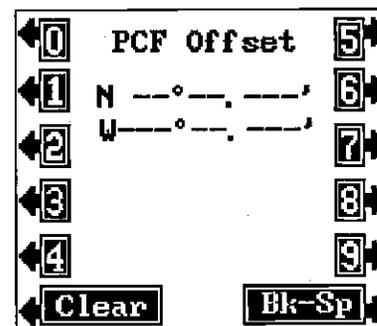
Press the key adjacent to the "North/South Lat." label to switch the latitude from north to south. Switch the longitude in necessary in the same manner by pressing the key next to the "East/West Long." label. If the position shown at the top of the screen is correct, press the key adjacent to the "Use Position" label. The Z-9500GPS returns to the last used position, navigation, or plotter screen using the offset information you entered. To verify that PCF is in effect, switch to the position, navigation, or plotter screen. The letters "PCF" appear on these screens when PCF is enabled.

Set as Offset

To enter the offset or difference in position from your present position and the one on the chart, first subtract your current position from the location on the chart you wish to match.

For example, if your location is N 32°10.220', W 80°12.106' and the chart's position is N 32°15.604', W 080°12.714, then the position offset is N 00°05.384, W 00°00.608'. Ppress the MENU key, then press the key adjacent to the "More" label until the "PCF Adjustment" label appears. Press the key adjacent to that label. The screen shown at the top of the previous page appears.

Now press the key adjacent to the "Set as Offset" label. The screen shown below appears. Enter the difference between your position and

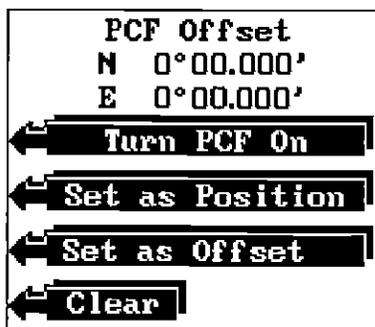


not change when the unit is turned off. However, Preset does erase the PCF settings.

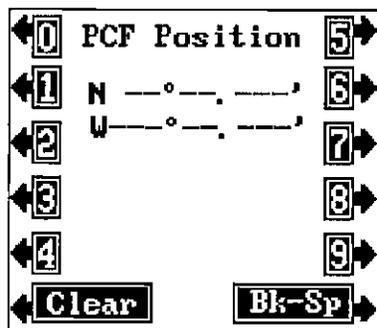
The Z-9500GPS gives you a choice of methods to enter the PCF. The first method (Set as Position) lets you simply enter the corrected latitude/longitude. The second method (Set as Offset) requires a calculation be performed, then entered into the unit.

Set as Position

To use the Set as Position method, first choose the location on the chart that you wish to match the unit's position display to. Then move the boat to that position and hold it there as accurately as possible. Now press the MENU key, then the key adjacent to the "More" label until the "PCF Adjustment" label appears. Press the key adjacent to that label. The screen shown below appears.

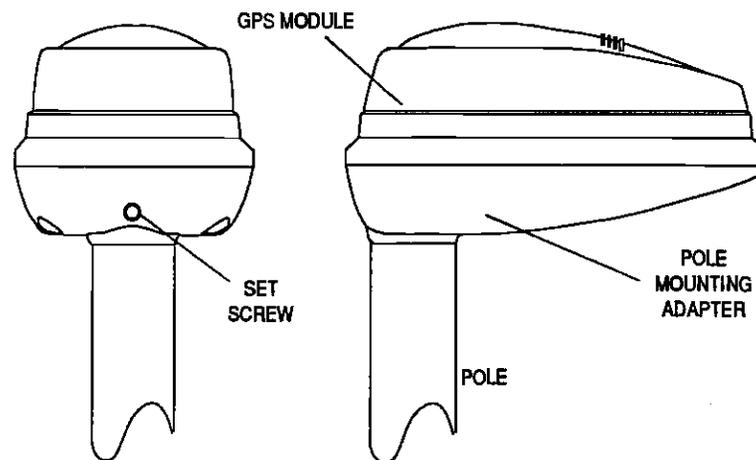


Now press the key next to the "Set as Position" label. The screen shown below appears. Now enter the position shown on the chart. After the last key is pressed, the screen shown at the top of the next page appears.



Pole Mount

First attach the GPS module's cable to the module. Next, pass the cable through the pole mounting adapter and attach it to the GPS module. Using the four 5 mm screws supplied with the Z-9500GPS, attach the pole mounting adapter to the GPS module. Now pass the cable through the mounting pipe. The mounting adapter is threaded for standard 1"-14 machine thread. (Not pipe thread.) Thread the mounting pipe onto the GPS module/pole adapter assembly. After tightening the threads, install the supplied set screw into the front of the pole mounting adapter and tighten it. This should prevent the GPS module from unscrewing from the pole.



NOISE

Minimize electrical noise by routing the power cable away from other possible sources of electrical interference. One of the largest noise generators is the engine's wiring harness. For best results, keep the power, GPS module, and transducer cables away from the engine wiring. Bilge pumps and their wiring can also radiate noise, so keep the cables away from them, if possible.

VHF radio antennas and cables radiate RF energy at high power levels. It is important to keep the Z-9500GPS' cables away from them, also.

Noise typically shows on the sonar display. If interference begins at slow boat speeds and gets worse as the speed increases, then the probable cause is acoustic noise or cavitation. This noise is not electrical, but is caused by air bubbles passing over the face

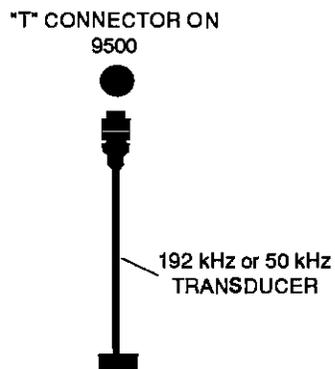
of the transducer. It's easy to determine if this noise is electrical or cavitation. Stop the boat, put the engine in neutral, and increase the rpm. If the noise increases, then it's electrical. If it doesn't show on the display, then the problem is cavitation. To solve this problem, the transducer must be moved out of the turbulent water flow or adjusted so that smooth water flows over it at all boat speeds.

The Z-9500GPS has reverse polarity protection. No damage will occur to the unit if the power wires are hooked up backwards. However, the unit will not work until the wiring is connected properly.

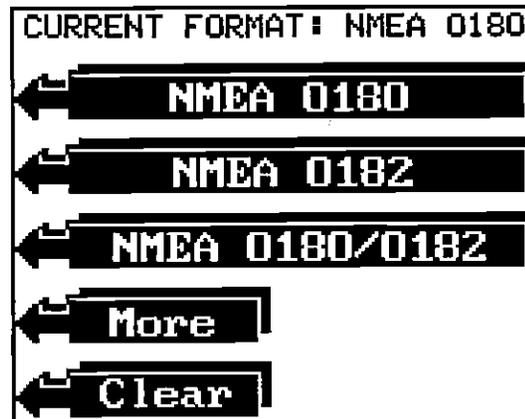
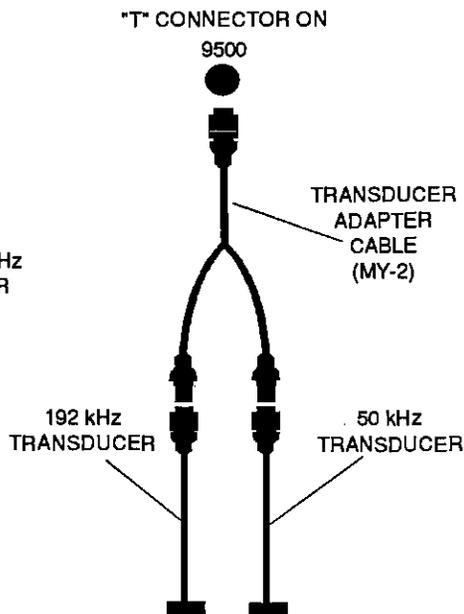
TRANSDUCER CONNECTIONS

The Z-9500GPS has dual frequency capability. It can operate at 50 or 192 kHz, separately, or at the same time. The connection diagram below shows the proper method to attach the transducers to the Z-9500GPS. See the transducer owner's manual for transducer installation instructions. If dual frequency operation is desired, a 50 kHz transducer and the MY-2 transducer adapter cable must be purchased separately.

SINGLE FREQUENCY



DUAL FREQUENCY



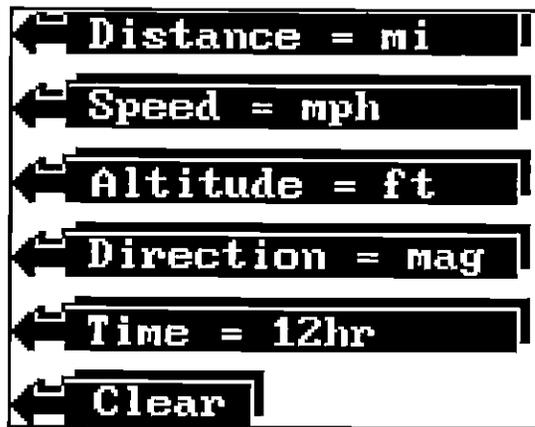
the Z-9500GPS can output the 0183 format as sonar data only, GPS data only, or both sonar and GPS data. Press the key adjacent to the desired data output. The Z-9500GPS will return to the last used GPS or plotter screen, and send NMEA data out the white wire on the power cable.

PCF OFFSET (Position Correction Factor)

The GPS navigation system relies on complex mathematical calculations to determine your position based on satellite data and other factors. One factor is the Earth's shape. Since the Earth is not a true sphere, variations in the calculations have to be made to accommodate deviations. To make matters more complex, not everyone uses the same data to determine what the deviations are. The size and shape of the ellipsoids that are used to approximate the earth's surface are improved often. This can lead to errors if your navigation device uses one ellipsoid, while your chart uses a different one. The term used for these ellipsoids is "datum."

To reduce the error factor between datum, the Z-9500GPS gives you the capability to move or "offset" the position shown on the display to match one shown on the chart. The unit will add this offset to all position displays at all times.

For example, suppose you are anchored at a location that is accurately marked on a chart. Your Z-9500GPS displays a longitude position that is .010 degrees less than the one on the chart. Using the Position Correction Factor (PCF) Offset feature, you make the Z-9500GPS read the same as the chart. If you raise anchor and move, the Z-9500GPS will add the change you made to all positions. This makes it more closely match the datum used by the chart. For this reason, you should be careful when entering the PCF Offset. This is saved in memory. It does



you wish to change. For example, to change Distance from miles to nautical miles, press the key next to the "Distance" label until the label reads "Distance = NM." You can change the units of measure for all of the items on this screen at the same time.

When you've modified the units of measure to the desired settings, press the CLEAR key. The Z-9500GPS reverts to the last used navigation screen using the changes you made.

NMEA COMMUNICATION

The Z-9500GPS sends data out the white wire on the power cable according to standards set by the NMEA (National Marine Electronics Association). This allows the Z-9500GPS to send position, depth, and navigation information to "listener" units, such as charting instruments, autopilots, and other marine instruments. The Z-9500GPS uses the following NMEA data protocols: NMEA 0180, 0182, and 0183. NMEA 0180 sends steering information only. It's useful mainly for autopilots. NMEA 0183 has the most information, sending depth, position, steering, speed, and more. In order to use this feature, the white wire on the power cable must be connected to the NMEA data input on the other instrument. See the installation section at the front of this manual for wiring connection information.

Once the wiring is connected properly, the Z-9500GPS must be told which data format to use. Consult the owner's manual of the "listener" equipment to see the which format it needs. Then set the Z-9500GPS as follows: First, press the MENU key while a GPS or plotter screen is displayed. Next, press the key next to the "More" label until the NMEA label appears. Press the key next to this label. The screen shown at the top of the next page appears. The data format currently in use shows at the top of the screen. To view more formats, press the key adjacent to the "More" label. Notice that

KEYBOARD

The keyboard has keys arranged in two vertical columns. The keys in the left column are used for GPS selections. The keys in the right column pertain to the basic sonar functions. The MENU key in the bottom right corner of the keyboard activates the first menu page.

SONAR - This switches the unit from GPS to sonar operation.

SENS - Use this to adjust the sonar's sensitivity and Grayline®.

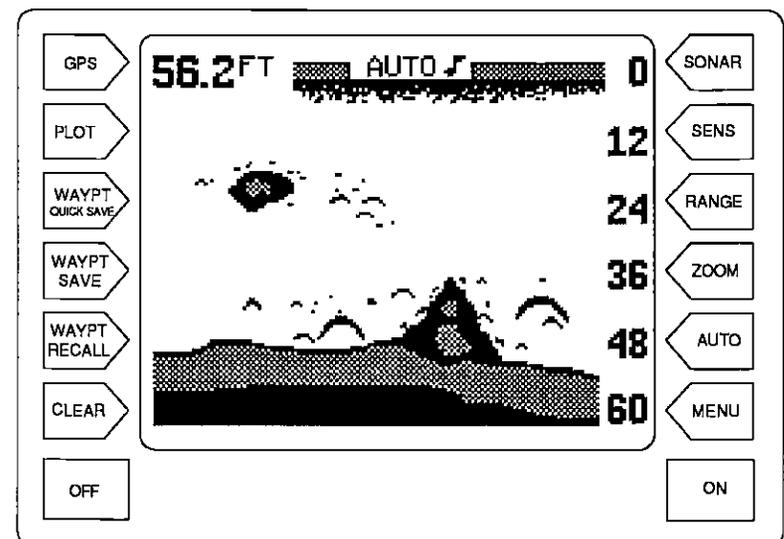
RANGE - This key lets you adjust the sonar's depth range.

ZOOM - Press this key to adjust the sonar's zoom and bottom track features.

AUTO - Switches the Sonar from automatic to manual operation and back.

MENU - Press this key to show the menus and gain access to most functions.

ON - The ON key turns the Z-9500GPS on.



GPS - The GPS key switches the unit to GPS operation.

PLOT - This enables the GPS Plotter function.

WAYPOINT QUICKSAVE - Press this key to instantly save a location or "waypoint" in memory.

WAYPOINT SAVE - This feature gives you more waypoint saving options.

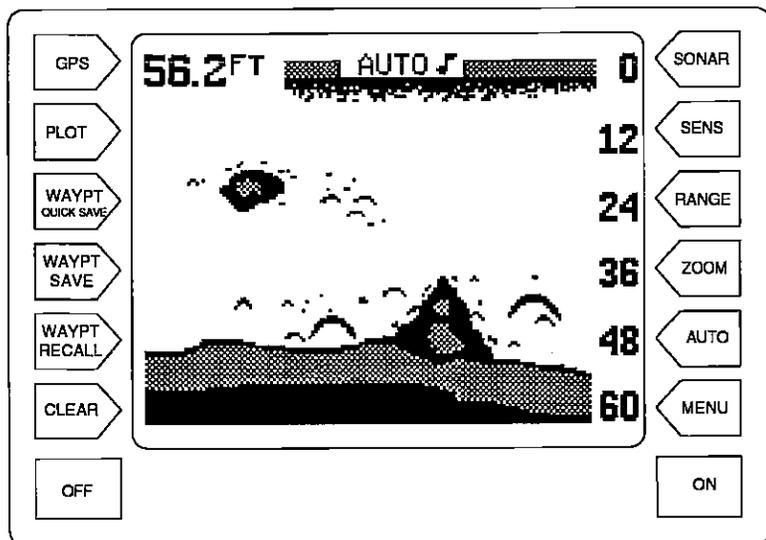
WAYPOINT RECALL - This key is used to recall waypoints from memory.

CLEAR - Use this key to exit from menus

OFF - Press and **HOLD** the Off key to turn the Z-9500GPS off.

DISPLAY - General

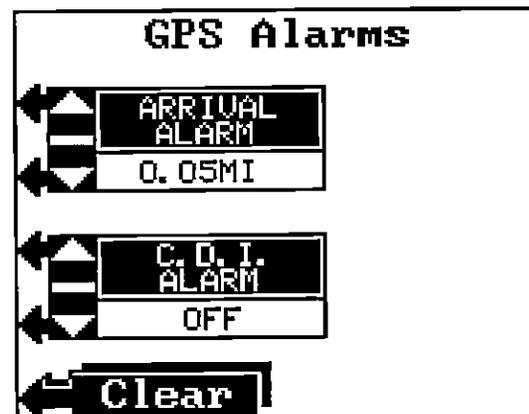
The lights are turned on for approximately ten seconds when the Z-9500GPS is first turned on. A menu appears at the same time on the left side of the screen. This is the Light menu. It controls the backlighting used on the display and keyboard. If you wish to keep the lights on, press the key adjacent to the ON label. To turn the lights off, press the key adjacent to the OFF label, or wait ten seconds and the lights will automatically turn themselves off.



ARRIVAL ALARM

The arrival alarm sounds a tone when your position is within the alarm's radius of a waypoint. For example, if the alarm's setting is .5 mile, then the alarm sounds a tone when you come within .5 miles of a waypoint.

To set the arrival alarm, first press the MENU key, then press the key next to the "More" label until the "Set Alarms" label appears. Now press the key adjacent to that label. The screen below appears. Press the key adjacent to the up arrow in the arrival alarm's menu to increase the alarm's radius. Press the key next to the down arrow to decrease it. The arrival alarm's range is from .01 to 10 miles.



To turn the arrival alarm off, press the key next to the down arrow until the word "OFF" appears.

Press the CLEAR key to exit from the GPS alarm menu.

UNITS OF MEASURE

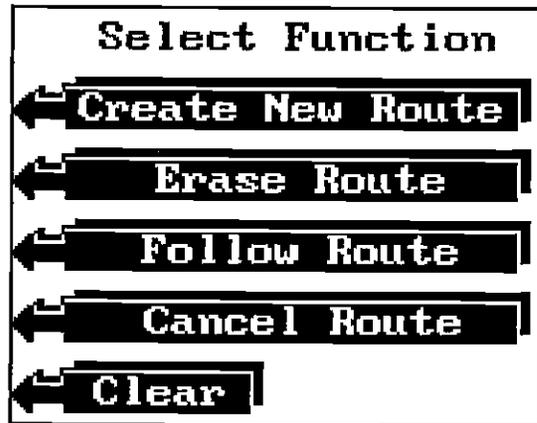
The Z-9500GPS can display distance, speed, altitude, degrees, and time in different units of measure. For example, distance can be displayed in statute miles, nautical miles, or kilometers.

To change the units of measure, first press the MENU key, then press the key next to the "More" label until the "Change Units" label appears. Now press the key adjacent to the "Change Units" label. The screen shown at the top of the next page appears.

The unit of measure for all of the items on this menu are shown on this screen. To change one or all, simply press the key adjacent to the label that

CANCELING A ROUTE

To stop the Z-9500GPS in a route, press the MENU key, then press the key adjacent to the "Route Planning" label. Now press the key adjacent to the "Cancel Route" label. This stops the Z-9500GPS from sequencing to any waypoints after the current waypoint. The unit will continue to show navigation information to the current waypoint until the arrival alarm sounds, even though the route was canceled.



NOTE:

Canceling a route does not erase the route from memory. It merely stops the Z-9500GPS from sequencing through the waypoints in the route.

ERASING A ROUTE

To erase a route from memory, first press the MENU key, then press the key next to the "More" label. Now press the key next to the "Route Planning" label. Next, press the key adjacent to the "Erase Route" label. The screen shown below appears. Use the keys adjacent to the up or down labels to move the box to the desired route name. Then press the key adjacent to the "Erase" label. This erases the route from memory. Press the CLEAR key to exit this menu.

GPS ALARMS

The Z-9500GPS has two GPS alarms; a CDI alarm and an Arrival alarm. The CDI alarm sounds an audible tone when the CDI indicator moves past a preset limit. This alarm has already been covered in the Steering Screen section on page 67. The arrival alarm operation is described on the next page.

The menus will also disappear after ten seconds, or you can turn them off by pressing the key adjacent to the CLEAR label at the bottom of the screen.

When the Z-9500GPS is first turned on, the display will appear similar to the one above. The digital bottom depth is displayed in the upper left corner of the screen. The word "AUTO" in the upper center of the display indicates the sonar's automatic feature is on. A small note symbol next to the "AUTO" indicator means the alarm speaker is enabled.

