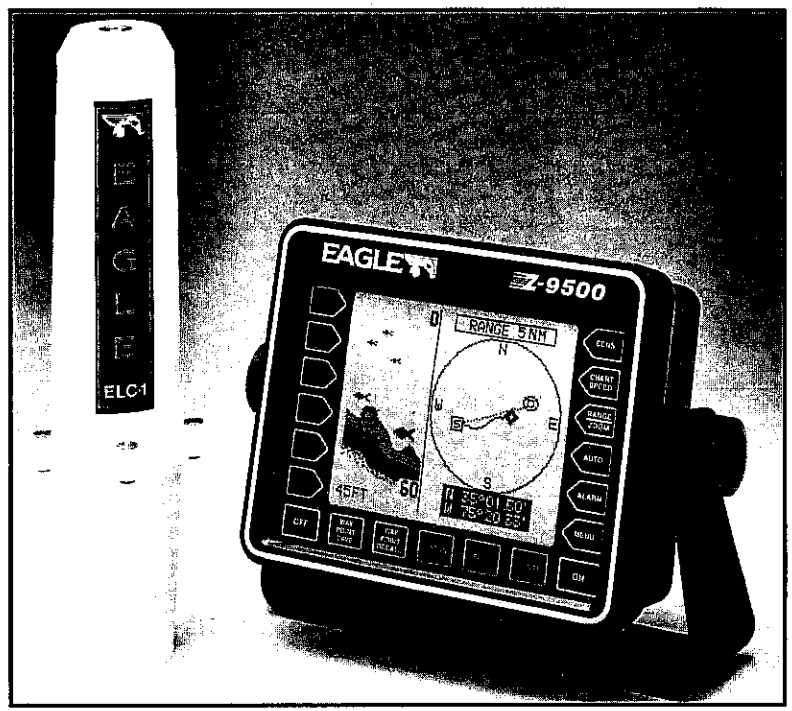


Z-9500

INSTALLATION/OPERATION MANUAL

EAGLE™

LITHO IN U.S.A.

988-0119-26

WARNING!

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

CAUTION

This loran receiver, (like all loran 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!

MAKE CERTAIN THE LORAN IS DISPLAYING THE CORRECT POSITION IN *LATITUDE/LONGITUDE* COORDINATES BEFORE NAVIGATING WITH THIS UNIT. THE POSITION MUST BE CORRECT FOR THE NAVIGATION FEATURES TO WORK PROPERLY.

Features and specifications subject to change without notice.

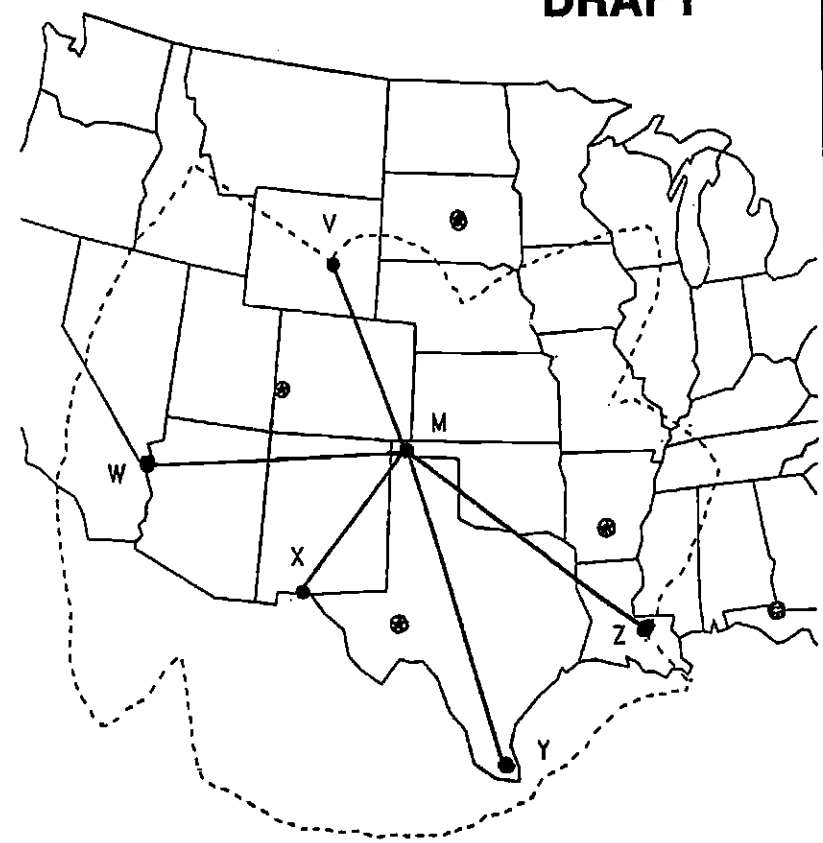
All display screens in this manual are simulated.

LORAN-C

SOUTH CENTRAL U.S. CHAIN (SOCUS)

GRI 9610

DRAFT



LEGEND:

- TRANSMITTER
- CONTROL
- MONITOR

Approximate Limits of Coverage -- 1:3 SNR and 1/4 NM Fix Accuracy (95% 2 dRMS), Noise 53 db

- **M** BOISE CITY, OK
- **V** GILLETTE, WY
- **W** SEARCHLIGHT, NV
- **X** LAS CRUCES, NM
- **Y** RAYMONDVILLE, TX
- **Z** GRANGEVILLE, LA

Note: This is an "Unofficial-Preliminary Coverage Diagram". Coverage was computed using conservative estimates of station range limits, atmospheric noise, and grid geometry.

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LORAN-C

NORTH CENTRAL U.S. CHAIN (NOCUS)

GRI 8290

DRAFT

Approximate Limits of Coverage -- 1:3 SNR and
1/4 NM Fix Accuracy (95% 2 dRMS), Noise 53 db

M HAVRE, MT
W BAUDETTE, MN
X GILLETTE, WY
Y WILLIAMS LAKE, BC

Note: This is an "Unofficial-Preliminary Coverage Diagram". Coverage was computed using conservative estimates of station range limits, atmospheric noise, and grid geometry.

INTRODUCTION

The Z-9500 represents one of the best values in sportfishing sonar today. It rivals other combination sonar/loran units costing much more in features and performance. The Z-9500 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-9500 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.

MOUNTING - DISPLAY UNIT

Install the Z-9500 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

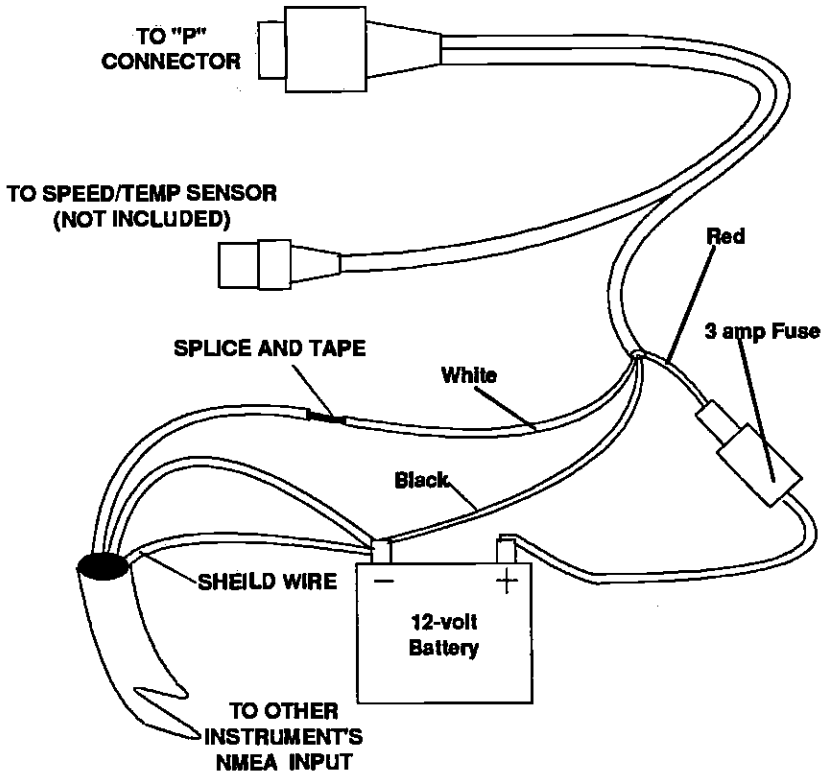
The Z-9500 works from a twelve-volt battery system only. You can attach the power cable to an accessory or power buss, however if you have problems with electrical interference, then attach the power cable directly to the battery. If the cable is not long enough, splice #18 gauge wire onto it.

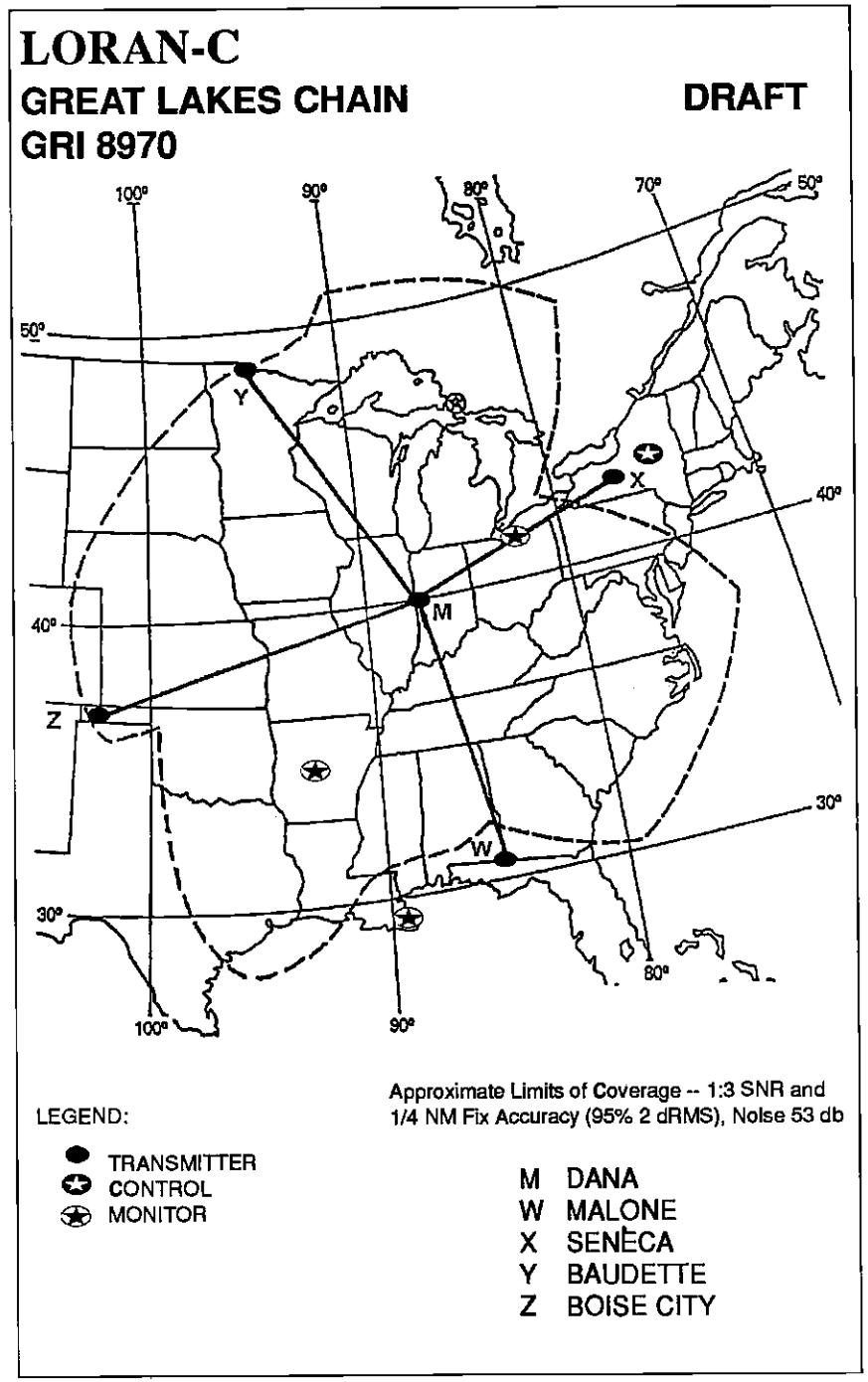
*Requires optional ST-T Speed/Temperature sensor.

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-9500 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-9500's NMEA output, attach a shielded, twisted pair cable from the autopilot's NMEA intput to the white wire on the Z-9500's power cable. Solder the ground conductor of the twisted pair and the shield to the black wire on the power cable. Do not connect the shield to the autopilot. See the other device's manual for more wiring instructions.

The ELC-1 supplied with the Z-9500 has an external ground lug. This is useful if you have noise problems or if you're in an area with low signals. See page 103 for wiring instructions.





Note: This is an "Unofficial-Preliminary Coverage Diagram". Coverage was computed using conservative estimates of station range limits, atmospheric noise, and grid geometry.

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

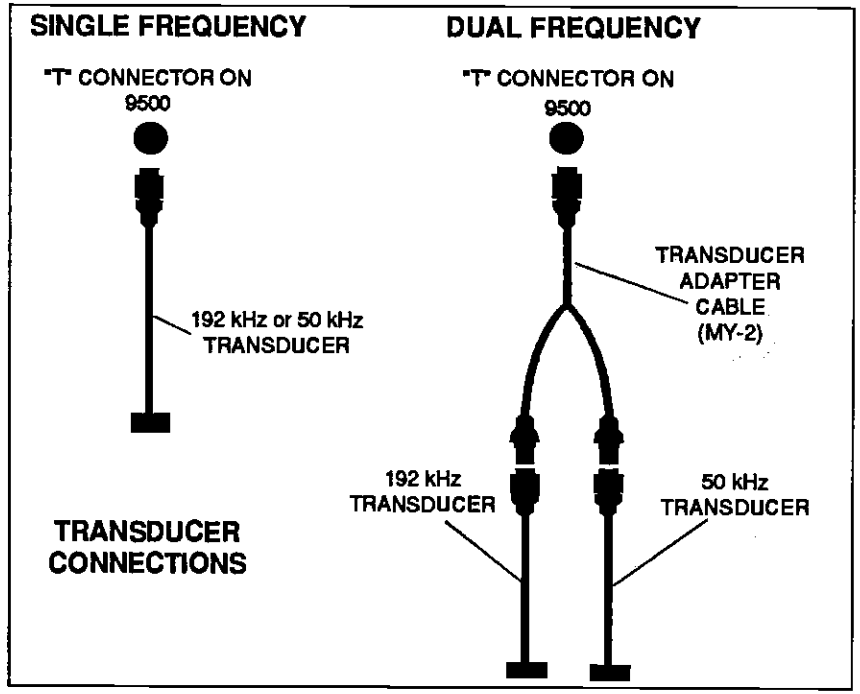
TRANSDUCER CONNECTIONS

The Z-9500 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-9500. 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 separtately.

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, loran 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-9500's 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 sonar's 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-9500 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.