SONAR OPERATION

AUTOMATIC

When the Z-9500GPS is first turned on, the Automatic feature is enabled. This is indicated by the word "AUTO" at the top of the screen. The Automatic feature adjusts the sensitivity and range so the bottom signal is displayed in the lower portion of the screen at all times.

To turn Automatic off, simply press the AUTO key. The letters "Man" appear, indicating the unit is in the manual mode. To turn Automatic on, press the AUTO key again.

SENSITIVITY

The sensitivity key on the Z-9500GPS controls the ability of the unit to pick up echoes. A low sensitivity level excludes much of the bottom information, fish signals, and other target information. High sensitivity levels enable you to see this detail, but it can also clutter the screen with noise. Typically, the best sensitivity level shows a good solid bottom signal with Grayline® and some surface clutter.

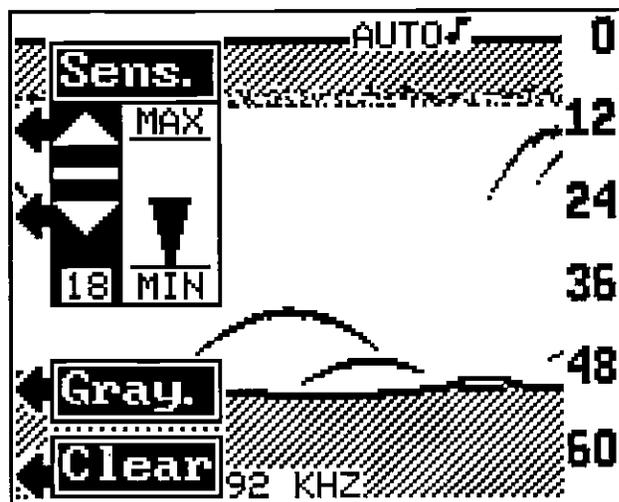
When the Z-9500GPS is in the Automatic mode, the sensitivity is automatically adjusted to keep a solid bottom signal displayed, plus a little more. This gives it the capability to show fish and other detail.

Sometimes it becomes necessary to manually increase or decrease the sensitivity. This typically happens when you wish to see more detail, so an increase in sensitivity is indicated. The procedure to adjust it is the same whether the unit is in the automatic or manual mode.

To adjust the sensitivity, press the SENS key. The sensitivity adjust menu appears on the left side of the screen. The Grayline adjust menu is immediately beneath it.

The sensitivity menu has up and down arrows, plus a vertical bar graph. The graph gives a visual indication of the sensitivity level. A number beneath the down arrow also shows the sensitivity level. There are 32 steps of sensitivity.

To increase the sensitivity level, press the key adjacent to the menu's up arrow on the left side of the unit. As you press the key, the menu's bar graph will grow taller and the number will

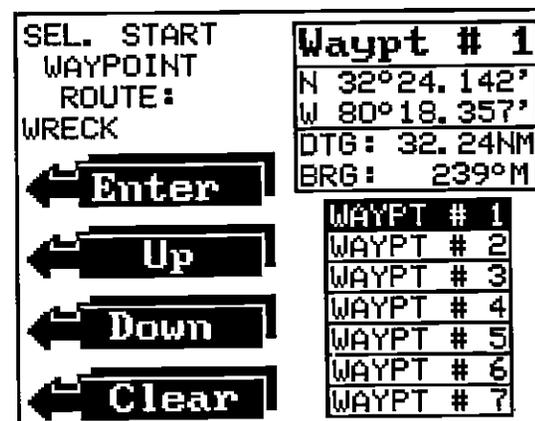


increase in value. You can also see the difference on the chart record as it scrolls. When the sensitivity is at the desired level, release the key.

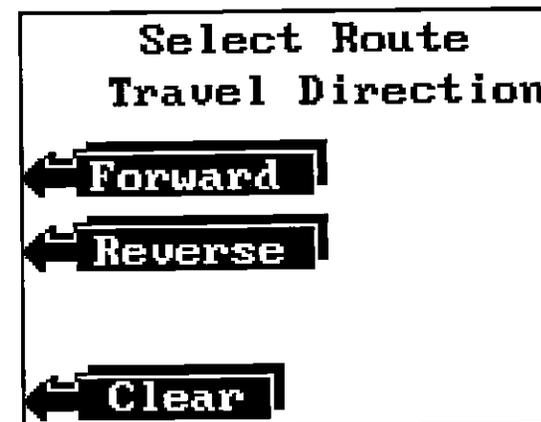
To decrease the sensitivity level, press the key adjacent to the down arrow. The bar graph and the number will decrease. When the sensitivity is at the desired level, release the key.

When you reach either the maximum or minimum limit, the speaker will sound an alert tone.

To turn the menus off, press the key adjacent to the CLEAR label at the bottom left side of the unit.



SELECT ROUTE STARTING WAYPOINT MENU



SELECT ROUTE TRAVEL DIRECTION MENU

The Z-9500GPS now shows navigation to the first waypoint on the route. The arrival alarm sounds when you reach each waypoint for about seven seconds. It's radius is preset for 0.1 mile. In other words, the arrival alarm sounds when you come within .1 nautical mile of the waypoint. When you reach the last waypoint in the route, the arrival alarm sounds until you turn it off.

IMPORTANT!

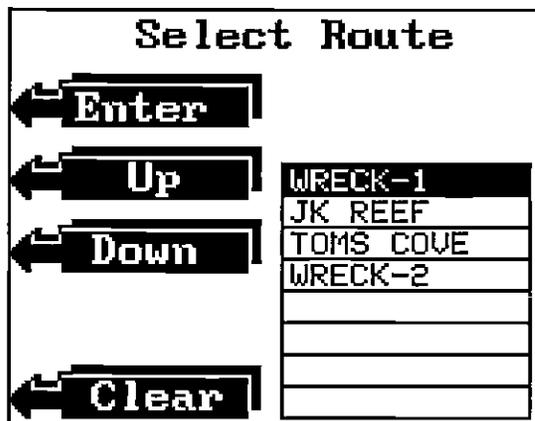
Turning the arrival alarm off prevents the Z-9500GPS from sequencing to the next waypoint in the route. This, in effect, turns the route off.

other words, suppose you want a route that consists of waypoint numbers 1, 3, and 5. But you wish to travel to 3 first, then 1, and finally 5. In this case, you must select waypoint 3, 1, and 5 in that order when making the route.

After you've selected all of the waypoints for the route, press the "CLEAR" key. Your new route is stored in memory, ready for use.

FOLLOWING A ROUTE

To follow a route, press the MENU key, then press the key adjacent to the "More" label. Next, press the key adjacent to the "Route Planning" label. Finally, press the key next to the "Follow Route" label. The screen shown below appears. The "Select Route" menu has the list of routes on the screen's right side. Press the key next to the up or down labels until the box is around the desired route. Then press the key next to the "Enter" label. This tells the Z-9500GPS which route to follow.



The starting waypoint menu automatically appears as shown at the top of the next page. You must tell the unit which waypoint in the route to go to first. The route can start at any waypoint in the route. For example, suppose you have a route consisting of waypoints one through ten in consecutive order. You can start at waypoint number 5, if desired. The Z-9500GPS will give navigation data to waypoint number 5 first. When you reach number 5 and the arrival alarm sounds, the Z-9500GPS will sequence to waypoint number 6. It will continue in this manner until you reach waypoint number 10.

Finally, the "Select Route Travel Direction" menu appears. This is the last route menu. You can follow a route forward or backward. In our example route, starting at waypoint number 5, travelling forward would take us to waypoints 6, 7, 8, 9, and 10. Travelling backward would take us to waypoints 4, 3, 2, and 1. Press the key next to the label showing the desired direction of travel.

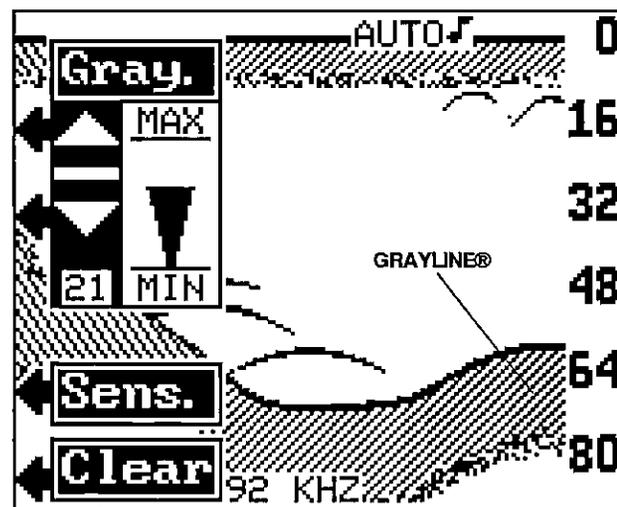
GRAYLINE®

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

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

GRAYLINE is adjustable. Since GRAYLINE shows the difference between strong and weak signals, adjusting Sensitivity may require a different GRAYLINE level, also. The level chosen by the Z-9500GPS at power on is usually adequate for most conditions. Experiment with your unit to find the GRAYLINE setting that's best for you.

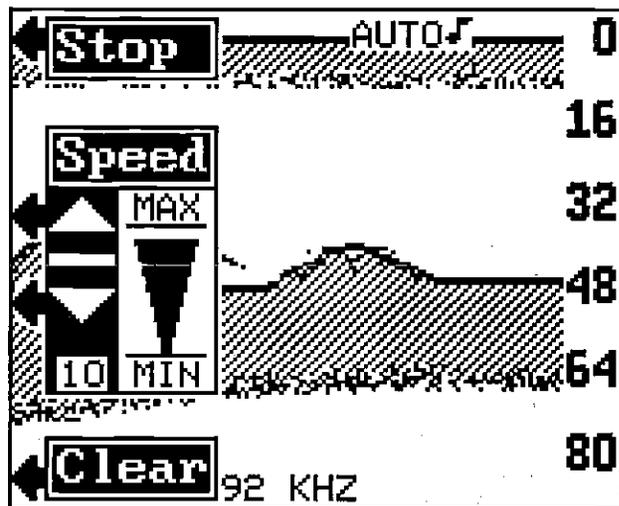
To adjust GRAYLINE, press the SENS key. The sensitivity menu appears in the upper left side of the display, while the GRAYLINE label appears immediately beneath it. Next, press the key adjacent to the "Gray." label. This changes the sensitivity adjust menu to GRAYLINE adjust and the GRAYLINE label to Sensitivity. Now press the key adjacent to the up arrow to



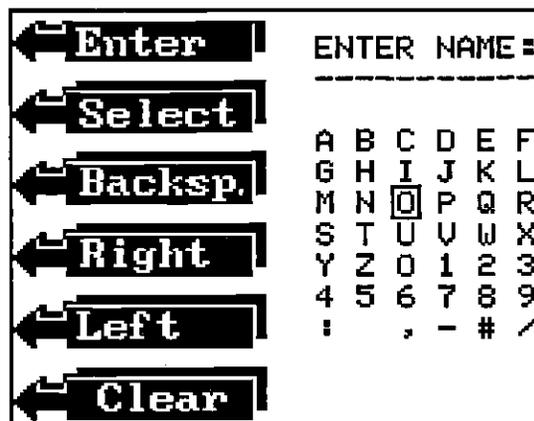
increase the GRAYLINE level. Press the key adjacent to the down arrow to decrease it. The number in the menu's lower left corner gives the current GRAYLINE level. The bar chart also gives a graphical indication of the GRAYLINE level. You can see the change on the screen (both on the menu and on the chart record) as you press the keys. After you've made the adjustment, press the key adjacent to the CLEAR label to erase the menu.

CHART SPEED

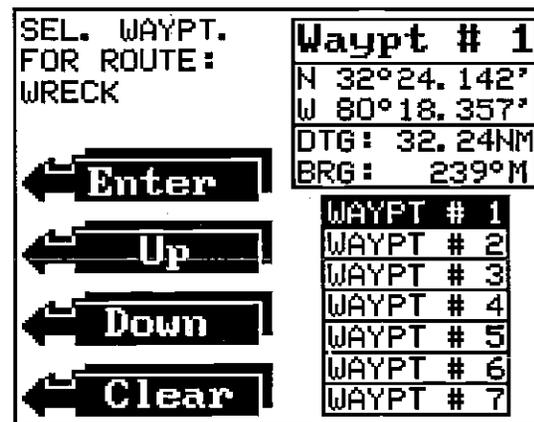
The rate echoes scroll across the screen is called the chart speed. To change it, first press the MENU key, then press the key adjacent to the "Chart Speed" label. The chart speed menu appear on the left side of the screen. Increase the chart speed by pressing the key adjacent to the up arrow or decrease it by pressing the key adjacent to the down arrow. There are 10 steps of chart speed, 1 is the slowest, 10 is the fastest.



Stop the chart by pressing the key adjacent to the STOP label. When the chart is stopped, the word STOP appears at the top center portion of the screen and the STOP label changes to START. The chart can be started again by pressing the key adjacent to the START label. Press the key adjacent to the CLEAR label to erase these menus.



For example, to name a new route "WRECK," move the box to the "W," then press the key next to the "Select" label. The letter "W" appears at the top of the screen. Now move the box to the "R" and press the key next to the "Select" label again. Repeat until the word "WRECK" shows at the top of the screen. Now press the key adjacent to the "Enter" label. This names the route and the Z-9500GPS automatically displays the select waypoint menu as shown below.



The Select Waypoint For Route menu works the same as the View and Save Waypoint menu. Move the box that surrounds waypoint number one up or down until it's on the first waypoint in the route. Press the key next to the "Enter" label. This selects the waypoint. Move the box to the next waypoint in the route and select it in the same manner. Continue doing this until all waypoints in the route are selected.

IMPORTANT!

You must select waypoints in the order they are to be used in the route. In

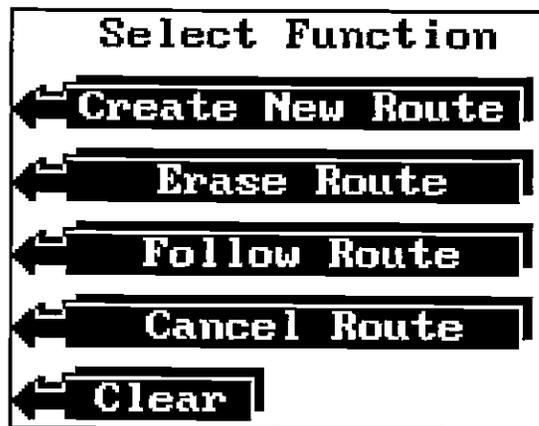
ROUTES

Routes gives you the ability to navigate to several waypoints without having to re-program the unit after arriving at each one. A route consists of two or more waypoints. When you run a route, the Z-9500GPS gives navigation information to the first waypoint in the route. When you reach the first waypoint (signalled by the Arrival Alarm), the Z-9500GPS automatically sequences to the next waypoint. Navigation information is shown to this waypoint and the process repeats. When you reach the last waypoint in a route, the arrival alarm sounds until you turn it off.

There are four steps required to create and follow a route. First, you must create and name the route. Next, select the waypoints used in the route. Then determine the starting waypoint. Now tell the unit to follow the route. Finally, the unit will ask you if you wish to run the route forward or backward. After these steps are completed, the Z-9500GPS will start on the route.

CREATING A ROUTE

To create a route, first press the MENU key while the unit is in the GPS mode. Next, press the key adjacent to the "More" label. Now press the key adjacent to the "Route Planning" label. The screen shown below appears. Finally, press the key adjacent to the "Create New Route" label. The screen shown at the top of the next page appears. This screen lets you enter the name of the route. The route name can have up to ten characters.



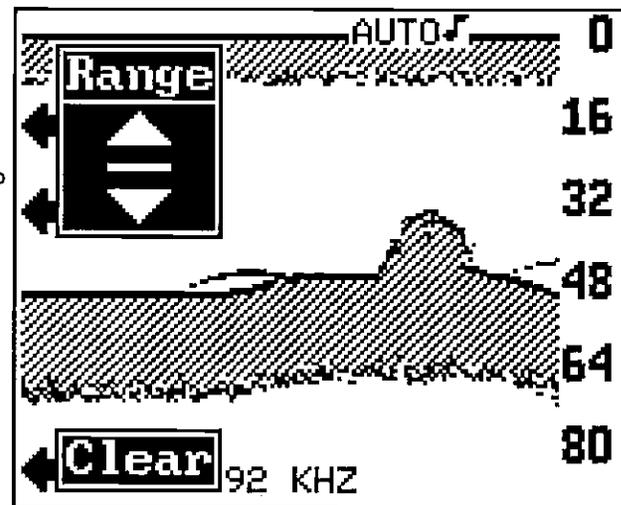
To spell the route's name, use the keys next to the left and right labels to move the box to the desired letter. Now press the key adjacent to the "Select" label. The selected letter appears at the top of the screen under the "ENTER NAME:" message. To erase the last letter, press the key next to the "Backsp." label. Each time you press this key, the letter at the end of the line will be erased.

RANGE - Automatic

When turned on for the first time, the Z-9500GPS automatically places the bottom signal in the lower portion of the screen. This is called Auto Ranging and is part of the automatic function. The range can be changed while the unit is in automatic. However, if the bottom depth goes higher or lower than a preset depth, the unit will change the range (autorange) to keep the bottom signal on the screen.

To change the range while the unit is in automatic, press the RANGE key. Now press the key adjacent to the up arrow to

Press a key adjacent to these arrows to change the range.



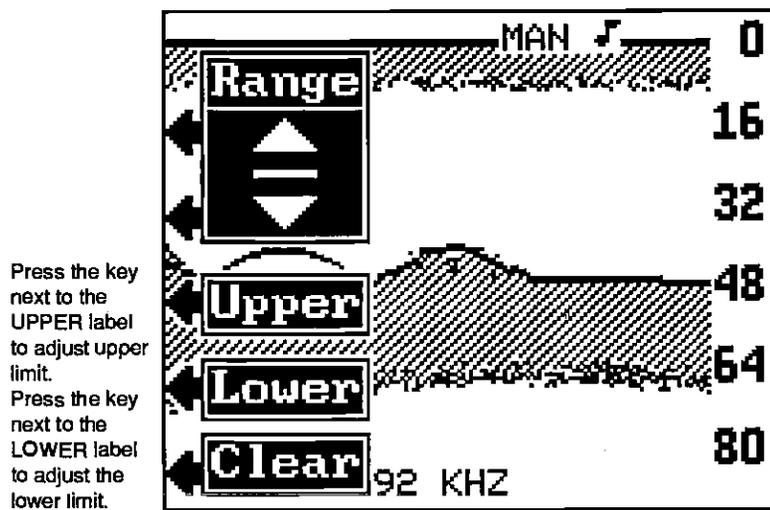
decrease the range or the key adjacent to the down arrow to increase it. The ranges are: 0-10, 20, 40, 60, 80, 100, 200, 300, 500, 800, 1000, 1500, 2000, 3000, 5000, and 9000 feet. Metric ranges are 0-5, 10, 15, 20, 25, 30, 40, 60, 100, 150, 200, 300, 400, 600, 1000, 1500, and 3000 meters. Press the key adjacent to the CLEAR label to erase the menus.

NOTE: The Z-9500GPS won't let you select a range that will move the bottom signal higher than the first 25% of the screen, or lower than the first 60%.

RANGE - Manual

The Z-9500GPS gives you more control over the range when it's in the manual mode. Both the lower and the upper limit are adjustable.

To change the range, first make certain the Z-9500GPS is in the manual mode. If necessary, press the AUTO key to switch to the manual mode. Next, press the RANGE key. Now you have a choice. You can press a key corresponding to the upper or lower arrow in the RANGE menu. This increments the lower limit the same as in automatic (see previous section), or you can enter the exact upper and lower depth using the Upper and Lower Limit menus.