INSTALLATION - ELC-1 Loran-C MODULE

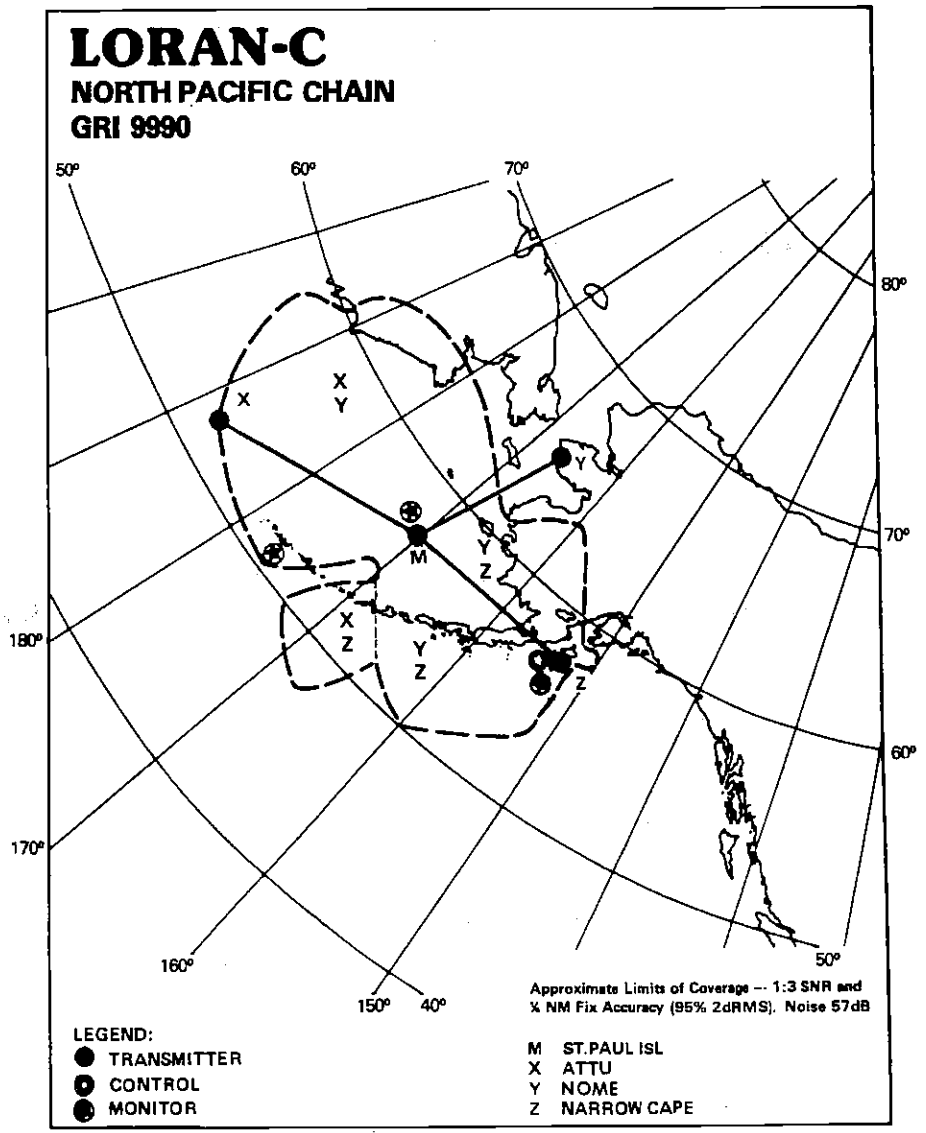
When choosing a mounting location, remember to install the ELC-1 where it's clear of other antennas, wires, masts, or other obstructions. A high location is preferred, however for lightning protection, the antenna shouldn't be the highest part of the boat. The antenna should be mounted vertically. Make certain it is as far away as possible from VHF radio antennas.

Improper performance can also occur if the antenna is mounted too close to metal objects such as tuna towers. Again, a location that places the Loran assembly in the clear is preferable to one that is high and obstructed.

You must purchase an eight foot stainless steel or fiberglass whip antenna. The threads are standard 3/8"-24 for the whip. A ratchet mount base is most commonly used to mount the Loran to the boat. The base mounting threads are conventional 1"-14 machine thread (NOT pipe thread). This allows the use of standard antenna mounting hardware. Tighten all hardware securely.

The cable supplied with the ELC-1 is thirty feet long. Do not cut the cable if it's too long. Instead, coil and store it out of the way. An extension cable is available if the cable is too short. Ask your dealer or call your local service center or the Eagle Factory Customer Service department for more information.

The ELC-1 can be attached to a swivel bracket or hollow extension mast, if desired.



NORTH PACIFIC LORAN-C CHAIN GR1 9990
REGIONAL MANAGER COMMANDER. PACIFIC AREA. ALAMEDA, CA
CHAIN MANAGER: COMMANDER. 17TH COAST GUARD DISTRICT. JUNEAU, AK
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORMONSTA KODIAK, AK
CONTROL SITE: LORMONSTA KODIAK, AK

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	ST. PAUL AK	57 09 12.3N 170 15 06.8W		AN/FPN-42	325	625 FT MONOPOLE	0.0	
XRAY	ATTU AK	52 49 44.0N 173 10 49.0E	11000/ 3875.25	AN/FPN-42	325	625 FT MONOPOLE	0.0	
YANKEE	PORT CLARENCE AK	65 14 40.3N 166 53 12.6W	29000/ 3068.95	AN/FPN-42	1000	1350 FT MONOPOLE	+0.6	
ZULU	NARROW CAPE, AK	57 26 20.2N 152 22 11.3W	43000/ 3590.45	AN/FPN-44A	400	625 FT MONOPOLE	0.0	DUAL RATE W/GRI7960

KEYBOARD

The keyboard has keys arranged in two vertical columns. The keys in the left column are used for loran 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 loran 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.

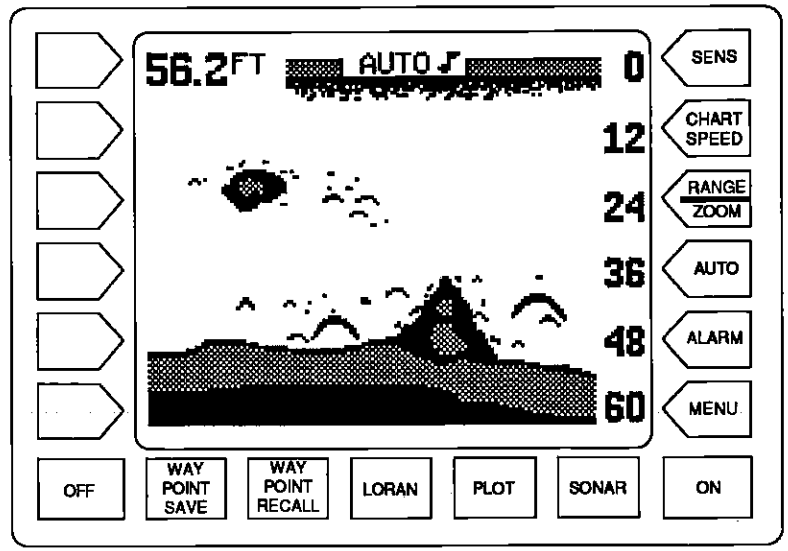
ZOOM - Press this key to adjust the sonar's zoom and bottom track features.

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-9500 on.

LORAN - The LORAN key switches the unit to loran operation.



PLOT - This enables the loran's plotter function.

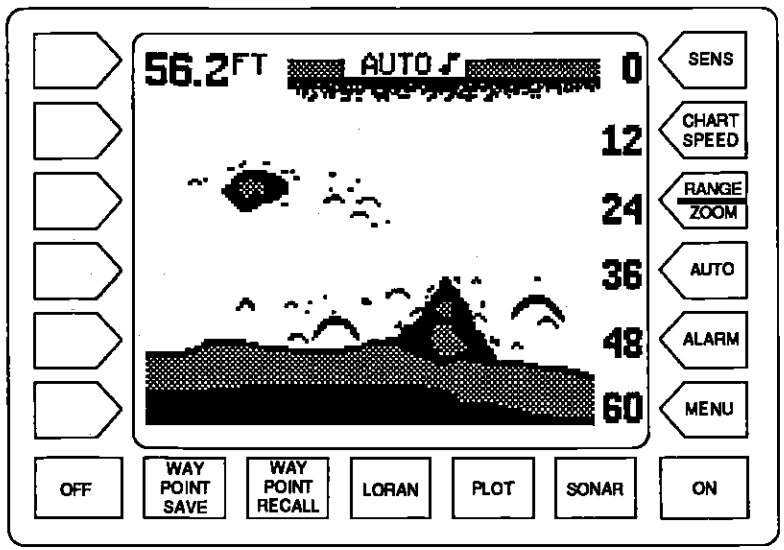
WAYPOINT SAVE - This feature gives you more waypoint saving options.

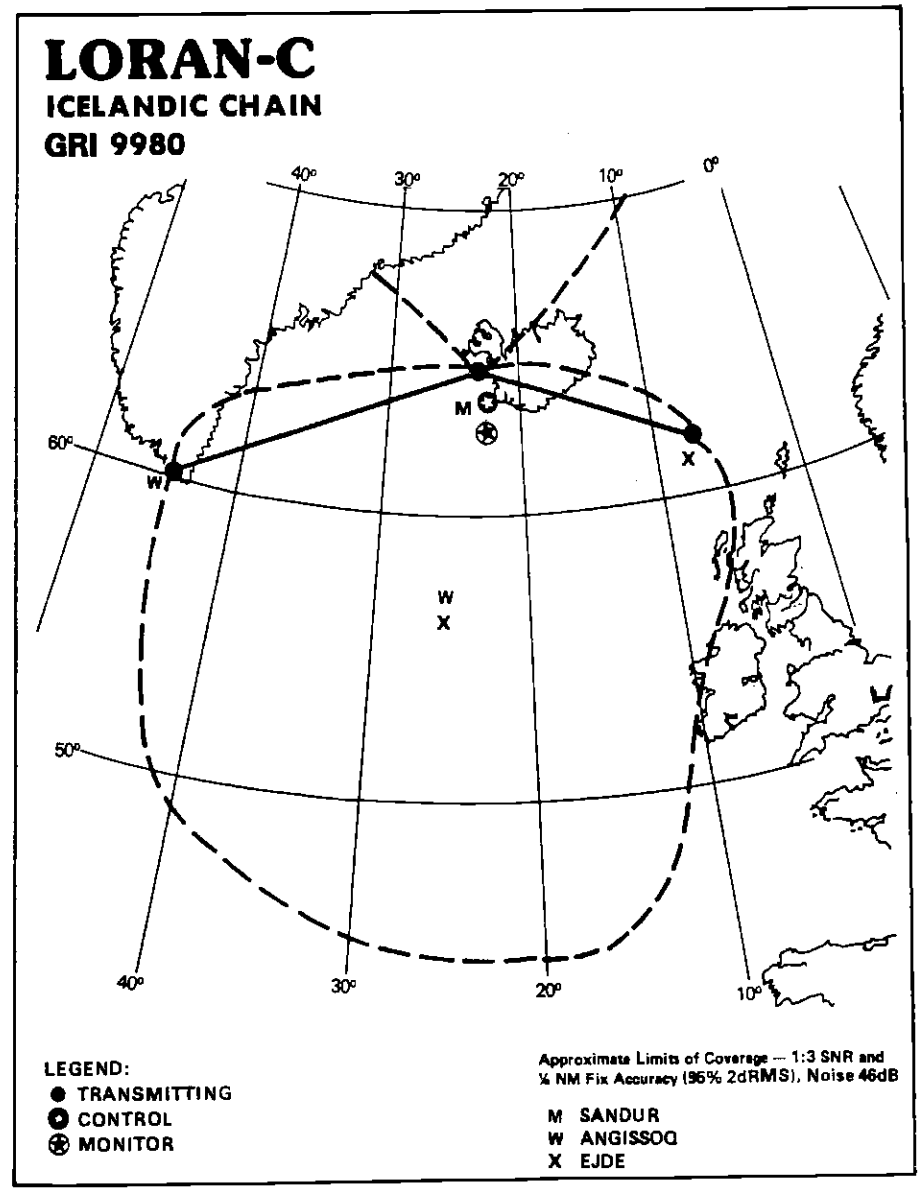
WAYPOINT RECALL - This key is used to recall waypoints from memory.

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

DISPLAY - General

The lights are turned on for approximately ten seconds when the Z-9500 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. The menu will also disappear after ten seconds, or you can turn it off by pressing the key adjacent to the CLEAR label at the bottom of the screen.





ICELANDIC LORAN-C CHAIN GR1 9980
REGIONAL MANAGER, COMMANDER COAST GUARD ACTIVITIES EUROPE, LONDON, UK
CHAIN MANAGER COMMANDER COAST GUARD ACTIVITIES EUROPE, LONDON, UK
COORDINATOR OF CHAIN OPERATIONS LOCATION LORMONSTA KEFLAVLK, ICELAND
CONTROL SITE: LORMONSTA KEFLAVIK, ICELAND

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	SANDUR ICELAND	64 54 26.6N 23 55 21.8W		AN/FPN-45	1500	1350FT MONOPOLE	0.0	
WHISKEY	ANGISSOO GREENLAND	59 59 17.2N 45 16 27.5W	11000/ 4068.03	AN/FPN-45 MONOPOLE	750	625 FT	+1.0	DUAL RATE W/GRI7930
XRAY	EJDE FAEROE IS..DENMARK	62 17 59.6N 07 04 26.5W	30000/ 2944.54	AN/FPN-44 MONOPOLE	325	625 FT	0.0	DUAL RATE GRI7970

When the Z-9500 is first turned on, the display will appear similar to the one on the previous page. The digital bottom depth is displayed in the upper left comer 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-9500 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.

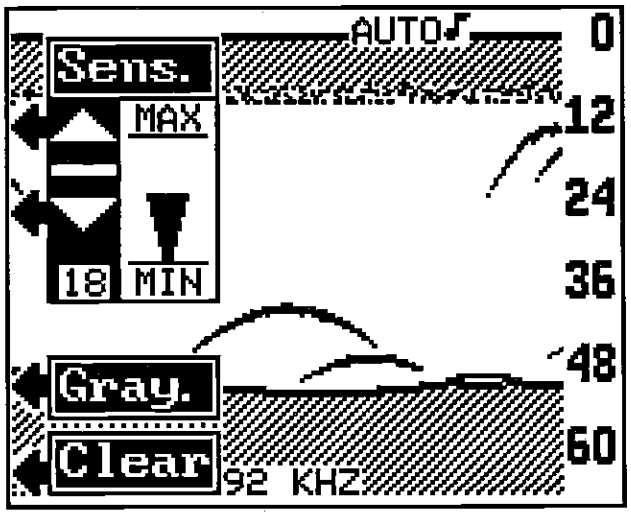
SENSITIVITY

The sensitivity key on the Z-9500 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-9500 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. (See the screen at the top of the next page.)



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.