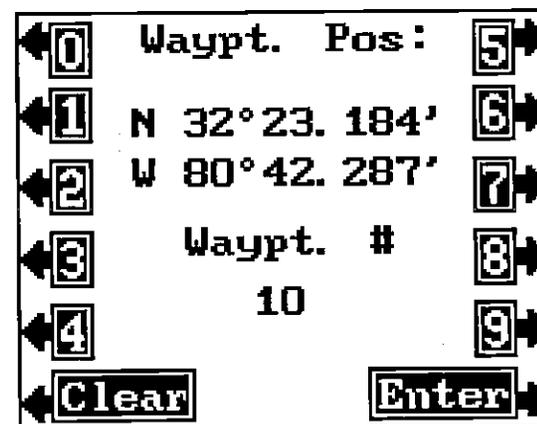
To enter an exact upper limit depth, first press the key corresponding to the Upper Limit menu arrow. A new menu appears: Enter Upper Limit: 0 as shown on the next page. Enter the desired upper limit using the keys on the left and right side of the unit. For example, for a 25 foot upper limit, first press the key adjacent to the 2, then press the key adjacent to the 5 label. (Note: Since the 5 label is pointing to the SENS key, pressing the SENS key at this time will enter a 5.) Next, press the key adjacent to the ENTER label in the lower right corner of the display. This will change the upper limit to 25 feet. If you make an error, press the key adjacent to the CLEAR label in the lower left corner of the screen and re-enter the desired number.

At the screen's upper right corner is the waypoint number currently displayed. The position for this waypoint is shown directly beneath the waypoint number. Distance to the waypoint and bearing to the waypoint from your present position show under the position. The first seven waypoint numbers are listed at the bottom of the screen. This is the waypoint selection box. Waypoint number one is shown in reverse. To select a different waypoint number, press the key adjacent to the up or down labels. As the black box moves to each waypoint number, the waypoint's location, distance to go, and bearing display at the top of the screen. Move the black box to the desired waypoint number, then press the key adjacent to the Enter label to recall the waypoint. The Z-9500GPS will immediately show navigation information to the recalled waypoint on the GPS screens.

Destination Waypoint Number

The Destination Waypoint Number menu gives you another way to recall a waypoint.

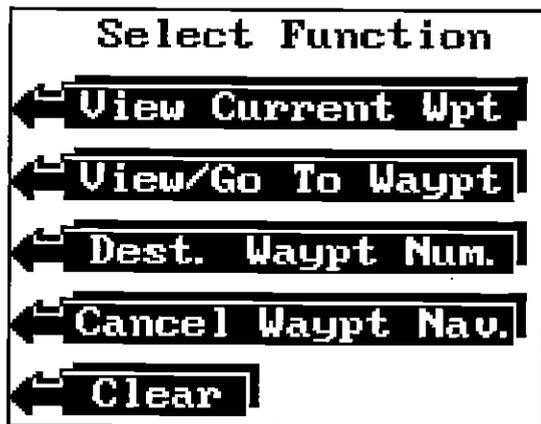
To use this feature, first press the Waypoint Recall key. Now press the key adjacent to the "Dest. Waypt Num" label. The menu shown below appears.



Simply press the key adjacent to the number of the destination waypoint. For example, if you want to recall waypoint number 10, press the 1 and the 0 keys. Finally, press the key adjacent to the Enter key. The Z-9500GPS will immediately show navigation information to the recalled waypoint on the GPS screens.

WAYPOINT RECALL

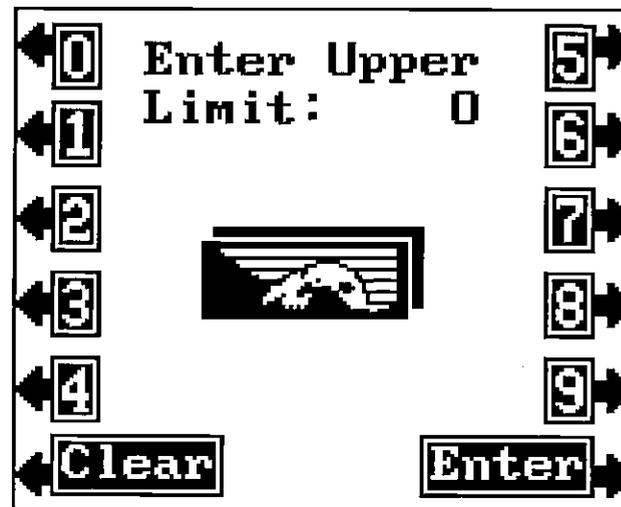
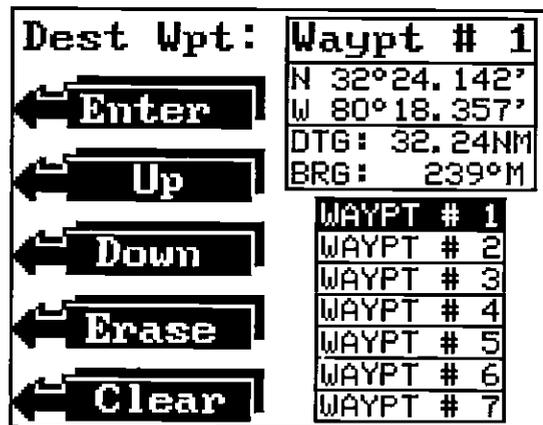
You must recall a waypoint in order to use the navigation features of the Z-9500GPS. To recall a waypoint, first press the WAYPOINT RECALL key. The screen shown below appears. There are two choices in recalling a waypoint. You can use the View/Go To Waypoint method, which is identical in operation to the Waypoint Save View/Save menu. The other option is the Destination Waypoint Number in which you simply enter the waypoint number that is your desired destination.



The other two options on this screen lets you view the currently recalled waypoint (View Current Wpt) or cancel the navigation to the current waypoint (Cancel Waypt. Nav.)

VIEW/GO TO WAYPOINT

To select a destination waypoint from the list of stored waypoints, first press the WAYPOINT RECALL key. Now press the key adjacent to the "View/Go To Waypt" label. The screen shown below appears.



Change the lower limit the same way using the LOWER LIMIT menu. You can choose any upper limit between 0 and 9,990 feet or any lower limit between 10 and 9999 feet. There must be at least ten feet between the upper and lower limit. For example, a 25 to 35 foot range has a ten foot spread.

NOTE: The depth capability of the Z-9500GPS depends on the transducer installation, water and bottom conditions, and other factors. You can expect to read depths in excess of 500 feet in both fresh and salt water.

Upper and lower limits can be set in various combinations to show segments of the water from the surface to the bottom and anywhere in between.

Press the CLEAR key to erase the menus when you're finished.

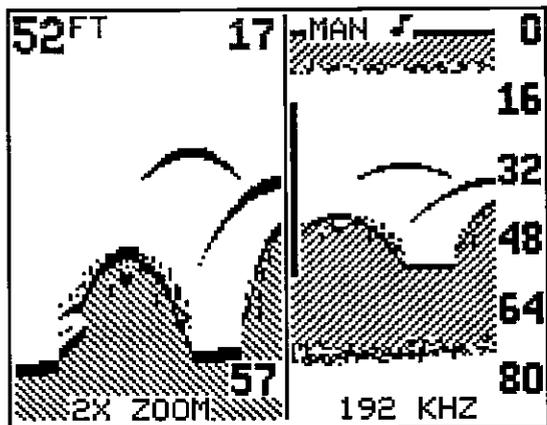
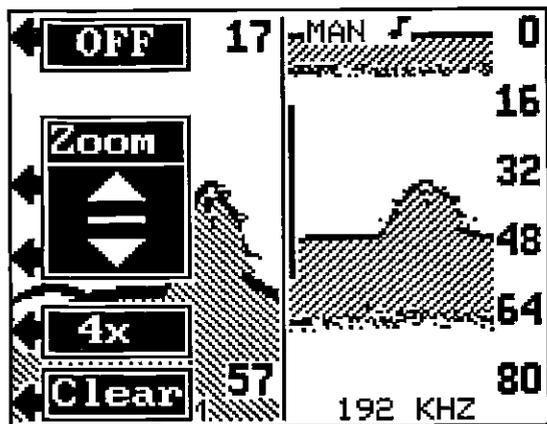
ZOOM

Enlarging or "zooming" the picture is a common method used to show small detail and fish signals. The Z-9500GPS gives you several different, flexible ways to zoom a screen.

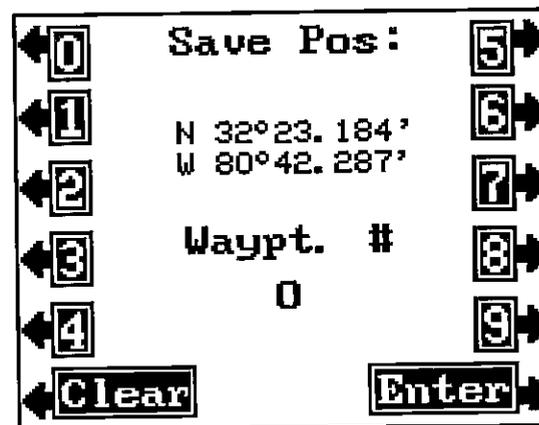
The first method used to zoom is to press the ZOOM key. The Zoom and Bottom Track menus appear. Press the key corresponding to the Zoom menu. The screen instantly splits into two

sections. The left side shows a zoomed image of a portion of the right side screen. All targets on the left are shown twice the size of the ones on the right. After the menus are cleared, the bottom of the left screen shows the words "2X ZOOM". A vertical bar in the center of the screen shows the area of the right side echoes that are zoomed on the left. You can move this bar up or down by pressing keys matching the arrows in the ZOOM menu. The 2X ZOOM doesn't track the bottom, it only shows echoes that pass inside the bar on the right side.

The menu labeled "4X" zooms the screen on the left four times larger than the one on the right. The "OFF" label turns the zoom function off. The split screen disappears when zoom is turned off.



Once you've set the zoom as desired, press the key adjacent to the CLEAR label to erase the menus.



Simply press the key adjacent to the waypoint number(s) that you wish to assign the position shown at the top of the screen. For example, if you want to save the position as waypoint number 10, press the 1 and the 0 keys. Finally, press the key adjacent to the Enter key. The Z-9500GPS stores that position as waypoint number 10 and returns to the last used screen.

IMPORTANT!

Remember, the New Waypoint Number will let you save a position under a waypoint number that is already in use. Make certain you are using the correct waypoint numbers before using this method!

ERASE A WAYPOINT

To erase a position from the waypoint list, press the Waypoint Save key, then press the key adjacent to the "View/Save Waypt." label. Use the up and down arrow keys to select the waypoint number that you wish to erase. When the desired waypoint number is selected, press the key adjacent to the Erase label. This deletes the position from that waypoint number, leaving it blank. Press the CLEAR key to exit from this menu.

GO TO WAYPOINT

The Z-9500GPS gives you the option to enter a position and go to it without storing it in the unit's memory.

To go to a waypoint without saving it, first enter a position using the "New Waypoint Position" method described earlier. Next, press the key adjacent to the "More" label until the "Go To Waypoint" label appears. Now simply press the key adjacent to this label. The Z-9500GPS will immediately show navigation data to this position.

Save Wpt:	Waypt # 1
← Enter	N 32°24.142'
← Up	W 80°18.357'
← Down	DTG: 32.24NM
← Erase	BRG: 239°M
← Clear	WAYPT # 1
	WAYPT # 2
	WAYPT # 3
	WAYPT # 4
	WAYPT # 5
	WAYPT # 6
	WAYPT # 7

At the screen's upper right corner is the waypoint number currently displayed. The position for this waypoint is shown directly beneath the waypoint number. Distance to the waypoint and bearing to the waypoint from your present position show under the position. The first seven waypoint numbers are listed at the bottom of the screen. This is the waypoint selection box. Waypoint number one is shown in reverse. To select a different waypoint number, press the key adjacent to the up or down labels. As the black box moves to each waypoint number, the waypoint's location, distance to go, and bearing display at the top of the screen. Move the black box to the desired waypoint number, then press the key adjacent to the Enter label to save the position. The position is now saved.

NOTICE!

The Z-9500GPS won't let you save a position in a waypoint location that's already in use when you use the Waypoint QuickSave feature. However, it will let you overwrite a position when using the View and Save or the New Waypoint Number (see below) methods. Use caution when saving a position. Make certain the waypoint number is really the one you wish to use.

New Waypoint Number

The New Waypoint Number menu gives you another way to save a waypoint. This option lets you simply enter the number of the waypoint that you want the position assigned to.

To use this feature, first enter a position, or use your present position by merely pressing the Waypoint Save key. Next, press the key adjacent to the More label. Now press the key adjacent to the "New Waypt. Num." label. The menu shown at the top of the next page appears.

ZOOM - BOTTOM TRACK

This feature zooms all echoes and tracks the bottom signal at the same time. It can be used in the split screen, full screen, 2X or 4X modes.

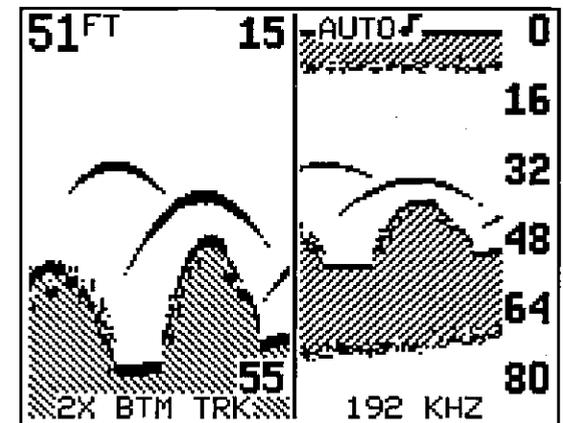
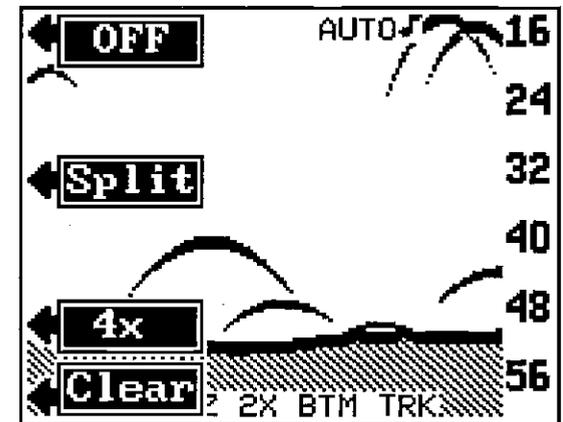
To activate the Zoom Bottom Track function, press the ZOOM key. Next, press the key adjacent to the Bottom Track menu. This will place the Z-9500GPS in the Full Screen 2X Bottom Track mode. More menus appear on the left side of the screen:

SPLIT. Pressing the key corresponding to the Split menu separates the screen into two parts. The 2x Zoom Bottom Track displays on the left side, normal echoes scroll across the right side of the screen. The left side tracks the bottom, keeping it on the display at all times, zooming all echoes at the same time. Press the CLEAR key to erase the menus.

4x This key changes the zoom from twice normal size to four times normal size. Simply press the key and the zoom size changes immediately.

OFF Press this key to turn the Bottom Track function off. The Z-9500GPS will revert to a full screen, normal mode.

CLEAR. Press this key to erase the menus.



2X SPLIT SCREEN
BOTTOM TRACK

SONAR ALARMS

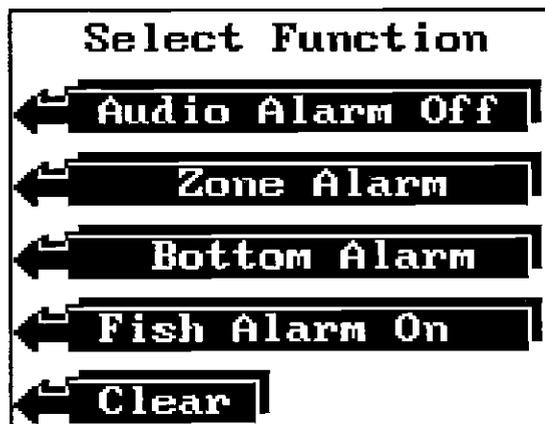
The Z-9500GPS has three different sonar alarms. The Zone Alarm consists of a bar. Any echo that appears inside this bar triggers the alarm. Another alarm is the Bottom Alarm. Only the bottom signal will "trip" this alarm. This is useful as an anchor watch, a shallow water alert, or for navigation. The Fish Alarm sounds a tone when the Fish ID feature displays a fish symbol on the screen.

You can also turn the alarm speaker off through the ALARM menu.

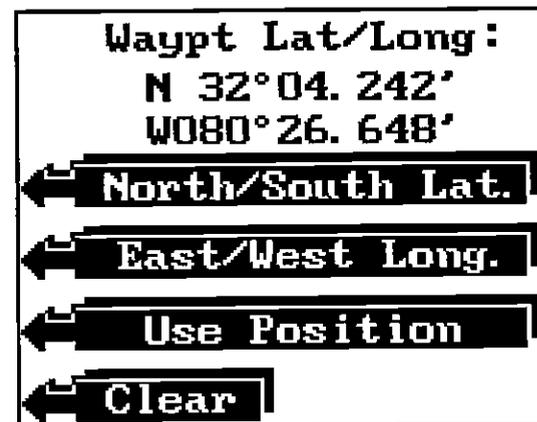
Zone Alarm

To activate the Zone Alarm, first press the MENU key. Next, press the key adjacent to the "More" label. Now press the key next to the "Alarms" label. The screen shown below appears. Now press the key next to the Zone Alarm label. The menu at the top of the next page appears. The word "ZONE" shows at the top of the screen, signifying the Zone Alarm is active. The adjustment label appears on the left side of the display. The zone bar shows on the far right side. Any echo that appears between the top and bottom of this bar triggers the alarm. This alarm sounds on fish, structure, bottom echoes, etc.

To adjust the zone alarm bar, first press the key next to the Adj. label. The menus shown in the middle of the next page appears.



To adjust the top of the bar shallower or deeper, press the key adjacent to the up or down arrow in the Upper menu. To adjust the bottom of the zone alarm bar, first press the key adjacent to



Press the key adjacent to the "East/West Long." to switch the longitude from west to east, if necessary. When the correct position is shown, press the key adjacent to the "Use Position" label. To exit from this screen without saving the position, press the CLEAR key.

The Z-9500GPS returns to the Save Waypoint screen (shown at the top of the previous page) after you press the key adjacent to the "Use Position" label. The position you entered shows at the top of the screen. To save this position, press the key adjacent to the "Save as #" label as described above or press the key adjacent to the "View/Save Waypt." label. Information on this menu selection follows.

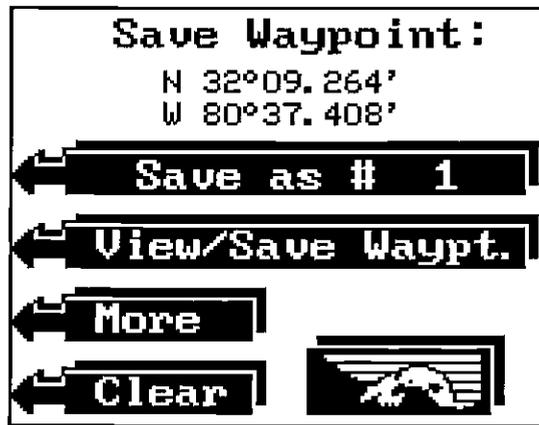
IMPORTANT!

You haven't saved the waypoint yet! You will lose the position if you press the key adjacent to the "CLEAR" label. See the "Save as #" or "View and Save Waypoint" section to save this position.

View and Save Waypoint

The View and Save Waypoint screen lets you see the list of saved waypoints. You can then choose the waypoint number to save the position or erase a position from the waypoint list.

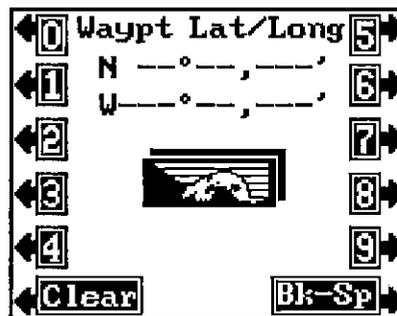
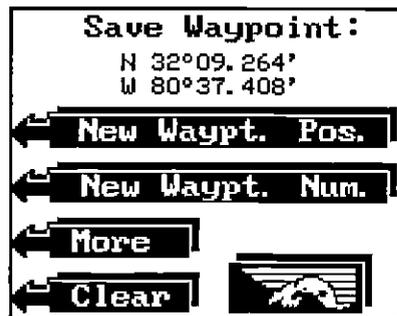
To save your present position as a waypoint using this method, first press the Waypoint Save key. Then press the key adjacent to the "View/Save Waypt." label. The screen shown at the top of the next page appears.