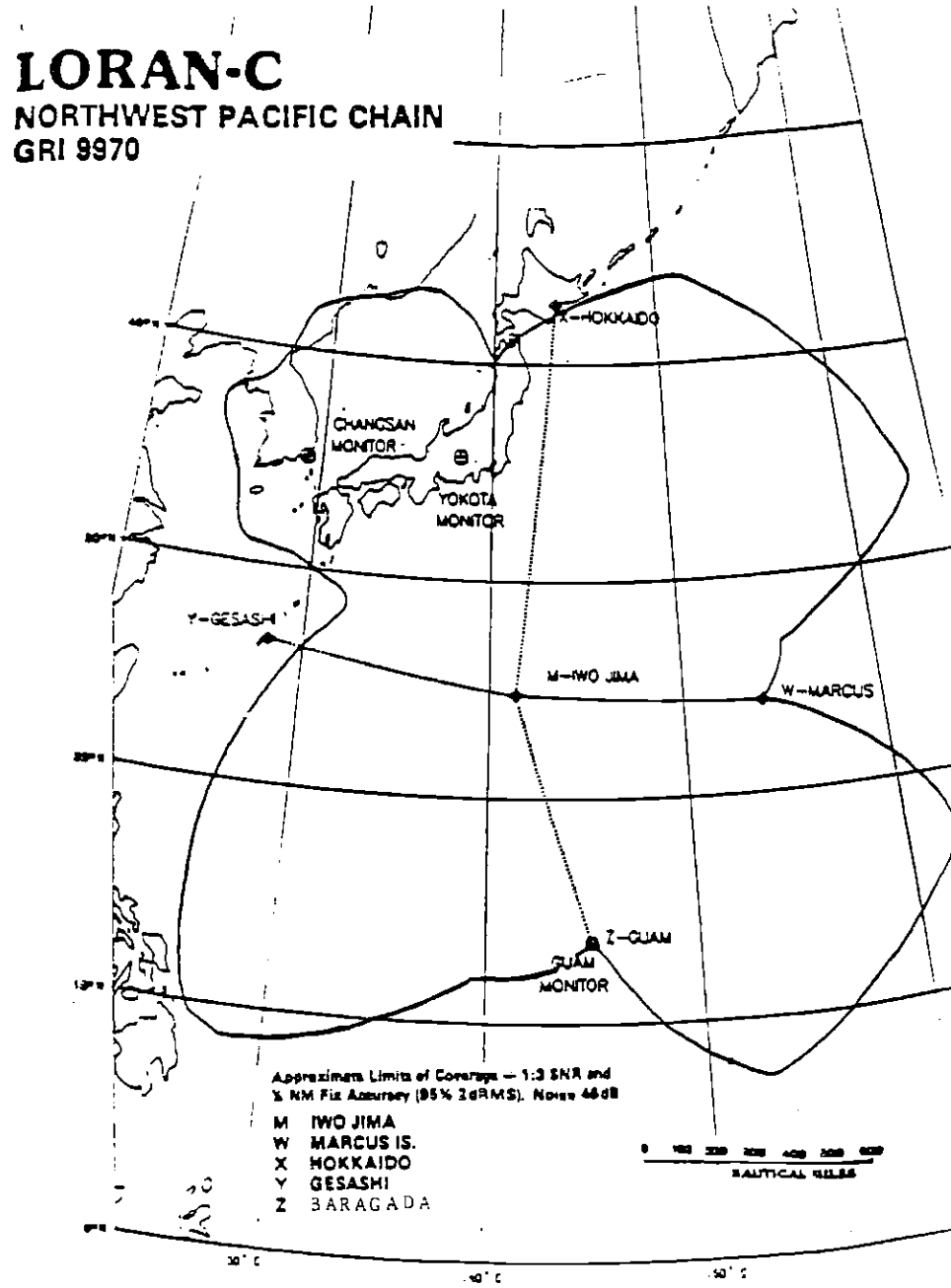
To decrease the sensitivity level, press the key adjacent to the down arrow. The bar graph and the number will decrease. When the sensitivity is at the desired level, release the key.

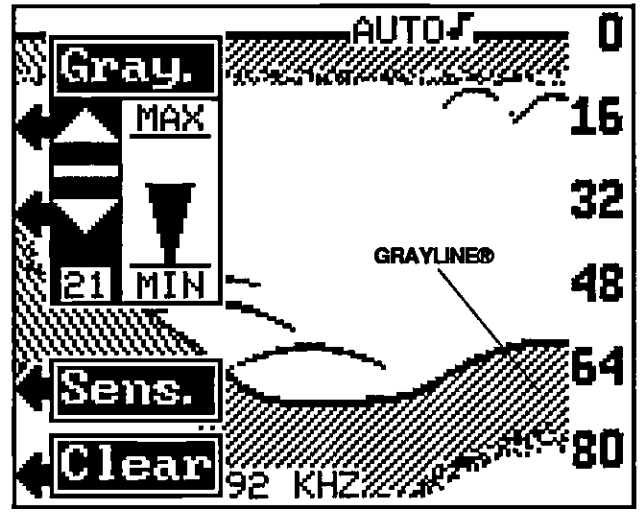
When you reach either the maximum or minimum limit, the speaker will sound an alert tone.

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

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





NORTHWEST PACIFIC LORAN-C CHAIN GR1 9970
REGIONAL MANAGER COMMANDER. PACIFIC AREA, ALAMEDA, CA.
CHAIN MANAGER COMMANDER, 14TH COAST GUARD DISTRICT, HONOLULU, HI
COORDINATOR OF CHAIN OPERATIONS LOCATION. COMMANDER, FAR EAST SECTION. YOKOTA, JAPAN
CONTROL SITE LORMONSTA YOKOTA, JAPAN

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	IWOJIMA JAPAN	24 46 03.6N 141 19 30.3E		AN/FPN-45	1615	1350 FT MONOPOLE	0.0	
WHISKEY	MARCUS ISLAND JAPAN	24 17 07.9N 153 58 53.2E	11000/ 4283.98	AN/FPN-45	2160	1350 FT MONOPOLE	0.0	
XRAY	HOKKAIDO JAPAN	42 44 37.1N 143 43 09.2E	30000/ 6685.17	AN/FPN-45	600	625 FT MONOPOLE	0.0	DUAL RATE W/GRI5970
YANKEE	GESASHI JAPAN	26 36 25.0N 128 08 56.4E	55000/ 4463.29	AN/FPN-45	600	625 FT MONOPOLE	0.0	DUAL RATE W/GRI5970
ZULU	BARRIGADA	13 27 50.1N 144 49 33.0E	2536.84/ 81000			750 FT		

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.

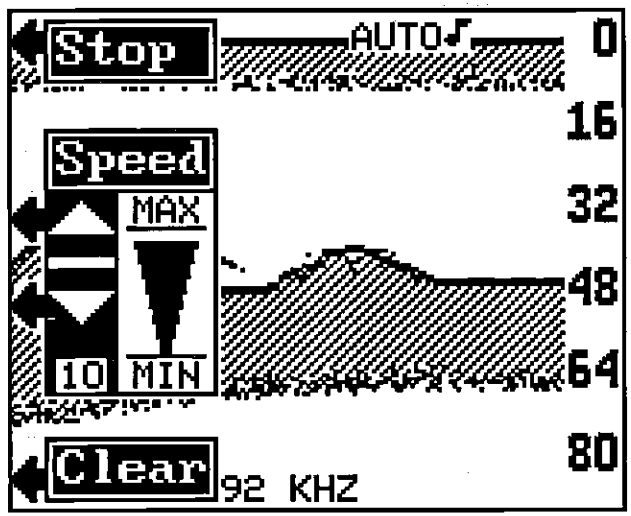
GRAYLINE is adjustable. Since GRAYLINE shows the difference between strong and weak signals, adjusting Sensitivity may require a different GRAYLINE level, also. The level chosen by the Z-9500 at power on is usually adequate for most conditions. Experiment with your unit to find the GRAYLINE setting that's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

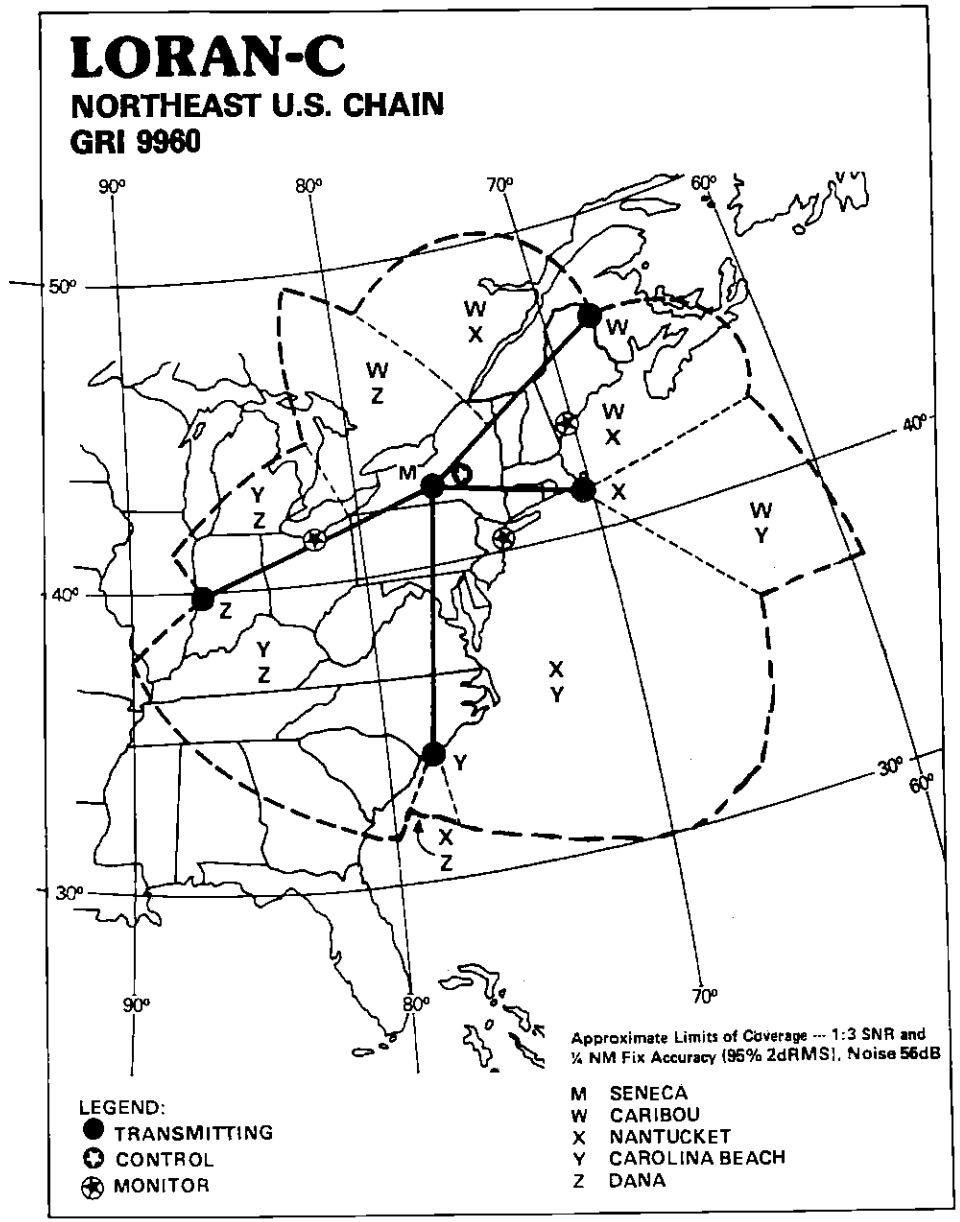
Stop the chart by pressing the key adjacent to the STOP label. When the chart is stopped, the word STOP appears at the top center portion of the screen and the STOP label changes to START. The chart can be started again by pressing the key adjacent to the START label.



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

RANGE - Automatic

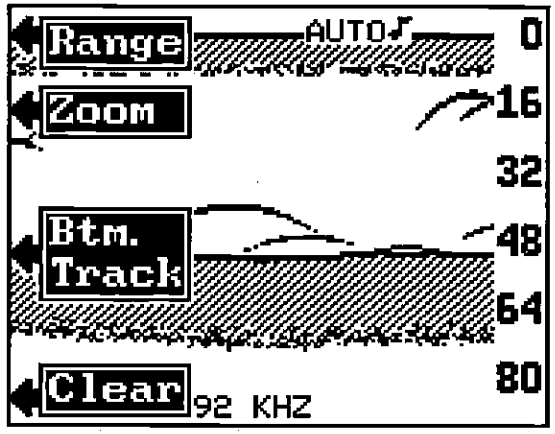
When turned on for the first time, the Z-9500 automatically places the bottom signal in the lower portion of the screen. This is called Auto Ranging and is part of the automatic function. The range can be changed while the unit is in automatic. However, if the bottom depth goes higher or lower than a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



NORTHEAST U.S. LORAN-C CHAIN GRI 9960
REGIONAL MANAGER COMMANDER, ATLANTIC AREA. NEW YORK, NY
CHAIN MANAGER COMMANDER, ATLANTIC AREA, NEW YORK, NY
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORSTA SENECA, NY
CONTROL SITE: LORSTA SENECA, NY

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	SENECA, NY	42 42 50.6N 76 49 33.9W		AN/FPN-64 (56 HCG'S)	800	700 FT MONOPOLE	0.0	DUAL RATE W/GRI8970
WHISKEY	CARIBOU, ME	46 45 27.2N 67 55 37.7W	11000/ 2797.20	AN/FPN-42	350	SLT	0.0	DUAL RATE W/GRI5930
XRAY	NANTUCKET MA	41 15 11.9N 69 58 39.1W	25000/ 1969.93	AN/FPN-42	325	625 FT MONOPOLE	0.0	DUAL RATE W/GRI5930
YANKEE	CAROLINA BEACH, NC	34 03 46.1N 77 54 46.7W	39000/ 3221.64	AN/FPN-42	550	TIP	0.0	DUAL RATE W/GRI7960
ZULU	DANA IN	39 51 07.5N 87 29 12.1W	54000/ 3162.06	AN/FPN-44	400	625 FT MONOPOLE	-0.5	DUAL RATE W/GRI8970

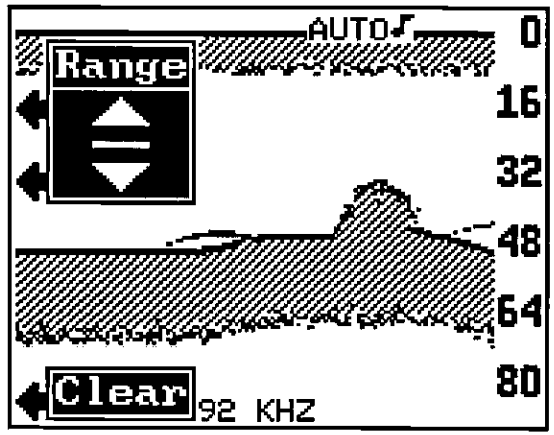
To change the range while the unit is in automatic, press the RANGE/ ZOOM key. The screen shown below appears. Next, press the key adjacent to the "Range" label.