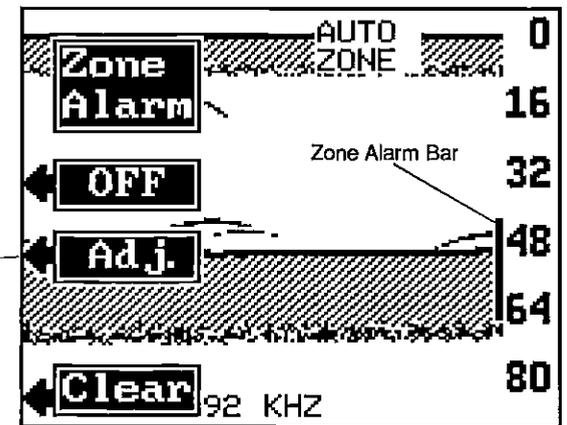
position at the top of the screen under the waypoint number listed on the label. The Z-9500GPS returns to the last used screen.

Enter New Waypoint

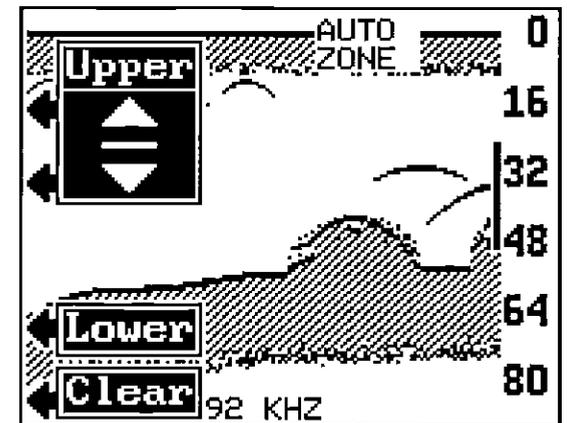
To save a position other than your present one, first press the WAYPOINT SAVE key. Next, press the key adjacent to the More label. The screen shown below left appears. Now press the key adjacent to the "New Waypt. Pos." label. The screen shown below right appears.



Now enter the position you wish to save as a waypoint. Remember to enter the position in degrees, minutes, and thousands of a minute. Also, if the position is less than 100 degrees longitude, add a zero to it. For example, if the longitude is 80 degrees, then enter 080. After entering the last number, the screen shown at the top of the next page appears.



To adjust the zone alarm, press the key next to this label.



Pressing the keys adjacent to this label moves the top of the zone alarm bar up or down.

the Lower label. Now the adjustment menu says "Lower". You can now adjust the bottom of the zone alarm bar using the keys adjacent to the up and down arrows. Once you've made the adjustments, press the key adjacent to the CLEAR label to erase the menus. The Zone Alarm bar will remain on the display. This lets you know the exact location of the Zone Alarm.

To turn the Zone Alarm off, return to the Zone Alarm menu, then press the key adjacent to the "OFF" label.

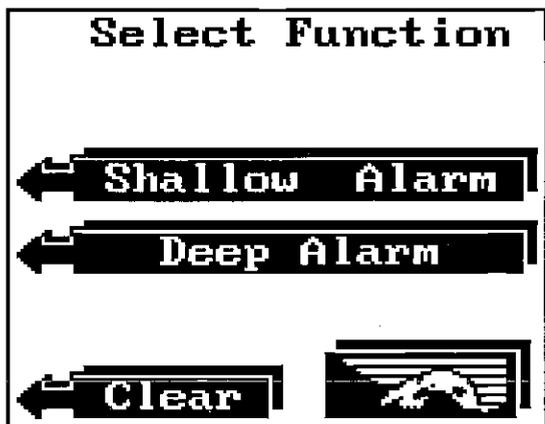
NOTE: The Zone Alarm will not operate and is not available when the Z-9500GPS is in the Full Screen Bottom Track mode, but it can be used in the Split Screen mode. To use the Zone Alarm in the Split Screen Bottom Track mode, first enable the Split Screen Bottom Track, then turn the zone alarm on.

Bottom Alarm

The Bottom Alarm works off the bottom signal only. No other echo will trigger this alarm. The Bottom Alarm is actually two different alarms. It consists of a shallow alarm and a deep alarm. The shallow alarm sounds a warning tone when the bottom signal goes shallower than the alarm set point. The deep alarm sounds when the bottom signal goes deeper than the alarm set point. Use the shallow alarm to warn you of shallow water. Use the deep alarm to alert you to deeper water, such as a drop-off.

The shallow and deep alarms adjust identically, although through different menus.

To turn the Bottom Alarm on, first press the MENU key. Next, press the key adjacent to the "More" label. Now press the key adjacent to the "Alarms" label. Finally, press the key adjacent to the Bottom Alarm label. The screen shown below appears.



This is the Shallow Alarm and Deep Alarm menu. Press the key corresponding to the desired alarm. The shallow alarm was adjusted in this example, so the key adjacent to the Shallow Alarm label was pressed. The screen shown at the top of the next page appears. The current shallow alarm setting is displayed at the top of the screen.

To set the shallow alarm press the key adjacent to the "Adj. Alarm Value" label. The screen shown in the middle of the next page appears. Now enter the desired depth. 10 feet is used in this example. Now press the key adjacent to the ENTER label to set the shallow alarm. Using this example, if the bottom signal gets shallower than ten feet, the alarm will sound.

The plotter has 200 dots available to plot your track on the screen. As each dot is placed at your last location, one is erased from the end of the line. You can use up all 200 dots if you plot a course to a destination that's a long distance away. This is especially true if you use a short plotter update time.

To keep a continuous line plotted, you may want to experiment with the update interval. Lengthening the interval between plots gives you a better chance to see more history. To save more detail, use a shorter time.

To change the plotter update time, first press the MENU key while the plotter is displayed. Next, press the key adjacent to the "Plotter Setup" label. The UPDATE INTERVAL menu appears in the middle of the screen. Now press the key adjacent to the up arrow to increase the time between plots or the down arrow to decrease it. Press the CLEAR key when finished.

HOW TO SAVE A WAYPOINT

Waypoints are locations that you store in the Z-9500GPS's memory. You can then navigate to these locations using the Steering, Navigation, or Plotter displays. Waypoints are useful for marking shipwrecks, buoys, and other fishing or navigational positions. The Z-9500GPS can store up to 75 waypoints. You can store your present position as a waypoint or enter latitude/longitude positions as waypoints.

Saving Current Position (Waypoint Quick Save Method)

The Z-9500GPS lets you instantly save your present position as a waypoint. This "Quick Save" feature permits the storage of a wreck's position or other fishing and navigational positions quickly and easily.

To save your present position, simply press the WAYPOINT QUICKSAVE key. The Z-9500GPS immediately stores your present position in the first available empty waypoint location. (Waypoint locations are numbered 1 through 75.) A message appears at the top of the screen: "SAVED AS #1." This lets you know the waypoint number assigned to the position you just saved. To return to that waypoint, see the Waypoint Recall section.

Saving Current Position (Save as # Method)

This method is similar to the Quick Save method, except it allows you to view the waypoint number before the Z-9500GPS automatically saves it. To save a position using this method, first press the WAYPOINT SAVE key. The screen shown at the top of the next page appears. The position to be saved appears at the top of the screen. This is your position at the time you pressed the WAYPOINT SAVE key. Immediately beneath this position is a label that says "Save as #." The number in this label is the first available empty waypoint number. Simply press the key adjacent to this label to save the

CLEAR PLOT TRAIL

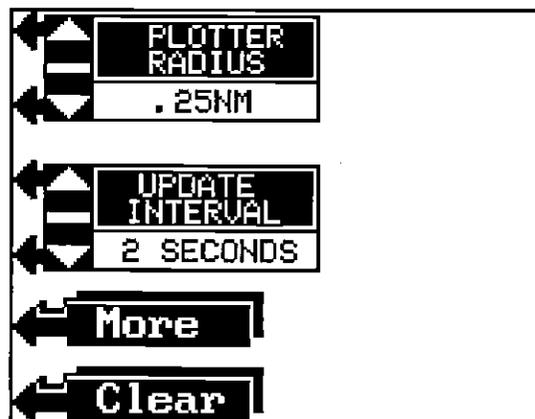
To erase the track line from the display, press the MENU key while the plotter is displayed. Now press the key adjacent to the "Clear Plot Trail" label. The Z-9500GPS returns to the plotter, erases the track line(s) and centers your present position in the circle. As you travel, the plotter continues to draw your new track line.

PLOTTER SETUP

The Plotter Setup menu lets you change the circle's radius and the plotter update interval. Pressing this key displays both the radius and the update menus. See the following for more information.

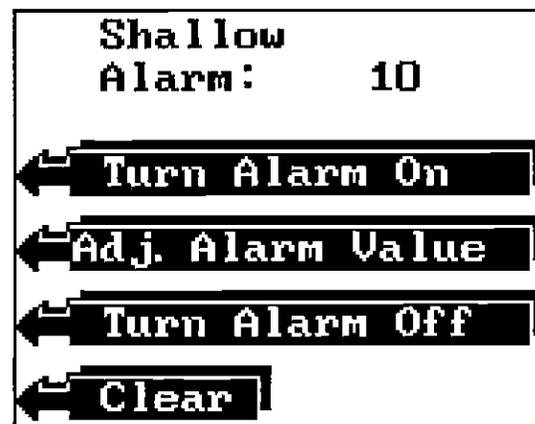
PLOTTER RADIUS

Radius menu lets you change the circle's radius. The circle's radius is .25 nautical mile when the Z-9500GPS is first turned on or preset. To change the radius, first press the MENU key while the plotter is displayed. Next, press the key adjacent to the "Plotter Setup" label. The screen shown below appears. The Plotter Radius menu appears at the top of the screen. Now press the key adjacent to the up arrow to increase the radius or the down arrow to decrease it. Press the CLEAR key when finished.



UPDATE INTERVAL

The plotter shows your track by drawing a solid line behind your present position. When the unit is turned on for the first time, the position is updated once every ten seconds. This time is variable from two seconds to ten minutes.



The deep alarm adjusts and activates exactly like the shallow alarm. The only difference is the sound the deep alarm makes when the bottom goes deeper than the alarm depth. This tone is different so you can tell by the sound which alarm was triggered.



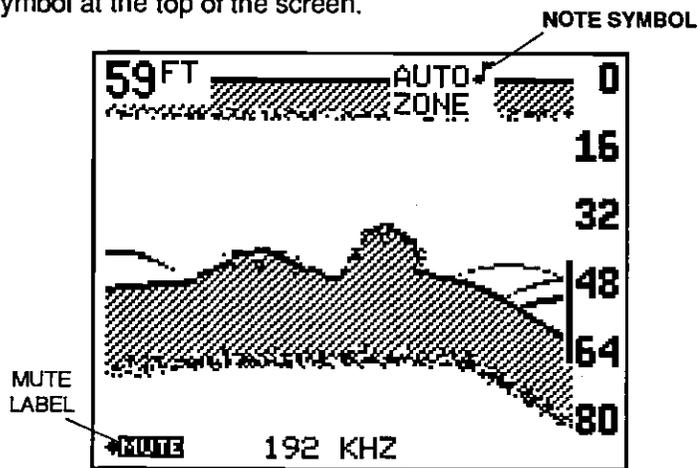
FISH ALARM

To use the Fish Alarm, first make certain the Fish ID feature is on. Now press the MENU key. Next, press the key adjacent to the "More" label. Now press the key adjacent to the "Alarms" label. Finally, press the key adjacent to the "Fish Alarm On" label. This enables the Fish Alarm. Every time the Z-9500GPS displays a fish symbol on the screen, a tone sounds. There are different tones for each fish symbol size.

To turn the Fish Alarm off, repeat the above steps, then press the key adjacent to the "Fish Alarm Off" label.

Audio Alarm On/Off

When the Z-9500GPS is first turned on, the audio alarm (speaker) is automatically enabled. This is shown by a note symbol at the top of the screen.



To turn the speaker off, press the ALARM key. Next, press the key adjacent to the "Audio Alarm Off" label to turn the audio off. To turn the speaker on, press the ALARM key, then press the key next to the "Audio Alarm On" label.

NOTE: The words corresponding to the alarm in use will still flash at the top of the display when the alarm is triggered even if the speaker is turned off. For example, the word "ZONE" will flash when the zone alarm is triggered.

MUTE

When any sonar or GPS alarm sounds (except the Fish Alarm), the 'Mute' label appears at the bottom of the screen. Pressing the key adjacent to this label silences the alarm until it is triggered again.

MENU

The Z-9500GPS uses menus extensively to guide you through the functions and features of the unit. The MENU key accesses many of these features, allowing you to customize the unit to your particular needs and water conditions. Although you may have to leave one menu and enter another to reach the desired function, the choices have been carefully worded to lead you in the right direction. If you ever get lost in a menu, simply press the CLEAR key. All of the following features are accessed through the MENU key.

The square box with a "S" is your starting location. This is your position when the waypoint is recalled. The diamond is your present position, and the circle with the "D" is the destination. The destination is the position of the recalled waypoint. If you are travelling on a route, it's the first waypoint on the route. The dotted line is the shortest path to the destination from the starting location. Follow this line to get to the waypoint. The solid line is your track, or path you've travelled.

PLOTTER MENUS

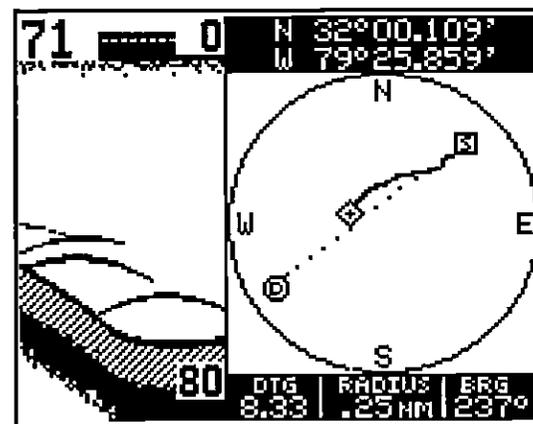
Pressing the MENU key while the plotter screen displays gives you a new set of menus which relate only to the plotter. Pressing the key adjacent to the "More" label on this screen gives you access to the other GPS menus.

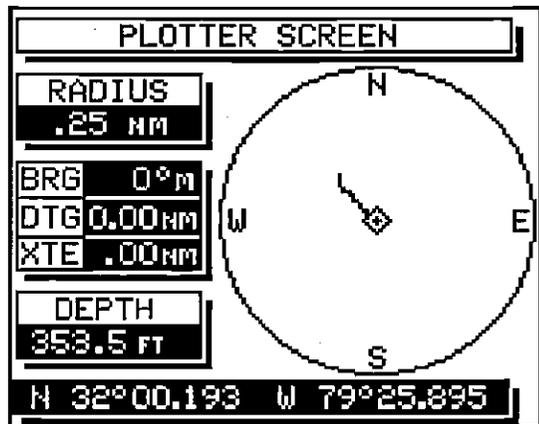
A description of the plotter menus follow.



PLOTTER/SONAR

The Z-9500GPS lets you view the plotter in the "Full-Screen" mode or both plotter and sonar data. When the unit is first turned on, or after a preset, the full screen plotter shows. To switch to the split screen mode, press the MENU key while the plotter displays. Now press the key adjacent to the "Plotter/Sonar" label. A screen similar to the one below appears. The sonar is on the left side of the screen, the plotter on the right. Position shows at the top of the screen. Distance To Go (DTG), Plot Radius (RADIUS), and Bearing to Waypoint (BRG) appear at the bottom of the screen.





PLOTTER
DISPLAY

The plotter's radius shows at the top left corner of the screen. This is the distance from the center of the circle to the edge. The plotter's radius is .25 nautical mile when the unit is first turned on or when it's preset. See the Plotter Radius section for information on changing the radius.

Beneath the radius display are the Bearing, Distance To Go, and Cross Track Error displays. These are used only when a waypoint is recalled. Water depth shows beneath the Cross Track Error display. Present position in latitude/longitude displays at the bottom of this screen.

Using the Plotter with a Waypoint

You can see your present position, starting position, and destination when you recall a waypoint. To use the plotter in this manner, simply recall a waypoint (see the Waypoint Recall section), then press the PLOTTER key. A screen similar to the one below appears.

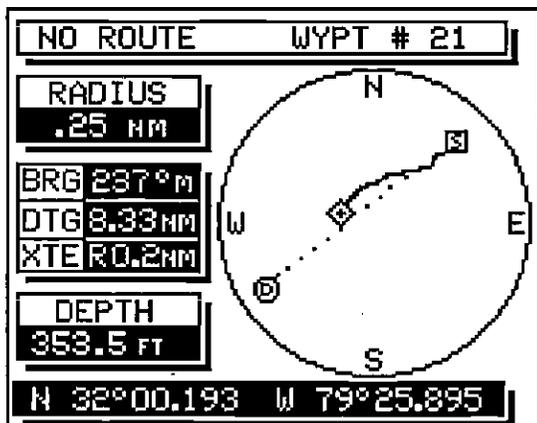
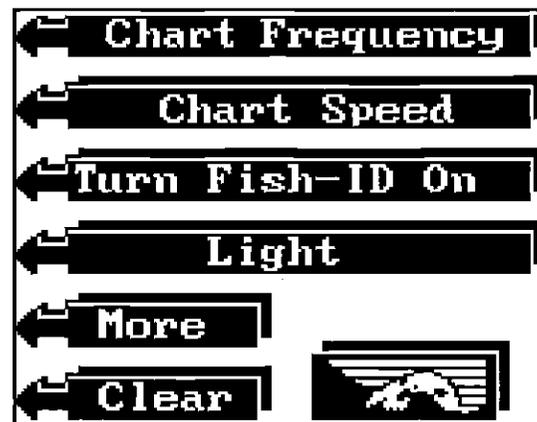


CHART FREQUENCY

The Z-9500GPS operates from 50 or 192 kHz, either independently or simultaneously. The sonar unit comes with a 192 kHz transducer, other optional transducers are available. See the transducer diagram on page 3 for single or dual transducer connections. The chart can operate from a different frequency than the digital sonar.



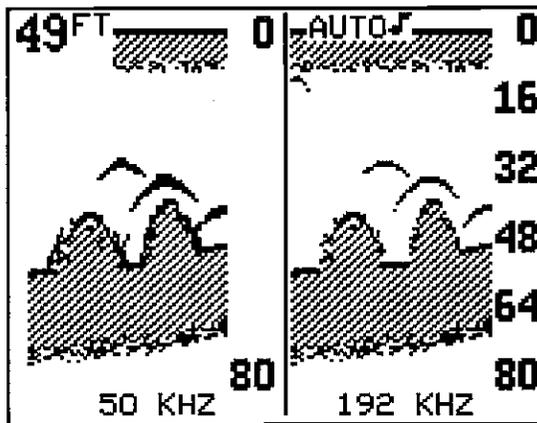
The Z-9500GPS chart's operating frequency is 192 kHz when it's first turned on. To change frequencies, first press the MENU key. The menu shown above appears. Next, press the key adjacent to the Chart Frequency label.



Now press the key adjacent to the desired frequency, either 50 kHz, 192 kHz, or both 50 and 192 kHz-split screen operation. The unit will begin scrolling echoes across the display.

The frequency in use will also be displayed at the bottom of the screen.

NOTE: The 192 kHz frequency for both the chart and digital sonar is enabled when the Z-9500GPS is turned on for the first time. For more information about the digital sonar frequency, please read the "Digital Sonar" section.



Dual Frequency, Split Screen Mode
(Left chart is operating at 50 kHz, right chart is 192 kHz.)

CHART DUAL FREQUENCY OPERATION

The Bottom Track and Zoom features are not available when the Z-9500GPS is in the dual frequency mode. To "zoom" a range, switch to the manual mode by pressing the AUTO key, then press the RANGE key. Now upper and lower limits can be changed to suit conditions.