The screen shown below appears. Now press the key adjacent to the up arrow to 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-9500 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% when the automatic feature is on.

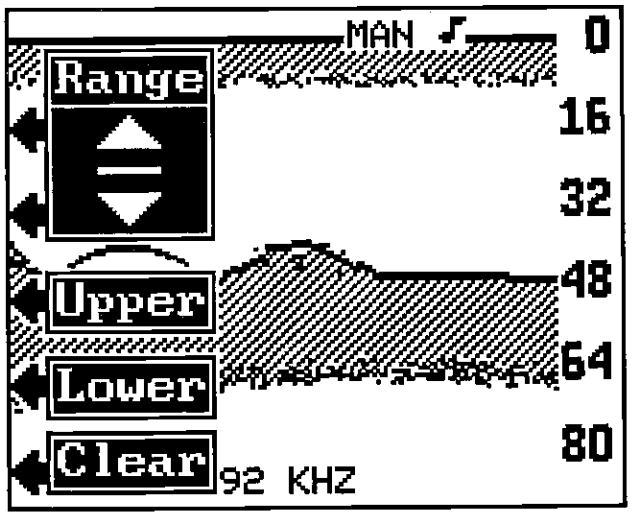
Press a key adjacent to these arrows to change the range.



RANGE - Manual

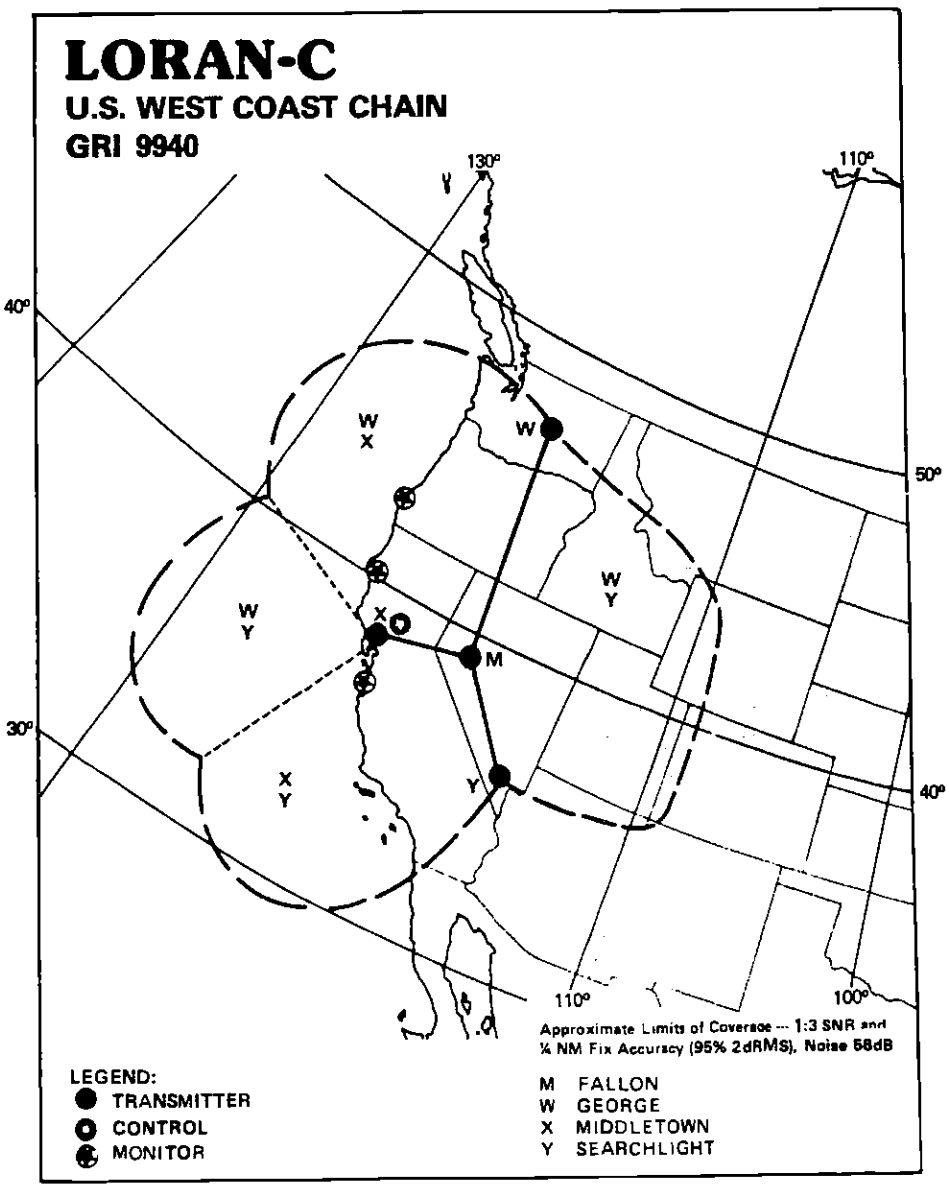
The Z-9500 gives you more control over the range when it's in the manual mode. Both the lower and the upper limit are adjustable.

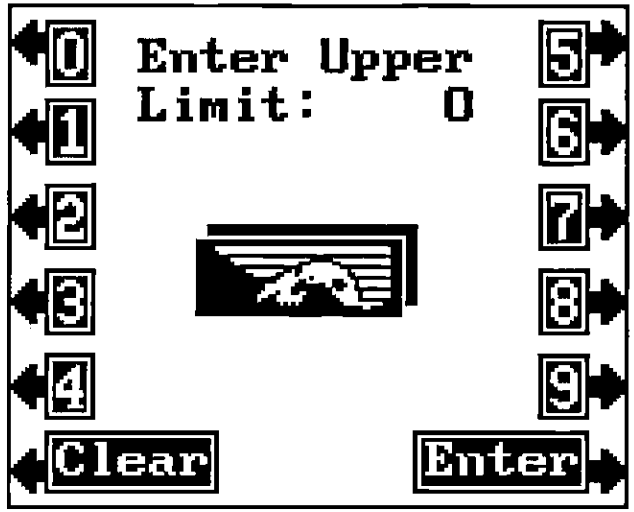
To change the range, first make certain the Z-9500 is in the manual mode. If necessary, press the AUTO key to switch to the manual mode. Next, press the RANGE/ZOOM key. Finally, press the key adjacent to the "Range" label. The screen shown below appears. Now you have a choice. You can press a key corresponding 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.



Press the key next to the UPPER label to adjust upper limit.
Press the key next to the LOWER label to adjust the lower limit.

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.





U.S. WEST COAST LORAN-C CHAIN GR1 9940
REGIONAL MANAGER COMMANDER. PACIFIC AREA, ALAMEDA, CA
CHAIN MANAGER COMMANDER. PACIFIC AREA, ALAMEDA, CA
COORDINATOR OF CHAIN OPERATIONS LOCATION LORSTA MIDDLETOWN, CA
CONTROL SITE: LORSTA MIDDLETOWN, CA

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	FALLON, NV	39 33 06.6N 118 49 56.4W		AN/FPN-44A	400	625 FT MONOPOLE	+1.0	
WHISKEY	GEORGE, WA	47 03 46.0N 119 44 39.5W	11000/ 2796.90	AN/FPN-45	1600	SLT	+0.5	DUAL RATE W/GR15990
XRAY	MIDDLETOWN CA.	38 46 57.0N 122 29 44.5W	27000/ 1094.50	AN/FPN-44A MONOPOLE	400	625 FT	+0.5	
YANKEE	SEARCHLIGHT NV.	35 19 18.2N 114 48 17.4W	40000/ 1967.30	AN/FPN-44	540	SLT	0.0	

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-9500 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.