The sensitivity and Grayline® also adjust differently when the Dual Frequency feature is enabled. To adjust them, first press the SENS key. The screen shown on the opposite page appears. To adjust the sensitivity or Grayline® level for the left, or 50 kHz side of the screen, press the key adjacent to the "Left" label. Press the key adjacent to the "Right" label to adjust the sensitivity and Grayline® on the right, 192 kHz side of the screen. The normal sensitivity and Grayline® labels appear and the features adjust normally.

devices. If the fix number and HDOP numbers are good, then the latitude/longitude position shown on the display should also be good, excluding the effect of S/A (selective availability).

Also shown in the fix box is the mode display, shown in parenthesis. "2D" means the unit is showing position only. "3D" means it's showing both position and altitude data. "H" stands for Altitude Hold.

Beneath the fix box is the Altitude display. This is your height above sea level in feet.

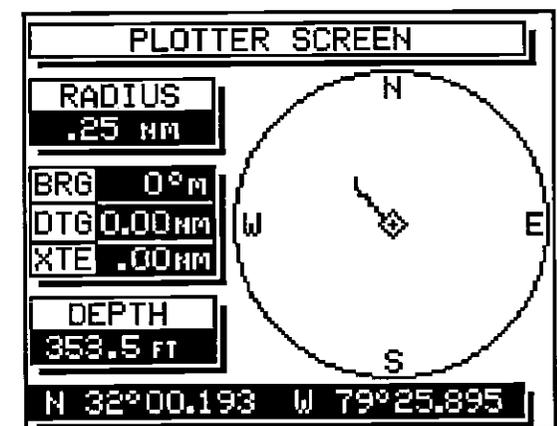
The box at the bottom of the screen shows the status of each receiver channel. Channels one through five are listed on the far left side of the screen. Each channel tracks one satellite (if available). A channel may switch between available satellites to track one not current used by the Z-9500GPS to determine position. The satellite number (sometimes called the PRN number) the channel is tracking shows in the SAT column. TRK is the "Track" column. An "S" in this column means the receiver is searching for the satellite. "T" means it's tracking the satellite. If the box is blank, no action is being taken by that receiver's channel. ELV is the elevation of the satellite above the horizon in degrees. AZM is the satellite's azimuth, or direction from your position in degrees. SNR is the signal to noise ratio for the satellite. The larger the SNR number, the better. The highest SNR we've seen so far is 52. Typically, any number in the forties is a good SNR.

PLOTTER

The plotter screen shows a "birds-eye" view of your present position, course, and direction of travel. If you've recalled a waypoint, the starting position and destination also show.

To use the plotter, simply press the PLOTTER key. A screen similar to the one at right appears.

The diamond is your present position. The solid line is your track, or path you've travelled. The circle is a compass rose with north, south, east, and west marked.



Status Display

This screen shows the state of each satellite the unit is tracking. To view this screen, press the MENU key, then press the key next to the "Status Display." The screen shown below appears.

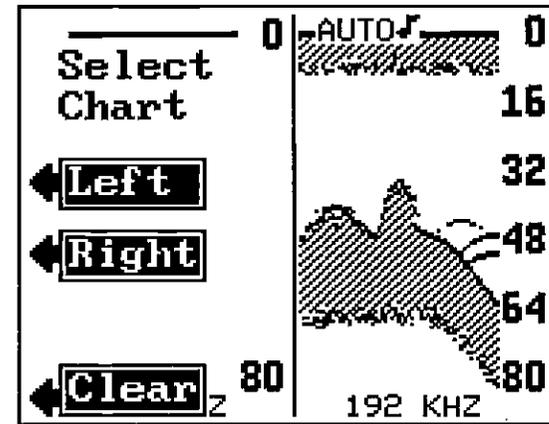
NO ROUTE		WYPT #21			
N 32°00.193' W 79°25.895'					
GDOP	5.37	FIX	5 (2D)		
HDOP	1.25	ALT	+5 FT		
SAT	PRN	TRK	ELV	AZM	SNR
1	7	T	54°	330°	43
2	11	T	45°	166°	50
3	15	S	15°	212°	10
4	18	T	73°	265°	36
5	21	S	30°	22°	21

STATUS
DISPLAY

Your present position appears near the top of the screen. Beneath this and to the left are the GDOP and HDOP displays. GDOP stands for Geometric Dilution Of Precision. This is a crossing angle indicator. It shows the combination value of horizontal (HDOP), vertical (VDOP), and Time (TDOP). The smaller the GDOP number is, the better the crossing angles are. The GPS receiver selects satellites based on GDOP, therefore it always tries to use satellites that will result in good crossing angles. The best way to use GDOP is to anticipate system problems. In other words, if the crossing angles are decreasing, then the satellites could be moving out of your viewing range. Therefore, the system may become unusable if more satellites don't appear shortly. By monitoring the GDOP display, you can foresee system geometry problems before they happen.

Beneath the GDOP display is the HDOP display. This shows the 2D, horizontal crossing angle. Again, the smaller the number is, the better the crossing angles are. Typically, 1-4 is good, 5-10 is fair, and anything over 10 is poor for both GDOP and HDOP.

To the right of the GDOP display is the Fix display. Fix shows how well the latitude/longitude filter in the receiver is working. The best fix number is nine (9), the worst is one (1). As the fix number decreases, the position's "jitter" increases. Jitter is the small position changes around a location. In other words, if you place a GPS receiver on the ground and turn it on, you'll see the position "jump around." Very small position changes will constantly occur. This is called jitter; it's normal and happens in all electronic navigation



Press the key next to the Left label to adjust the sensitivity and Grayline® on the left side of the screen.

Press the key next to the Right label to do the same on the right side of the screen.

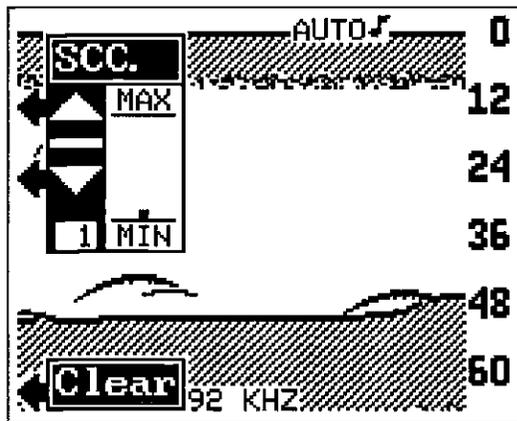
SURFACE CLARITY CONTROL (SCC)

The markings extending from the "0" line can extend many feet below the surface. This can interfere with fish signals or other targets. These markings are called surface clutter and are caused by wave action, boat wakes, temperature inversion, and more.

Surface Clarity Control (SCC for short) reduces or eliminates surface clutter signals from the display. SCC varies the sensitivity of the receiver, decreasing it near the surface and gradually increasing it as the range increases. The maximum depth that SCC will affect is 75% of the selected depth range. For example, on a 0-60 foot range with maximum SCC, surface clutter would be reduced down to 45 feet.

NOTE: SCC is available only when the Fish ID feature is turned off. The SCC menu doesn't appear when the Fish ID feature is on.

There are 10 levels of SCC available on the Z-9500GPS. When it's first turned on, the SCC level is one. To change it, press the MENU key. Next press the key adjacent to the "More" label until the SCC label appears. Now press the key adjacent to the SCC label. The screen shown at the top of the next page appears.

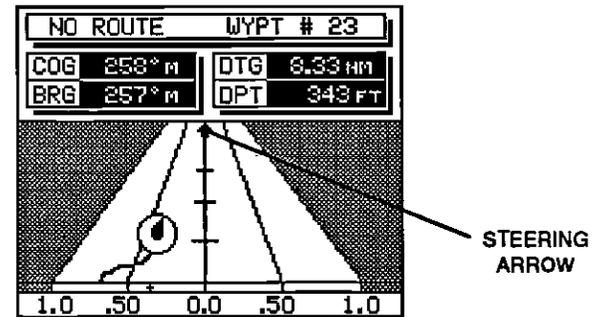


This brings up the SCC adjustment menu. To increase the SCC, press the key adjacent to the up arrow. The bar graph increases each time you press the up key. The number in the lower left portion of the SCC menu also changes as you change the level. To decrease the SCC, press the key adjacent to the down arrow.

Press the key adjacent to the CLEAR label to erase the menus.

DISCRIMINATION

Discrimination is a noise rejection feature that's effective in combating noise. In sonar terms, noise is any undesired signal. It is caused by electrical and mechanical sources such as bilge pumps, engine ignition systems and wiring, air bubbles passing over the face of the transducer, even vibration from the engine. In all cases, noise can produce unwanted marks on the display.

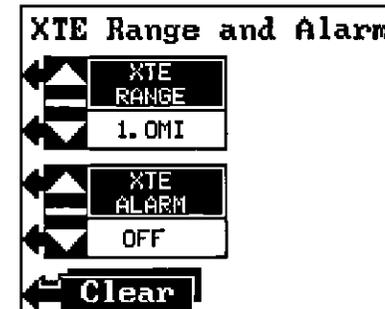


If the destination is too far away to show on the steering screen, an arrow appears showing the direction to the waypoint as shown above.

Using the digital displays at the top of the screen along with the graphical display at the bottom lets you accurately steer the boat to a waypoint.

XTE Range and Alarm

To change the XTE range or alarm settings, first press the MENU key. Then press the key adjacent to the "More" label until the "Change XTE Range" label appears. Press the key adjacent to this key. The screen shown below appears.



The XTE Range adjustment menu is at the top of the screen, the XTE Alarm is beneath it. Press the key adjacent to the up or down arrow to increase or decrease the XTE range. The range is adjustable from 0.1 to 10 miles.

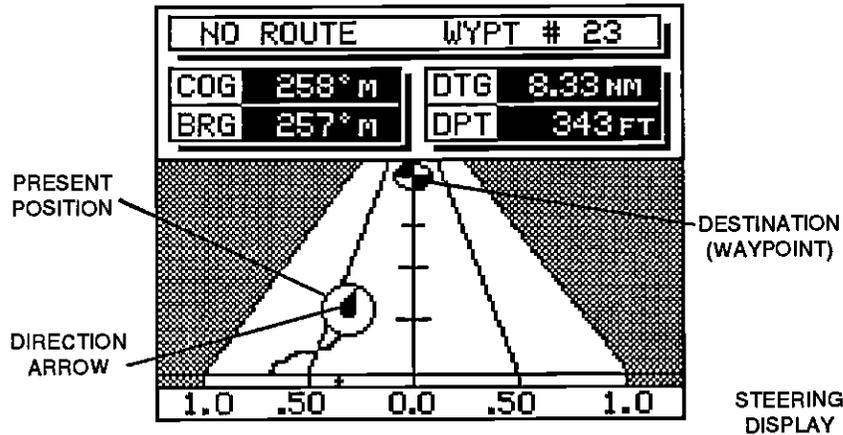
The XTE Alarm sounds a tone when your cross track error is more than the alarm setting. For example, the XTE alarm is set to 0.1 nautical mile. If you move to the left of course by more than 0.1 nautical mile, the XTE alarm sounds an alert tone. The XTE alarm ranges are from 0.01 to 10 miles. Press the key adjacent to the up or down arrow to increase or decrease the XTE alarm.

After you've finished with the settings on this page, press the CLEAR key to return to the GPS screen.

Steering Screen

This screen shows a graphical display of your present position, Cross Track Error, and Track. (Track is your path you've travelled.) At the top of the screen, the route name (if in use) and waypoint number are displayed. Next, Course Over Ground (COG), Distance To Go (DTG), Bearing (BRG) and water depth (DPT) display. Only Course Over Ground is used if a waypoint is not recalled.

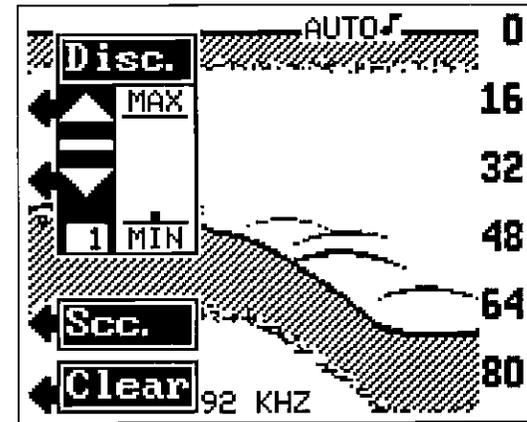
The CDI (Course Deviation Indicator) displays in the middle of the screen. The straight line down the middle of the display is the Bearing Line. This is the shortest distance to the waypoint. Angled lines on the left and right of the Bearing Line measure the cross track error. The scale at the bottom of the screen marks match the angled lines which lets you know the cross track error. This scale is adjustable (see below).



Your present position is shown by the circle with an arrow inside. The arrow shows the direction the boat is heading relative to the waypoint. In theory, if you steer the boat until the arrow always points towards the waypoint, then you will arrive at the waypoint. The solid line extending from the circle is your track. To travel directly to a waypoint, try to keep the circle on the center line. The waypoint is depicted by another circle at the top of the CDI display (if it's within the steering screen's range.) As you approach the waypoint, the two circles will move closer together. If the waypoint is not displayed on the screen, a small arrow will appear at either the top of the screen or the bottom pointing the way to the waypoint.

You can erase the track line on the steering display, if desired. To do this, press the MENU key, then press the key adjacent to the "More" label until the "Clr. Steer Trail" label appears. Press the key adjacent to this label to erase the track line.

NOTE: Discrimination is not available when the ASP feature is on. To change the level of Discrimination, first turn the ASP feature off. The Discrimination menu doesn't show unless the ASP feature is off.



There are 10 levels of Discrimination available on the Z-9500GPS. When it's first turned on, the Discrimination level is one. To change it, press the MENU key. Next press the key adjacent to the "More" label until the Disc/Sec label appears. Now press the key adjacent to that label. The screen shown above appears.

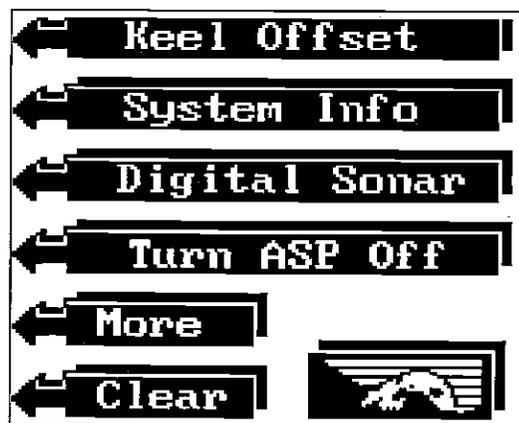
To increase the Discrimination, press the key adjacent to the up arrow. The bar graph increases each time you press the up key. The number in the lower left portion of the Discrimination menu also changes as you change the level. To decrease the Discrimination, press the key adjacent to the down arrow.

When the Discrimination level is at the desired level, press the key adjacent to the CLEAR label to erase the menus.

ASP

The newest technology in noise rejection systems is Advanced Signal Processing or ASP. This system constantly evaluates the incoming sonar signals, rejects noise signals, and displays true echoes with a minimum of interference. To our knowledge, this is the most advanced noise rejection system available in sportfishing sonar today. ASP is automatically on when the Z-9500GPS is first turned on. It's not adjustable, but it can be turned on or off. Generally, you will want to leave it on. How-

ever, if you are having problems seeing fish, structure, or other detail, you may wish to turn the ASP feature off. If there are high levels of noise present, ASP will not only filter out the noise, but other small echoes such as the above. If you do have noise problems, see the sonar troubleshooting section in this manual.



To turn ASP off, first press the MENU key, then press the key adjacent to the "More" label until the "Turn ASP Off" label appears. Now press the key next to that label. The Z-9500GPS returns to the sonar screen. You should see an increase in noise on the display. To turn ASP on again, repeat the above steps, then press the key adjacent to the "Turn ASP On" label.

FISH I.D.

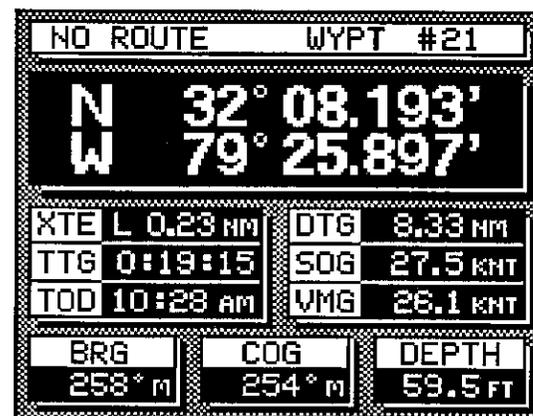
The Fish I.D. feature identifies targets that meet certain conditions as fish. The micro-computer analyses all echoes and eliminates surface clutter, thermoclines, and other signals that are undesirable. In most instances, remaining targets are fish. The Fish I.D. feature displays symbols on the screen in place of the actual fish echoes. There are three fish symbol sizes: small, medium, and large. These are used to designate the relative size between targets. In other words, it displays a small fish symbol when it thinks a target is a small fish, a medium fish symbol on a larger target, etc.

The micro-computer is sophisticated, but it can be fooled. It cannot distinguish between fish and other suspended objects such as trotlines, turtles, submerged floats, air bubbles, etc. Individual tree limbs extending outwards from a group of limbs is the hardest object for the Fish I.D. feature to distinguish from fish.

Navigation Display

This screen shows all major navigation information. The displays are as follows:

1. Present Position.
2. Cross Track Error (XTE)
3. Time To Go (TTG)
4. Time Of Day (TOD)
5. Distance To Go (DTG)
6. Speed Over Ground (SOG)
7. Velocity Made Good (VMG)
8. Bearing to waypoint (BRG)
9. Course Over Ground (COG)
10. Water Depth (DEPTH)



NAVIGATION DISPLAY

Present position is your location in latitude/longitude coordinates. This is expressed as degrees, minutes, and thousandths of a minute. Cross Track Error (XTE) is the distance to the left or right of the course to a waypoint. In other words, if you draw a straight line from your starting position to the destination, any deviation to the left or right of that line is your cross track error. Time To Go (TTG) is the time it will take you to reach the destination, travelling at your present speed. Time Of Day (TOD) is the current time. Distance To Go (DTG) is the distance from your present position to the destination. Speed Over Ground (SOG) is the actual speed you are travelling. Velocity Made Good (VMG) is the speed you are travelling towards the destination. Bearing to waypoint (BRG) is the direction from your present position to the destination measured in degrees. Course Over Ground (COG) is the direction the boat is travelling. Water depth (DEPTH) is the depth of the water beneath the transducer.

Remember, Cross Track Error, Distance To Go, Velocity Made Good, Time To Go, and Bearing to waypoint are used only when a waypoint is recalled.

POSITION/NAVIGATION DISPLAYS

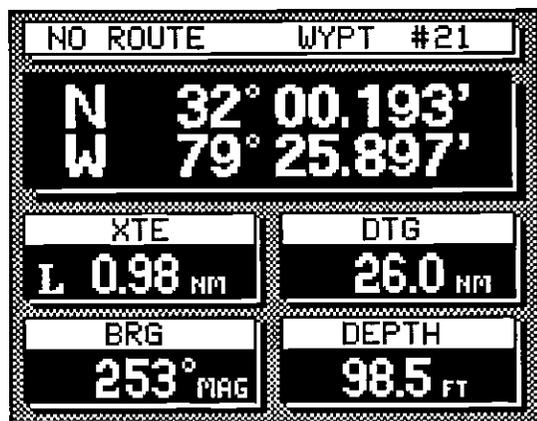
The Z-9500GPS has five main display modes on the GPS side. These are the Position , Navigation , Steering , Status , and Plotter displays.

To view any of the first four displays, press the MENU key. The screen shown below appears. To view a screen, simply press the key adjacent to the desired screen's label. A description of each screen follows.



Position Display

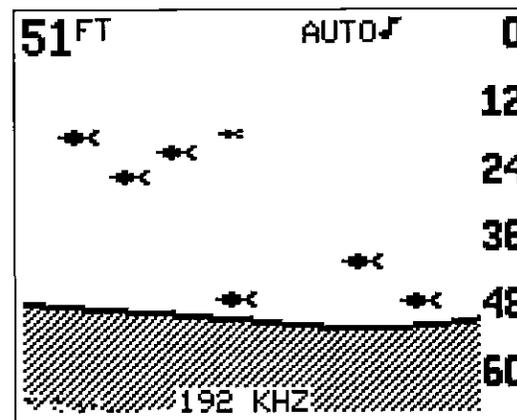
The Position display shows your present position in latitude/longitude coordinates. This is displayed in degrees, minutes, and thousands of a minute. (Not seconds.) Beneath the present position display is Cross Track Error (XTE), Distance To Go (DTG), Bearing to waypoint (BRG), and water Depth (DEPTH). Cross Track Error, Distance To Go, and Bearing are used only when a waypoint is recalled. See the section on waypoints for more information.



POSITION
DISPLAY

You may see Fish I.D. symbols on the screen when actually, there are no fish. Practice with the unit in both the Fish I.D. mode and without to become more familiar with the Fish I.D. feature.

To turn the Fish I.D. feature on, first press the MENU key. Next, press the key adjacent to the "Turn Fish-I.D. On" label. The menu immediately disappears and the sonar screen returns. Echoes will continue to scroll across the screen, however, the surface clutter will no longer be displayed. Any targets the micro-



FISH I.D. ON

computer determines are fish will be displayed as fish symbols. The Fish I.D. feature cannot be used when the Z-9500GPS is in the manual mode. If you turn the Fish I.D. feature on when the Z-9500GPS is in manual, the micro-computer will turn the automatic feature on. If you turn automatic off when the Fish I.D. feature is on, the Fish I.D. feature will be turned off also.

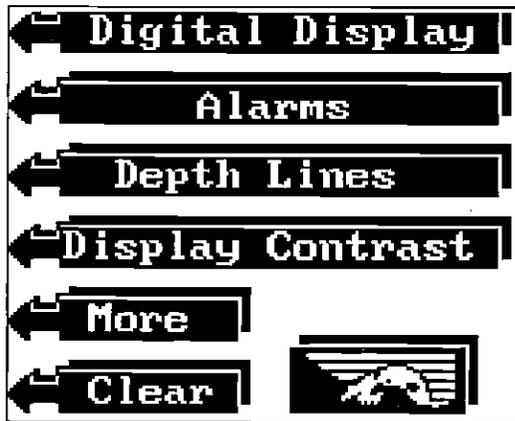
The sensitivity can only be increased a fixed amount when the Fish I.D. feature is on. This shouldn't affect the ability to display targets; if you can't see fish symbols, try increasing the sensitivity. SCC is also set to a fixed level and cannot be adjusted when the Fish I.D. feature is on.

To turn the Fish I.D. feature off, press the MENU key, then press the key adjacent to the "Turn Fish-ID Off" label. Or press the AUTO key. This turns the Fish I.D. feature and automatic off at the same time.

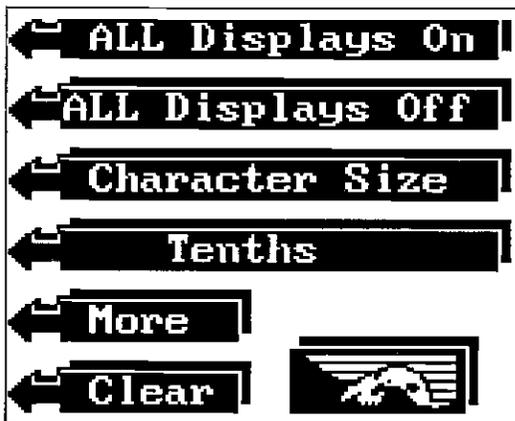
DIGITAL DISPLAYS

The Z-9500GPS can display the depth, speed, surface water temperature, distance log, time, and GPS position data on the upper left portion of the screen. (Requires optional ST-T speed/temperature sensor.) When it's first turned on, only depth displays. Each digital display can be turned on or off as desired. Or all of the displays can be turned on or off at the same time.

To turn all of the digital displays on, press the MENU key. Next, press the key next to the MORE label. Now press the key next to the "Digital Display" label. Now press the key next to the "All Displays On" label. This will turn all of the displays on and return you to the sonar screen.

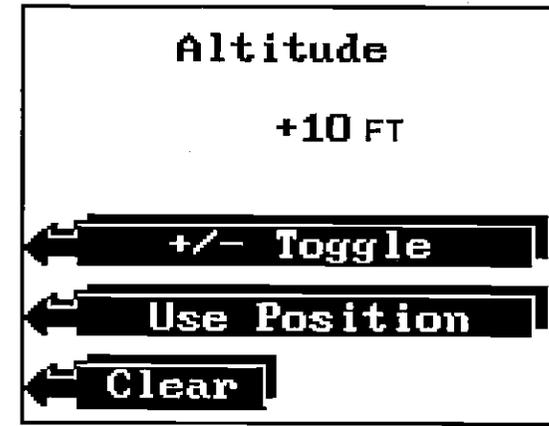


To turn all of the displays off, go to the digital menu as shown above. Then press the key adjacent to the "All Displays Off" label. This turns the displays off and returns to the sonar screen.



not altitude.) Now press the key adjacent to the Altitude label. The screen shown at the bottom of the previous page appears next.

Now enter your Altitude using the keys on both sides of the screen. After you've entered the numbers, a new screen appears as shown below. This lets you switch the numbers from positive to negative. In other words, use positive altitude when you're above sea level, use negative numbers if you're below it. Once the numbers on the display are correct, press the key adjacent to the "Use Position" label. The Z-9500GPS then returns to the Initial Settings screen.



The initial setup is now complete. Press the CLEAR key. The GPS position screen appears with the present position display flashing. The Z-9500GPS begins its search for the correct satellites. Once it locks onto at least three of them, your position displays. The latitude/longitude position will stop flashing when the Z-9500GPS has locked onto the necessary satellites. To view the satellite data, see the Satellite Status section in this manual.

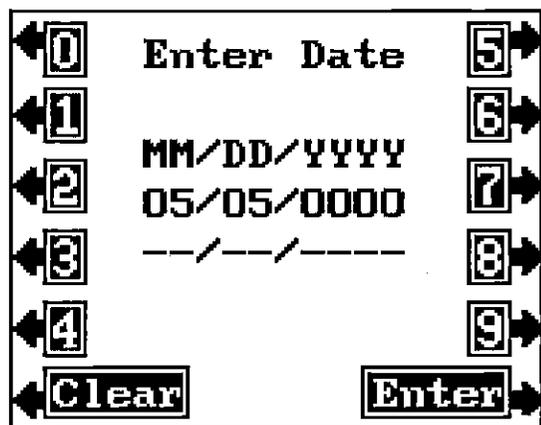
WARNING!

Never navigate with this unit when the position screen flashes the latitude/longitude! This means the unit is not usable for navigation. Always use more than one method to navigate.

If you move a long distance with the unit turned off, you may need to re-initialize the unit. If you preset the Z-9500GPS, you will definitely need to re-initialize the unit. The "Initial Setup" menu selection on the GPS' second menu page returns you to the initial setup menu, when needed. Otherwise, you shouldn't need to repeat these steps.

DATE

The next setup item is today's date. Press the key adjacent to the "DATE" label to change the displayed date. The screen shown below appears.



Now enter the month, then today's date, and finally the year. For example, if the date is October 22, 1991, then enter 10/22/1991. After entering the date, press the key adjacent to the "Enter" label. The Z-9500GPS returns to the initial setup menu.

ALTITUDE

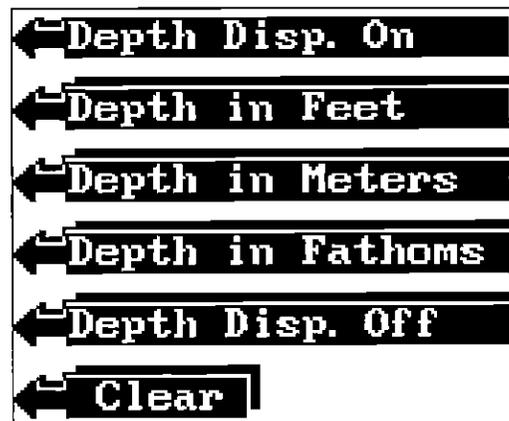
The next parameter the Z-9500GPS needs is your altitude. This is the distance from the GPS module to sea level in feet. The altitude doesn't have to be precise in order for the GPS receiver to find your position. For example, if you're on the ocean, enter 0 feet. Anywhere else, simply enter your altitude within 1000 feet. (Calling your local airport is the easiest way to find both altitude and your present position. Remember, however to ask for elevation,



DIGITAL DEPTH DISPLAY

When the Z-9500GPS is turned on for the first time, the digital depth display is located at the top left corner of the screen. This display comes from a separate digital sonar built into the Z-9500GPS. It displays only the bottom depth. If it loses the bottom, the last known depth will flash on the display. When the digital finds the bottom, it automatically displays the bottom depth.

The digital depth function has a number of features and options that are accessed through the Digital Display menu. To reach this menu, first press the MENU key. Next, press the key adjacent to the MORE label. This brings up the second menu page. Now press the key adjacent to the Digital Display label. Next, press the key adjacent to the MORE label. Finally, press the key adjacent to the DEPTH label. This is the Digital Depth function menu. As you can see below, this menu lets you turn the digital sonar display on or off. (NOTE: This doesn't turn the digital sonar on or off, only the display.) It can also display the depth in feet, fathoms, or meters on both the digital sonar and the graph.

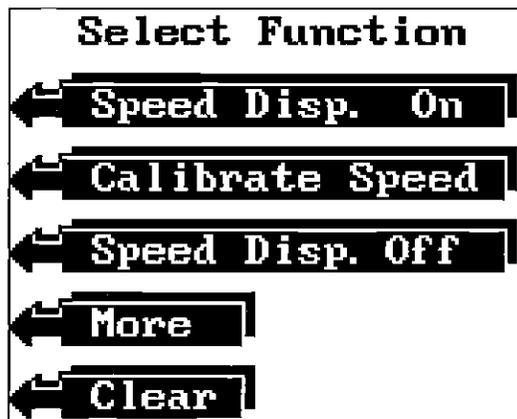


To make a change, simply press the key corresponding to the menu arrow. If you don't want to make a change, press the CLEAR key to exit. For example, to make the Z-9500GPS display the depth in fathoms, press the key adjacent to the "Depth in Fathoms" label. The screen will clear, revert to the sonar display with the depth displayed in fathoms. The letters "FM" next to the digital depth signify fathoms scale. "M" means meters, and "FT" means the digital depth is in feet.

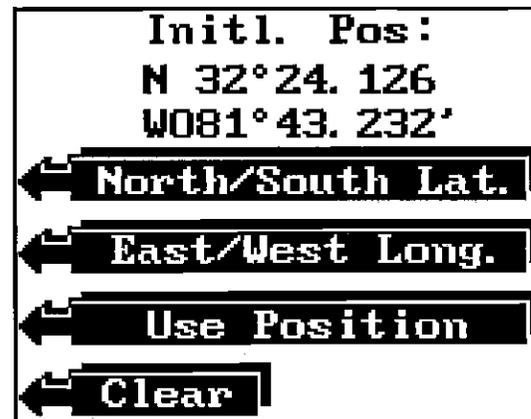
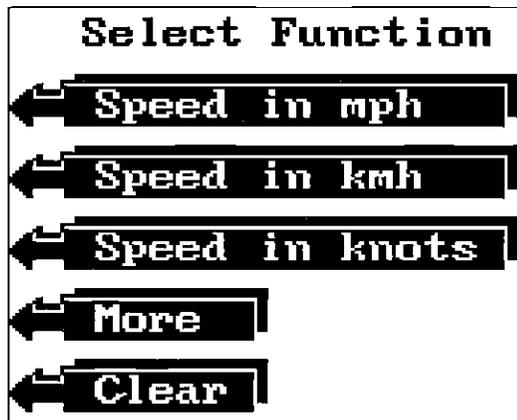
NOTE: The depth scale on the right side of the sonar screen also changes according to the selected mode.

SPEEDOMETER

The Z-9500GPS can display boat speed in miles per hour, kilometers per hour, or knots if the optional speed sensor is attached. The speedometer can also be calibrated through this menu. To display the speed, first press the MENU key. Next, press the key adjacent to the MORE label. Now press the key adjacent to the Digital Display label. Next, press the key adjacent to the MORE label. Finally, press the key next to the Speed label. This is the Speed menu. Press the key adjacent to the "Speed Disp. On" label to turn the digital speed display on.



The digital speedometer reads in statute miles per hour when it's first turned on. To change to kilometers per hour or knots, repeat the above steps to get the Speed menu. Then press the key adjacent to the "More" label. The menu shown below appears.

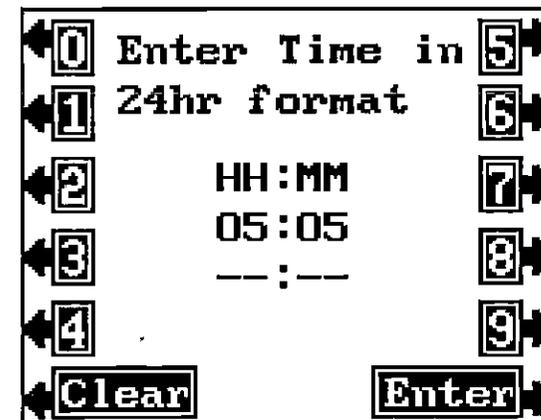


After entering the position, the screen shown above appears.

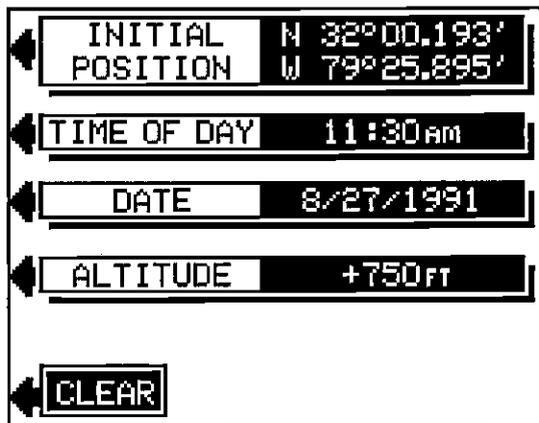
Press the key adjacent to the North/South label to change the latitude from north to south, if necessary. Likewise, press the key adjacent to the East/West label to change the longitude. When the initial position is correct, press the key adjacent to the "Use Position" label. The Z-9500GPS returns to the Initial Settings screen.

TIME OF DAY

The time of day is simply the present time at your location. If the time on the screen is wrong, then press the key adjacent to the "TIME OF DAY" label. The screen shown below appears.



Enter your local time in 24 hour format using the keys on both sides of the screen. For example, if your watch reads 2:00 in the afternoon, then you will enter 14:00. Twelve o'clock noon is 12:00, midnight is 24:00. After you've entered your local time, press the key next to the "Enter" label. The Z-9500GPS returns to the initial setup menu.



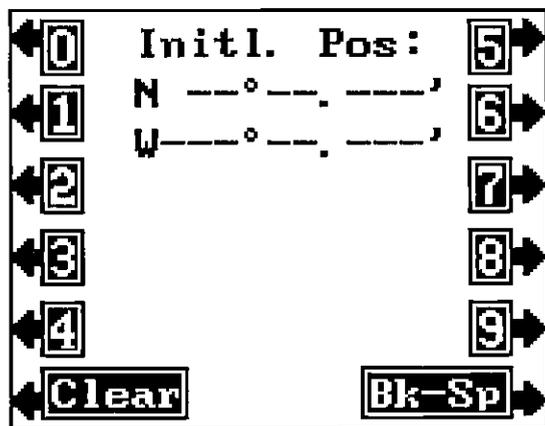
INITIAL SETTINGS

This screen lets you change some or all of the initial values. For example, when the time goes from standard to daylight savings time, you'll need to change the Time Of Day setting. A description of each section follows.

INITIAL POSITION

The first piece of information the Z-9500GPS needs to start is your present position in latitude/longitude. First, press the key adjacent to the "INITIAL POSITION" label. The screen shown below appears.

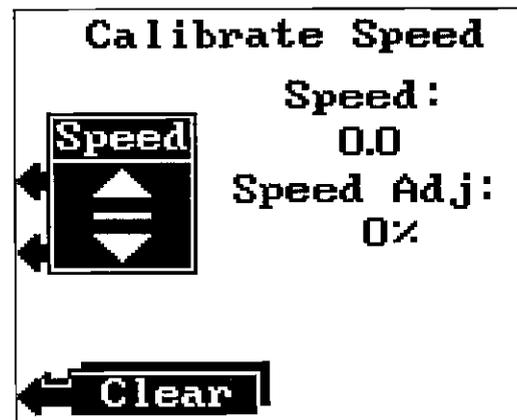
Now enter your latitude and longitude within one degree (1°) using the keys on both sides of the screen. Remember to add a zero to the longitude if it's less than 100 degrees. For example, if your longitude is 82 degrees, then enter 082.



Press the key adjacent to the desired speed label. For example, if you wish to display the speed in knots, press the key adjacent to the "Speed in knots". The Z-9500GPS reverts to the sonar display after the key is pressed.

Speedometer Calibration

The speedometer display can be calibrated to accurately show the boat's speed. Calibrate the reading using the Speedometer Calibration menu. To use this menu, first press the MENU key. Next, press the key adjacent to the MORE label. Now press the key adjacent to the "Digital Display" label. Press the key next to the "More" label. Then press the key next to the "Speed" label. Finally, press the key adjacent to the "Calibrate Speed" label. The screen shown below appears.



The current boat speed is displayed on the right side of the screen. To increase the displayed speed, press the key adjacent to the up arrow on the "Speed" menu. To decrease it, press the key adjacent to the down arrow. As the displayed speed changes, the amount of the change in percent also displays immediately below it. For example, if you are traveling at ten miles per hour, pressing the key adjacent to the down arrow once will decrease the displayed speed by -1 %, or 1 mile per hour. The displayed speed would then be 9 miles per hour.

The best way to calibrate the speedometer is to have someone else drive the boat through a measured mile at a constant speed. Time how long it takes to travel the mile, then calculate your

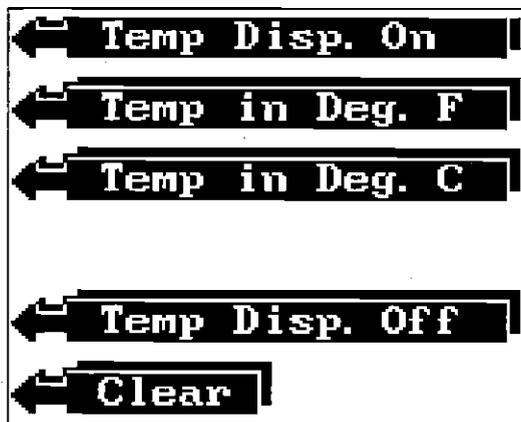
actual speed using this formula: $60/\text{Time}=\text{Speed}$. Now make the run through the mile in the opposite direction. Again calculate your actual speed. Now add your two speeds together and divide by two. This will cancel out any wind or current effects on the boat. Use this result to correct the speedometer.

Now either calculate the percentage the Z-9500GPS's speedometer is off, or run the boat at the same speed that you ran through the measured mile and adjust the speedometer until the correct speed is displayed.

For example, it took 7 minutes to run through a measured mile with the speedometer displaying 10 miles per hour in one direction, and 4 1/2 minutes to go the other direction. Calculating our speed, we find that the boat was actually going 8.5 miles per hour the first time through, and 13.3 miles per hour the last time. Adding these two together and dividing by two results in a 10.9 mile per hour actual speed. This is an approximate 1% error. Changing the speed adjust to +1% will make the speedometer more accurate.

TEMPERATURE

The Z-9500GPS can display the surface water temperature in degrees Fahrenheit or Celsius with the optional temperature sensor installed. When the Z-9500GPS is first turned on, the digital temperature display is off. To turn it on, first press the MENU key. Next, press the key adjacent to the MORE label. This brings up the second menu page. Now press the key adjacent to the Digital Display label. Next, press the key adjacent to the MORE label again. Finally, press the key next to the Temperature label. The screen shown below is the temperature menu.



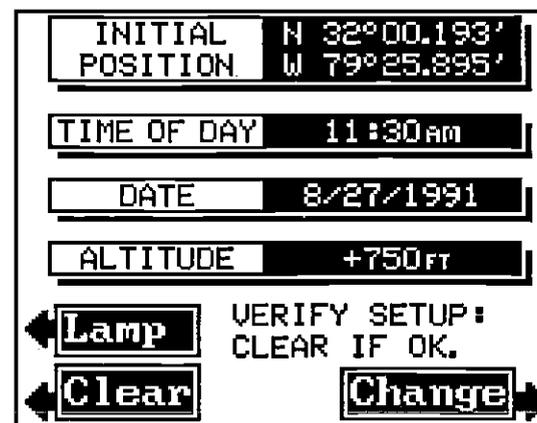
GETTING STARTED

Initialization - Power On

The Z-9500GPS must be initialized or "told where it is" the first time it's turned on. This initialization process is usually done only once and requires the following data:

1. Present position in latitude/longitude
2. Elevation above sea level (altitude)
3. Today's date and time

Every time the Z-9500GPS is turned on and the GPS key is pressed, the screen shown below appears. This shows the data that the GPS module will use at power on. This is needed by the Z-9500GPS to tell the GPS module



Initial Data Screen. Displays when Z-9500GPS is first turned on.

which satellites are visible so it can determine your position faster. Please check it every time you turn the unit on to make certain that it is correct. If it is correct, simply press the CLEAR key to erase the screen. It will automatically clear when the unit calculates your position. If you need to change any of this data, press the key adjacent to the "Change" label. The very first time you use the Z-9500GPS, you'll need to press this key. After pressing it, the screen shown at the top of the next page appears.

NOTICE! DON'T INITIALIZE THE UNIT WHILE THE Z-9500GPS'S GPS SIMULATOR IS ON!

ACCURACY

You may have heard tales of extraordinary accuracy from GPS receivers. The DOD requires accuracy of 10 to 15 meters from the satellite system. However, only the military gets this precision. The way the military keeps us and other unauthorized people from using the more precise system is coding. In other words, the data coming from the satellites is encrypted. Civilian GPS receivers use what's known as "C/A Code." It's accuracy is intentionally worse than the military's "P Code." In this manner, civilian users worldwide can benefit from excellent position fixes. Meanwhile, the military keeps the most accurate system away from potential enemies. Theoretically, C/A code can give accurate position fixes up to 15 meters. This is more than adequate for most people.

However (as of this writing), the military isn't satisfied with C/A's potential accuracy in the hands of the world. So, it's degrading it further with what's called "Selective Availability" or SA. This is small, random errors intentionally added to the system so your accuracy will typically be within 100 meters. Of course, accuracy also depends on the angle of the satellite above the horizon, signal-to-noise ratio, the number of satellites tracked at one time (the more the better), and other factors. The smaller ranges on the plotter may not be usable if the SA is high, because your present position will move off the screen even while you're sitting still.

Don't let this discourage you, however. GPS by nature has much faster updates than other systems (such as Loran), and typically is much easier to use. Accuracy, even with SA on is still better than most other navigation systems. You've purchased one of the finest navigation instruments on the market today. We hope you'll enjoy it for many years to come.

NOTE: The altitude display is also affected by SA and the ellipsoid used by the GPS receiver to calculate both position and altitude. Errors in the altitude display can be caused by variations in SA and the ellipsoid. See the PCF section in this manual for more information on the ellipsoids.

The EAGLE GPS Module

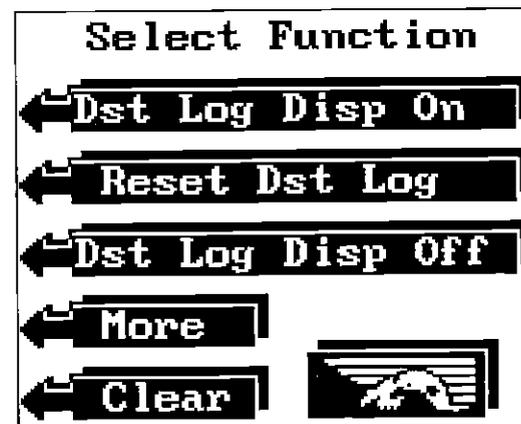
This GPS receiver (manufactured by Rockwell) is currently used in all Eagle GPS receivers. It's small, rugged, and fast. The five channel design lets it acquire and track up to five satellites at one time. It transmits position information to the Z-9500 once every second. By incorporating Rockwell's GPS receiver technology with Eagle's state-of-the-art design and manufacturing capabilities, Eagle brings to the consumer the most advanced line of GPS marine navigation systems available in the world.

Press the key adjacent to the "Temp Disp. On" label to turn the temperature display on. The screen will clear and begin scrolling echoes across the display. The digital temperature can be seen in the upper left corner of the screen. It will display the temperature in degrees Fahrenheit. If you wish to change to degrees Celsius, go back to the Temperature menu and press the key next to the "Temp in Deg. C" label. The digital temperature will display in degrees C.

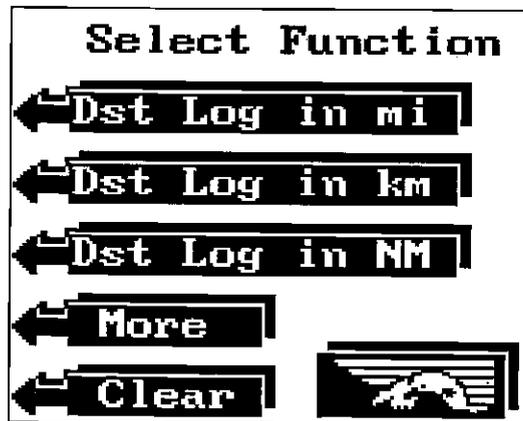
DISTANCE LOG

Using the information from the optional speed sensor, the Z-9500GPS automatically keeps track of the distance traveled.

When the Z-9500GPS is first turned on, the Distance Log display is off. To turn it on, first press the MENU key. Next, press the key adjacent to the MORE label. This brings up the second menu page. Now press the key adjacent to the Digital Display label. Next, press the key adjacent to the MORE label. Finally, press the key next to the Distance Log label.



Press the key adjacent to the "Dist Log Disp On" label to turn the distance log display on. The screen will clear and return to the sonar display. The distance log can be seen in the upper left corner of the screen. It will display the distance travelled in statute miles. If you wish to change to kilometers or nautical miles, go back to the Distance Log menu and press the key next to the MORE label. The screen shown at the top of the next page appears.



Now press the key adjacent to the desired label. The Z-9500GPS will return to the sonar screen.

The distance log displays the distance travelled from the time it was first turned on. To reset the distance log to zero, press the MENU key. Next, press the key adjacent to the MORE label. This brings up the second menu page. Now press the key adjacent to the Digital Display label. Next, press the key adjacent to the MORE label again. Finally, press the key next to the Distance Log label. Press the key adjacent to the "Reset Dst. Log" label to reset the distance log display to zero.

To turn the distance log off, go to the distance log menu, then press the key adjacent to the "Dst Log Disp Off" menu.

NOTE: The distance log is retained in memory when the Z-9500GPS is turned off.

GPS DISPLAY

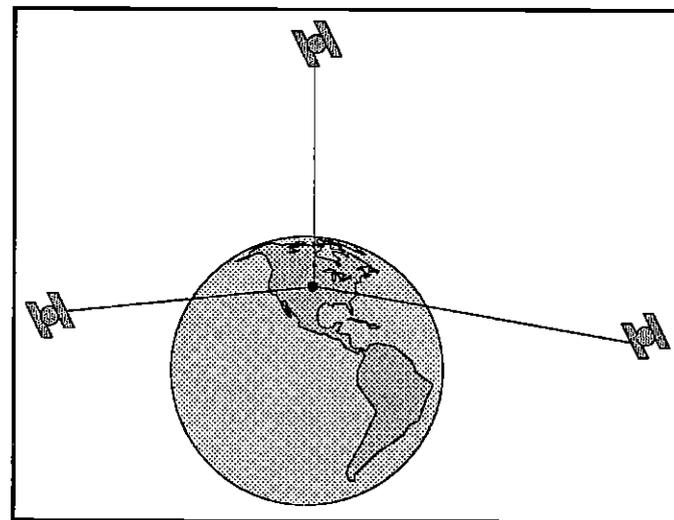
Position information can be displayed on the Z-9500GPS's sonar screen. Latitude/longitude, or distance and bearing to a waypoint are placed on the left side of the sonar screen.

To display position information on the sonar screen, press the MENU key. Next, press the key adjacent to the More label. Now press the key next to the Digital Display label. Press the key next to the More label until the screen shown at the top of the next page appears. Now press the key adjacent to the "Navigation" label. The screen in the middle of the next page appears. Press the key adjacent to the desired function. For example, pressing

GPS - HOW IT WORKS

The Global Positioning System (GPS) is the newest, most high-tech approach to navigation yet devised. Conceived by the Department of Defence (DOD) and the United States military, the GPS system is an answer to their needs of 24 hour global positioning, 365 days a year.

Basically, the system works by using a constellation of satellites orbiting Earth 11,000 miles in space. There will be 21 satellites in orbit when the system is fully operational. Three more satellites will act as spares, for a total of 24. When all satellites are in place, at least four of them will be in view nearly anywhere on Earth twenty-four hours a day. The GPS receiver requires at least three satellites to give a "2D" fix. (A 2D fix is your position in latitude/longitude. A 3D fix is your latitude/longitude plus altitude.) When it locks on to at least four satellites, it displays a 3D fix.

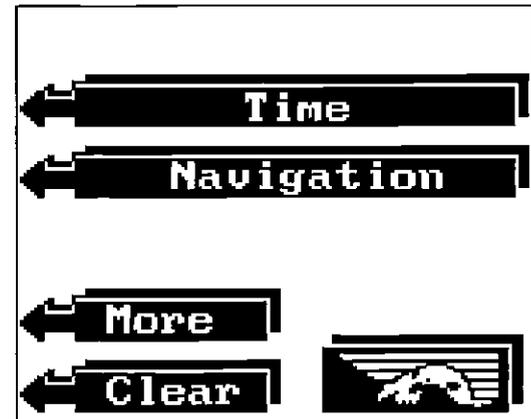


It takes three satellites to determine position.

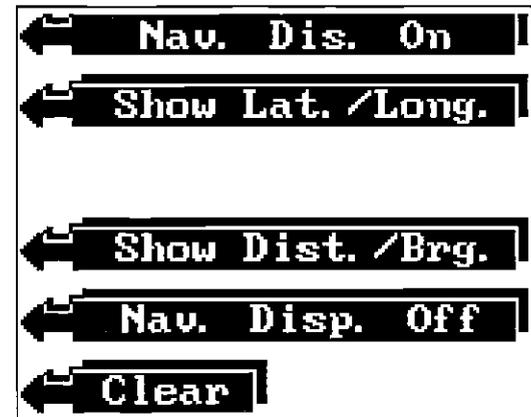
As the receiver locks on to each satellite, it calculates the distance from the satellite by measuring the length of time it takes the radio signal to reach it. Each satellite has an extremely accurate clock which tells the receiver when the radio transmission started. The receiver compares that time against its own clock, thus it knows how long it took the radio signal (travelling at the speed of light!) to reach it. If you know time and speed, then you can calculate distance. Once you have this from three satellites, then the receiver can determine position.

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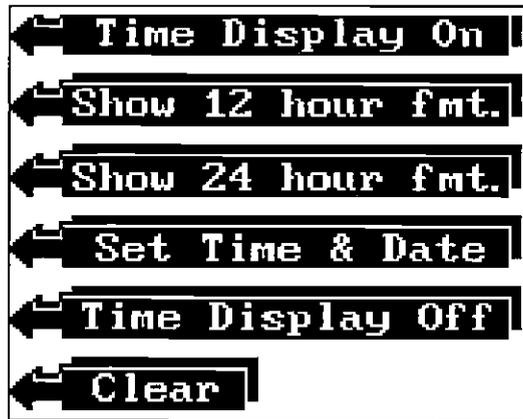
the key next to the "Show Lat./Long." label causes the unit to display your current latitude/longitude on the sonar screen. Other menu selections let you display distance and bearing to a waypoint, turn the navigation displays on or off. After pressing the desired feature, the Z-9500GPS returns to the sonar screen.



GPS DISPLAY MENU

TIME DISPLAY

To display the time on the sonar screen, press the MENU key. Next, press the key adjacent to the More label. Now press the key next to the Digital Display label. Press the key next to the More label until the screen shown at the top of this page appears. Now press the key adjacent to the "Time" label. The screen at the top of the next page appears. Press the key adjacent to the desired function.



TIME DISPLAY MENU

For example, pressing the key next to the "Show 12 hour fmt." label causes the unit to display your current time in am/pm format on the sonar screen. Other menu selections let you display the time in 24 hour format, set the time and date, or turn the time display on and off. After pressing the desired feature's key, the Z-9500GPS returns to the sonar screen.

CHARACTER SIZE

The digital number displays have two sizes; small and large. (Note: Position and Time show only in small digits.) The displays are shown in the large size when the Z-9500GPS is first turned on. To change the display size, press the MENU key. Next press the key adjacent to the More label. Then press the key adjacent to the Digital Display label. Next, press the key next to the Character Size label. Two labels appear: "Small Digits", and



Z-9500^{GPS} GPS OPERATION

WARNING!

USE THIS GPS RECEIVER ONLY AS AN AID TO NAVIGATION. A CAREFUL NAVIGATOR NEVER RELYS ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION.

CAUTION

This GPS receiver, (like all GPS navigation equipment) will show the shortest, most direct path to a 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.

NOTICE!

As of this writing, the Department of Defense (DOD) has not declared the GPS navigation system as operational. The system is still in a testing phase. Satellites can be turned off or accuracy can be degraded at will by the system operators. Remember that the Z-9500GPS, or any GPS receiver is only as accurate as the system it's using.

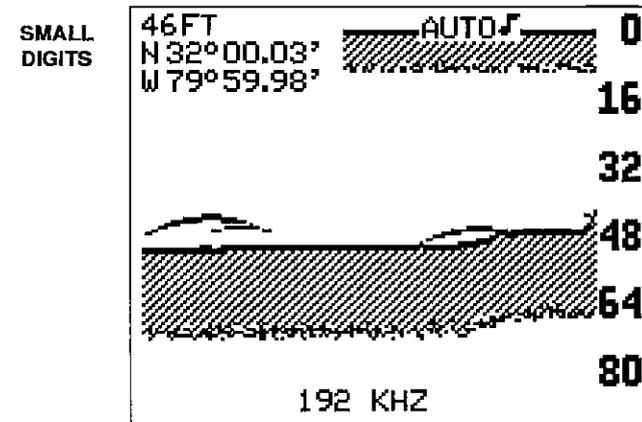
To eliminate or minimize the effects of electrical noise, first try to determine the cause. With the boat at rest in the water, the first thing you should do is turn all electrical equipment on the boat off. Make certain the engine is off, also. Turn your Z-9500GPS on, then turn off ASP (Advanced Signal Processing). There should be a steady bottom signal on the display. Now turn on each piece of electrical equipment on the boat and view the effect on the sonar's display. For example, turn on the bilge pump and view the sonar display for noise. If no noise is present, turn the pump off, then turn on the VHF radio and transmit. Keep doing this until all electrical equipment has been turned on, their effect on the sonar display noted, then turned off.

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

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

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

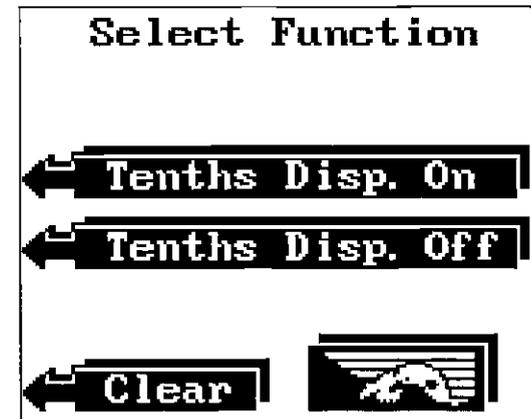
"Large Digits". Press the key corresponding to the digital size desired. The screen will clear and return to the sonar screen with the digital numbers displayed in the desired size.



TENTHS

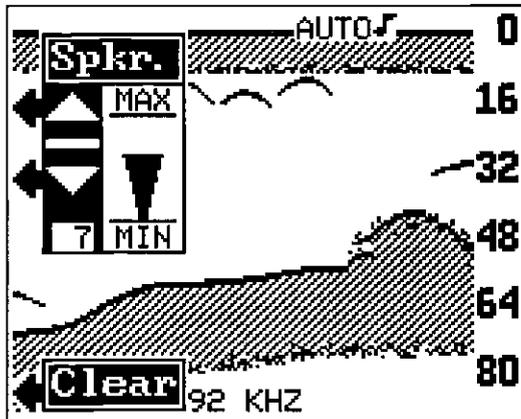
The Z-9500GPS has the capability to show all digital numbers in tenths. In other words, it can display the depth in tenths of a foot, speed in tenths of a mile per hour, etc. Tenths for all functions are turned on or off with a menu selection.

To change tenths, press the MENU key. Next, press the key adjacent to the More label. Then press the key adjacent to the Digital Display label. Next, press the key next to the Tenths label. Two labels appear: "Tenths Disp On" and "Tenths Disp Off". Press the key corresponding to the desired label. The screen will clear and return to the sonar screen with the digital numbers displayed in the desired manner.



SPEAKER VOLUME

The speaker volume is adjustable. You can make it louder so you can hear alarms or the "beep" each time you press the key in noisy surroundings. Or you can turn it down in quiet situations.



To adjust the speaker volume, press the MENU key. Next, press the key adjacent to the MORE label until the Speaker Volume label appears. Now press the key adjacent to the Speaker Volume label. The Speaker menu appears on the left side of the display. Use the key adjacent to the up arrow to increase the volume or the key adjacent to the down arrow to decrease it. The bar graph will increase or decrease corresponding to the change you make. The number in the menu's box will also change. When the Z-9500GPS is first turned on, the speaker volume is set to 7. The range is 1 to 10.

DISPLAY CONTRAST

The contrast of the display can be changed for easier reading in different light conditions.

To change the contrast, press the MENU key. Next, press the key adjacent to the MORE label. Now press the key adjacent to the Display Contrast label. The Disp. menu appears. Press the key adjacent to the up arrow to increase the display contrast. The key adjacent to the down arrow decreases it. The bar graph changes with your selection. The number in the menu box also changes. There are 31 steps of contrast available. Press the CLEAR key to erase the menu.

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

1. The transducer may be in turbulent water. It must be mounted in a smooth flow of water in order for the sonar to work at all boat speeds. Air bubbles in the water disrupt the sonar signals, interfering with its ability to find the bottom or other targets. The technical term for this is 'Cavitation'.
2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display. Try using resistor spark plugs or routing the sonar unit's power and transducer cables away from other electrical wiring on the boat.

No fish arches when the Fish ID feature is off:

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

ELECTRICAL NOISE

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

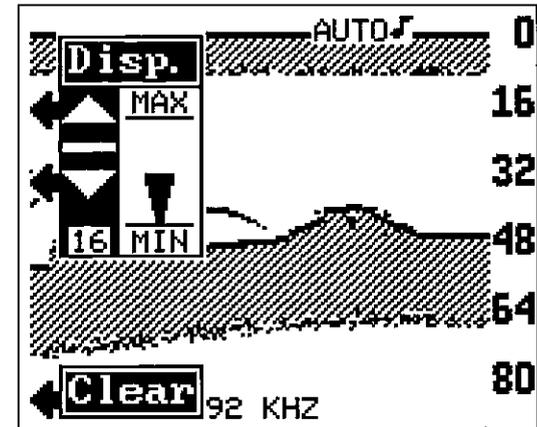
SONAR TROUBLESHOOTING (cont.)

Unit freezes, locks up, or operates erratically:

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

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

1. Make certain transducer is pointing straight down. Clean the face of the transducer. Oil, dirt, and fuel can cause a film to form on the transducer, reducing its effectiveness. If the transducer is mounted inside the hull, be sure it is shooting through only one layer of fiberglass and that it is securely bonded to the hull. Do NOT use RTV silicone rubber adhesive or Marinetex™.
2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display.
3. The water may be deeper than the sonar's ability to find the bottom. If the sonar can't find the bottom signal while it's in the automatic mode, the digital will flash continuously. It may change the range to limits far greater than the water you are in. If this happens, place the unit in the manual mode, then change the range to a realistic one, (for example, 0-100 feet) and increase the sensitivity. As you move into shallower water, a bottom signal should appear.
4. Check the battery voltage. If the voltage drops, the unit's transmitter power also drops, reducing its ability to find the bottom or targets.

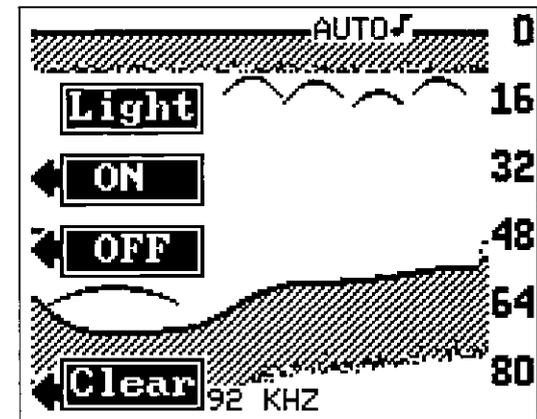


LIGHT

The keyboard and display are backlit for night use. Turn the lights on and off from the Light menu.

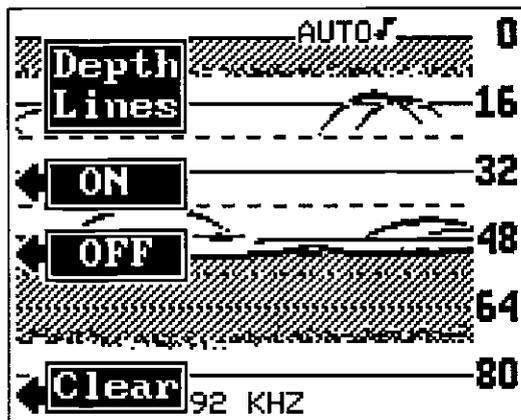
To turn the lights on or off, press the MENU key. Next, press the key adjacent to the LIGHT label. This displays the light menus. Press the key adjacent to the ON label to turn the lights on. Press the key adjacent to the OFF label to turn the lights off. Press the CLEAR key to erase the menu.

The light menu also appears each time the Z-9500GPS is turned on. The lights and the menu will turn themselves off after a few seconds unless the key adjacent to the ON key is pressed. This makes it easy to turn the lights on at night when the Z-9500GPS is turned on.



DEPTH LINES

The Z-9500GPS can print depth lines across the screen to make it easier for you to determine a target's depth.



To turn the depth lines on or off again, press the MENU key then press the key next to the MORE label. Next, press the key adjacent to the Depth Lines menu. Now press the key adjacent to the ON label to turn the lines on. Repeat the steps above, except press the key next to the OFF label to turn the lines off.

KEEL OFFSET

NOTE: The keel offset affects the digital sonar only. It does not change the graph scales.

Negative Keel Offset

Many times the transducer is not installed in the lowest portion of the hull. Therefore, portions of the hull are deeper in the water than the transducer. This poses a problem, since you could run aground when the sonar unit is showing an adequate water depth. Most sonar units (including the Z-9500GPS) read water depth from the face of the transducer.

However, the Z-9500GPS gives you an solution: Keel Offset. Measuring the distance between the lowest part of the boat and the face of the transducer, then inputting this value into the Z-9500GPS, lets you compensate for the depth of the boat.

One of the best ways to get fish arches is to expand or "zoom" a segment of the water. For example, from 45 to 60 feet. The smaller the segment, the better the screen resolution will be. The easiest way to do this on the Z-9500GPS is with the Bottom Track feature. Use the 2x or 4x Bottom Track mode to expand the echoes, making it easier to see detail. For the best results, turn the sensitivity up as high as possible without getting too much noise on the screen. In medium to deep water, this method should work to display fish arches.

If you see fish signals when the unit is in the manual mode, but don't get fish symbols when the Fish I.D. feature is on, try increasing the sensitivity. Although you can only vary the sensitivity a small amount when the Fish I.D. feature is on, many times it has helped to display fish symbols.

IMPORTANT SERVICE INFORMATION!

If your unit is not working, or if you need technical help, please use the following troubleshooting section before contacting a service center or the factory customer service department. It may save you the trouble of returning your unit

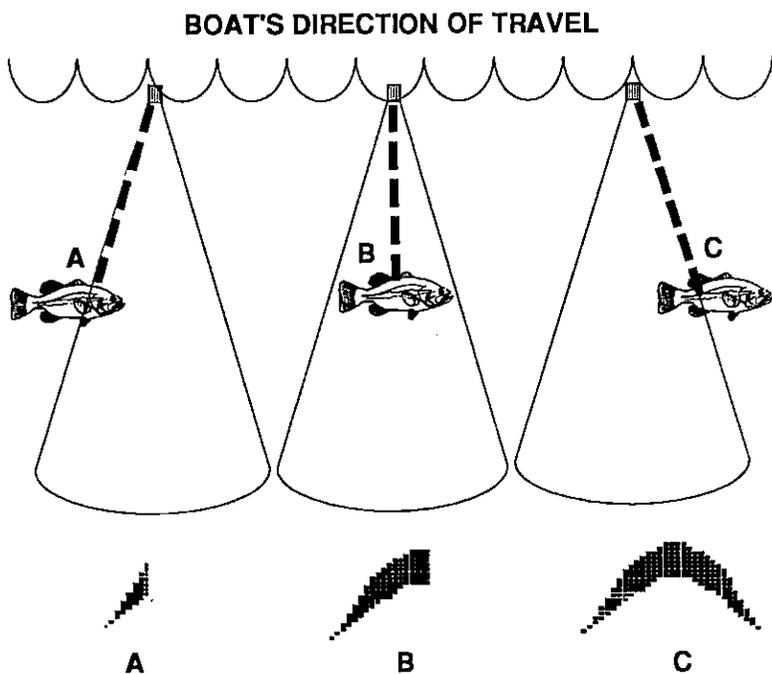
SONAR TROUBLESHOOTING

Unit won't turn on:

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

FISH ARCHES

Fish arches are created when the cone of sound passes over a fish. The distance to a fish when the cone first strikes it is shown as "A" below. When the center of the cone strikes the fish, the distance is shorter as shown "B". As the cone leaves the fish, the distance increases again as shown in "C".



When the Fish I.D. mode is off, the depth of the water will affect the size and shape of the fish arch due to the cone angle diameter. For example, if the cone passes over a fish in shallow water, the signal displayed on the Z-9500GPS may not arch at all. This is due to the narrow cone diameter and the resolution limitations of the display.

Very small fish probably will not arch at all. Medium sized fish will show a partial arch, or a shape similar to an arch if they're in deep water. Large fish will arch, but turn the sensitivity up in deeper water to see the arch. Because of water conditions, such as heavy surface clutter, thermoclines, etc., the sensitivity sometimes cannot be increased enough to get fish arches.

For example, let's say the bottom of the rudder on an inboard boat is the lowest part of the boat. After measuring, you discover it's 4 feet deeper than the face of the transducer. Turn the Z-9500GPS on and press the MENU key. Next, press the key next to the More label two times. Now press the key adjacent to the Keel Offset label. Finally, press the key adjacent to the Neg. Keel Offset label. A menu appears over the sonar screen that says "Enter Keel Offset 0.0".



Since the deepest part of the boat in our example is four feet deeper than the transducer's face, press the key adjacent to the 4 label, then the key next to the 0 label. The number "-4.0" appears in the Enter Keel Off. window. Now press the key adjacent to the ENTER label. The Z-9500GPS will automatically compensate for the four foot difference and display the digital bottom depth as if the transducer was four feet deeper than it actually is. For example, if the Z-9500GPS displayed the water depth as 10 feet before changing the keel offset, afterwards it would read six feet. This is the actual distance from the deepest part of our example boat to the bottom.

Positive Keel Offset

The transducer must be installed below the surface of the water to guarantee it will be in contact with the water at all times and boat speeds. No sonar system will operate with the transducer in air. Therefore, most sonar systems do not show the water's depth from the surface to the bottom, but from the transducer's face to the bottom.

The Z-9500GPS lets you measure the water depth from the surface to the bottom with the Positive Keel Offset feature. It works by adding the depth of the transducer to the bottom depth. In other words, if the actual bottom depth from the surface is ten feet, but the transducer's face is two feet beneath the surface, then the Z-9500GPS thinks the bottom is only eight feet deep. Using Positive Keel Offset, two feet can be added to this, making the Z-9500GPS display the true bottom depth of ten feet. This is useful when navigating using charts and you need to know the exact water depth as marked on the chart.

To use the Positive Keel Offset, press the MENU key. Next, press the key next to the More label two times. Now press the key adjacent to the Keel Offset label. Finally, press the key adjacent to the Pos. Keel Offset label. A menu appears over the sonar screen that says "Enter Keel Offset 0.0" Since the transducer's face in our example boat is two feet deep, press the key adjacent to the 2 label, then the key adjacent to the 0 label. The numbers "2.0" appear in the Enter Keel Off. window. Now press the key adjacent to the ENTER label. The Z-9500GPS will automatically compensate for the two foot difference and display all depth information as if the transducer was two feet shallower than it actually is. For example, if the Z-9500GPS displayed the water depth as 8 feet before changing the keel offset, afterwards it would read ten feet. This is the actual distance from the water's surface to the bottom using our example.

SYSTEM INFORMATION

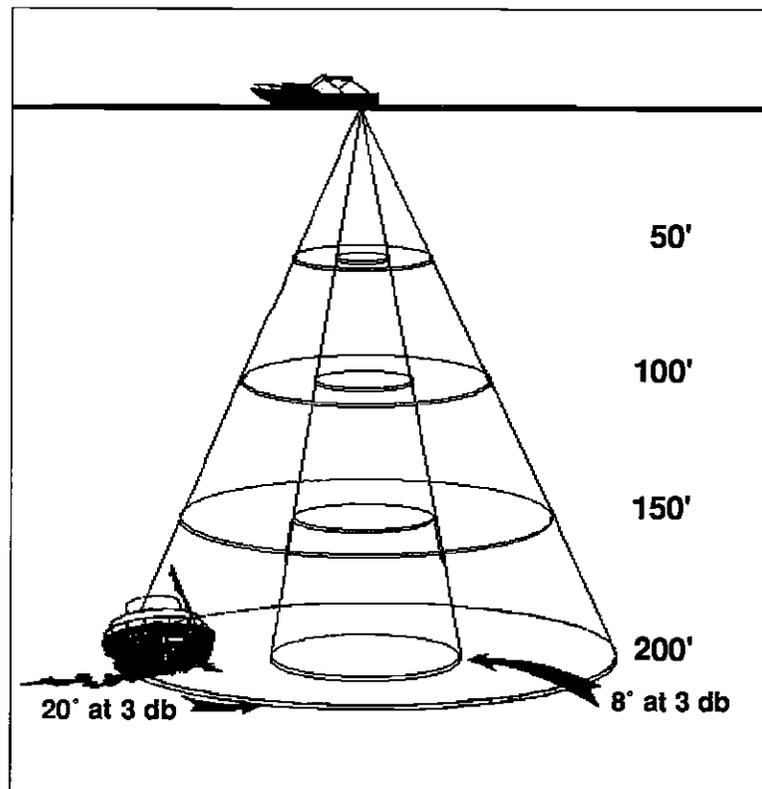
The code contained in the Z-9500GPS is numbered. This information can be obtained by pressing the MENU key, then the key adjacent to the MORE label two times. Next, press the key adjacent to the "System Info" label. A message similar to the one below will be displayed.

Z-9500GPS
Version: 2.0
Copyright 1991
Eagle Electronics

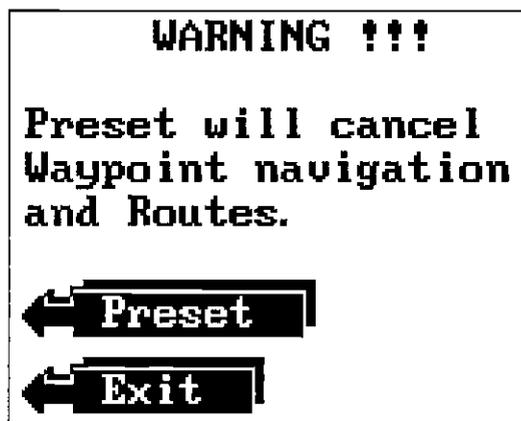
Press the key adjacent to the CLEAR label to erase this message and return to the sonar screen.

Both 8 degree and 20 degree transducers give accurate bottom readings, even though the bottom signal is much wider on the 20 degree model. This is because you are seeing more of the bottom. Remember, the shallow edge of the signal shows you the true depth. The rest of the signal tells you whether you are over rocks, mud, etc.

The Eagle 50 kHz transducer has a 36 degree cone angle. This is typically good to at least 2000 feet in fresh or salt water due to the better water penetration characteristics of the 50 kHz frequency. It also shows downrigger weights in most cases.



To do this, press the MENU key, then press the key adjacent to the MORE label three times. Now press the key adjacent to the Preset label. A warning label appears next. When presetting a unit, navigation to waypoints and routes is cancelled. Now press the key adjacent to the Preset label to continue. The screen will clear and the message "System Powering Up. Please Wait" may appear for a few seconds. Then the Z-9500GPS will start scrolling echoes across the screen, and all features will return to their factory settings.



TRANSDUCER CONE ANGLES

The sound waves from the transducer spread out into the water in a cone shaped beam. This looks much like the beam from a flashlight. The angle between the outside edges of the cone is the cone angle.

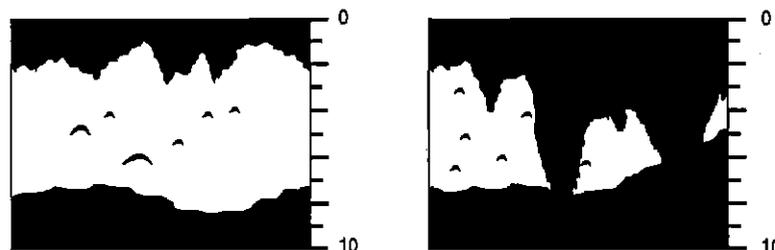
Eagle offers a choice of 192 kHz transducers with either an 8 or 20 degree cone angle. The transducer supplied with the Z-9500GPS has a 20 degree cone angle. Typically, wide cone angle transducers are ideal for operating in shallow to medium water depths. The wide cone angle allows you to see more of the underwater world. For example, in 15 feet of water the 20 degree cone covers an area about six feet across. The 8 degree transducer covers only about a two foot circle.

For 192 kHz users, the 20 degree transducer is almost always the best to use in fresh water, the 8 degree mostly in salt water. In a deep water environment, (300 feet - fresh water, 100 feet - salt water) the narrow cone angle is more desirable. Since the sound energy is concentrated in a smaller area, it can penetrate to much deeper depths.

TURN AUTOMATIC/DIGITAL SONAR ON/OFF

Your Z-9500GPS is actually two sonar units in one housing. The graph portion graphically displays all echoes from the underwater world on the screen. The digital sonar displays numbers on the screen to show the depth of the bottom. It is an extremely complex and accurate device using the latest in software technology to eliminate false echoes and show only the true bottom depth.

However, any digital sonar can be fooled. This typically occurs in very shallow water. The reason this happens is shown on the two charts below. First look at the chart on the left. The sonar signal penetrates the surface clutter, hits the bottom and returns. There's a clear difference between the surface clutter and the bottom. The digital has no problem with these conditions.



Problems occur when the surface clutter extends to the bottom as shown on the right. The digital sonar cannot distinguish between surface clutter and the bottom and so it becomes "lost." It may flash the last known bottom depth or it may lock onto an unrealistic depth such as 900 feet in a lake that only gets 60 feet deep at its deepest point. If the unit is in automatic, the auto-ranging feature may change the range to an extremely deep depth, such as 0 to 600 feet. This compresses the information on the display, making it difficult to read.

The Z-9500GPS is versatile enough to handle these situations. If it shows these symptoms in shallow water, press the MENU key. Next, press the key next to the More label 2 times. Now press the key adjacent to the Digital Sonar label. Now press the key adjacent to the "Digital Sonar" label. Now press the key adjacent to the "Dig. Sonar Off" label. The screen will clear and the Z-9500GPS will display sonar information again. You may need to change the range to 0-10 or 0-20 feet. If there is a lot of "clutter"

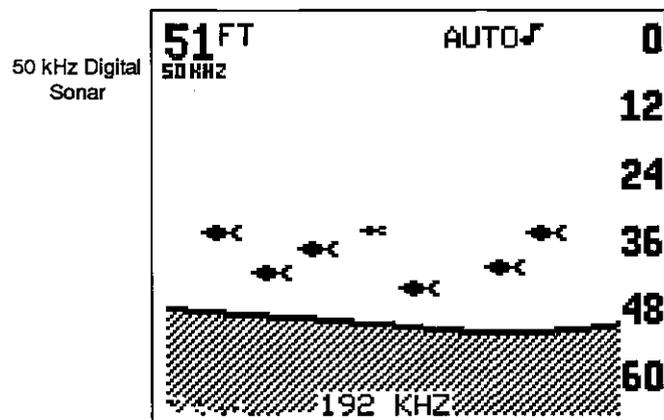
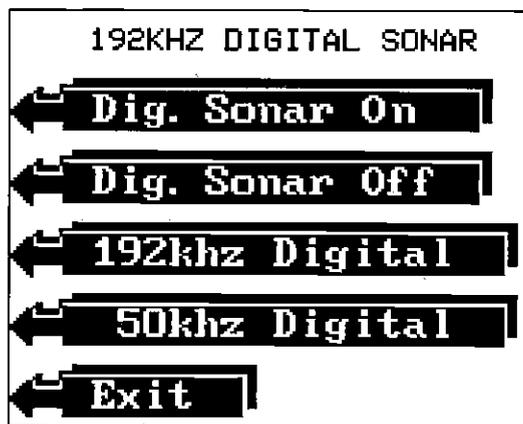
or random echoes on the screen, turn the sensitivity down until a definite bottom echo is seen. Use the unit in this manner until you move into deeper water. Once you're in deeper water, the digital and automatic features can be turned back on by pressing the exact same keys that turned them off. When you get to the last menu page, press the key adjacent to the Digital Sonar label. Now press the key adjacent to the desired digital sonar frequency and the digital will start working again.

TIP: An easier way to turn the digital and automatic functions back on again is to simply press the AUTO key.

DIGITAL SONAR FREQUENCY SELECT

The Z-9500GPS's digital has the capability of using the 192 kHz or 50 kHz frequency. Please note that the frequency used by the digital can be different than that used by the chart. Changing the digital's frequency doesn't affect the chart's frequency at all. When the unit is turned on for the first time or preset, the 192 kHz frequency is used for the digital. The 50 kHz frequency's biggest advantage is its superior depth penetration. With a good transducer installation and favorable water conditions, the 50 kHz digital can reach depths greater than 2000 feet in fresh or salt water. Of course, to use the 50 kHz digital, you must have a 50 kHz transducer installed and connected to the Z-9500GPS.

To change the digital sonar frequency, press the menu key, then press the key adjacent to the 'More' label two times. The menu below appears. Now press the key adjacent to the "Digital Sonar" label. The menu shown above appears. Now press the key adjacent to the desired frequency.



When the 50 kHz digital is in use, the words "50 kHz" appear immediately beneath the digital bottom depth. To turn the digital sonar off, or back on again, simply press the key adjacent to the "Turn Sonar On" or "Turn Sonar Off" labels. Note: This only turns the digital sonar off, not the chart.

MEMORY - PRESET

The Z-9500GPS saves all settings such as sensitivity, chart speed, alarm settings, and more in battery-backed-up memory. This memory is retained even if power is disconnected from the unit. If you need to return the unit to the factory settings, use the Preset function.

IMPORTANT!

Preset returns all GPS settings to zero. The GPS will have to be re-initialized after a Preset!