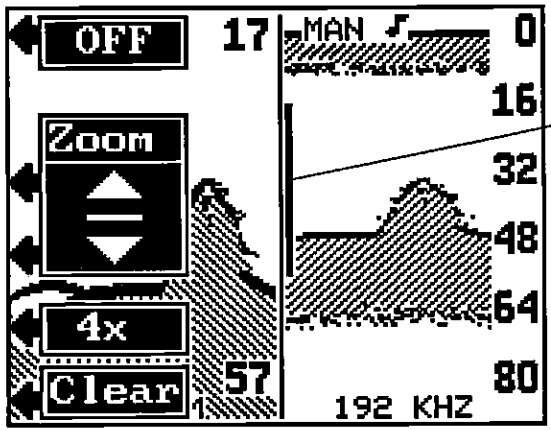
ZOOM

Enlarging or "zooming" the picture is a common method used to show small detail and fish signals. The Z-9500 gives you several different, flexible ways to zoom a screen. The zoom feature works the same in both manual and automatic modes.

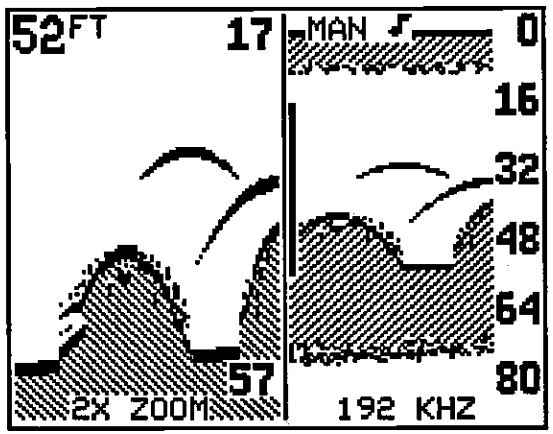
The first method used to zoom is to press the RANGE/ZOOM key, then press the key adjacent to the "Zoom" label. The screen instantly splits into two sections. The left side shows a zoomed image of a portion of

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.

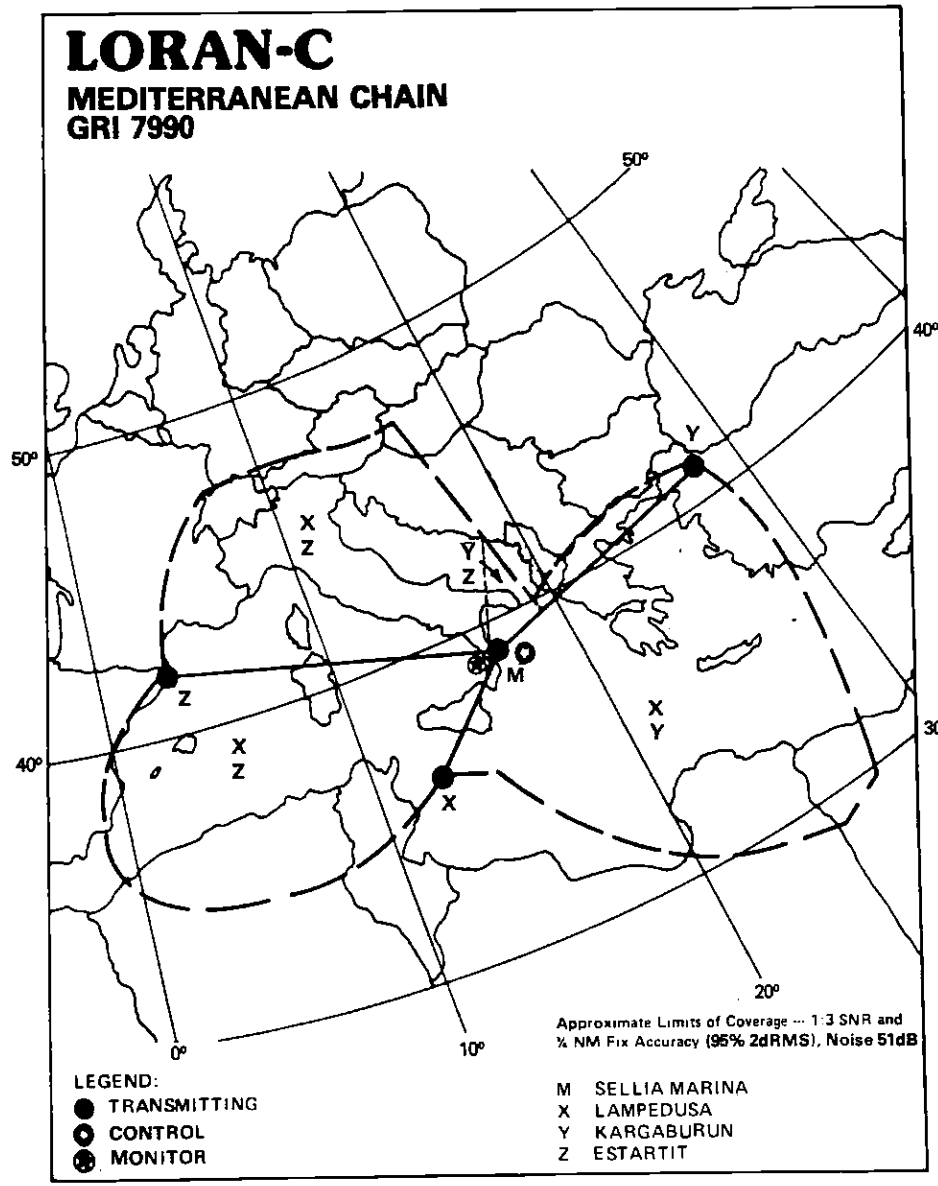
The menu labeled "4X" zooms the screen on the left four times larger than the one on the right. The "OFF" label turns the zoom function off. The split screen disappears when zoom is turned off.



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



2X SPLIT SCREEN ZOOM - MANUAL MODE



MEDITERRANEAN SEA LORAN-C CHAIN GRI 7990
REGIONAL MANAGER COMMANDER, COAST GUARD ACTIVITIES EUROPE, LONDON, UK
CHAN MANAGER COMMANDER. COAST GUARD ACTIVITIES EUROPE, LONDON, UK
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORSTA SELLIA MARINA, ITALY
CONTROL SITE: LORSTA SELLIA MARINA, ITALY

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	SELLIA MARINA,ITALY	38 52 20.6N 16 43 05.2E		AN/FPN-39	165	625 FT MONOPOLE	0.0	
XRAY	LAMPEDUSA ITALY	35 31 20.8N 12 31 30.2E	11000/ 1755.98	ATLS	325	625 FT MONOPOLE	0.0	
YANKEE	KARGABURUN TURKEY	40 58 21.0N 27 52 01.5E	29000/ 3273.29	AN/FPN-39	165	625 FT MONOPOLE	0.0	
ZULU	ESTAPTIT SPAIN	42 03 36.5N 03 12 15.5E	47000/ 3999.74	AN/FPN-39	165	625 FT MONOPOLE	0.0	

The second zoom method lets you shift the zoom window bar in one-foot increments. Again, press the RANGE/ZOOM key, then press the key next to the "Zoom" label. The screen shown on the opposite page appears. Now press the key next to the up arrow in the "Zoom" box. This shifts the zoom window on the left side of the screen up one foot. In other words, if the zoom is from 17 to 57 feet, pressing the key next to the up arrow will change the zoom window to 16 to 56 feet. You'll also see the zoom window bar move up slightly in the center of the screens. Press the key next to the down arrow to move the zoom window down. The bar in the center of the screen shows you the area that is displayed on the left side of the screen. When you have the zoom window at the desired depth, press the key next to the "Clear" label to erase the menus.

ZOOM - BOTTOM TRACK

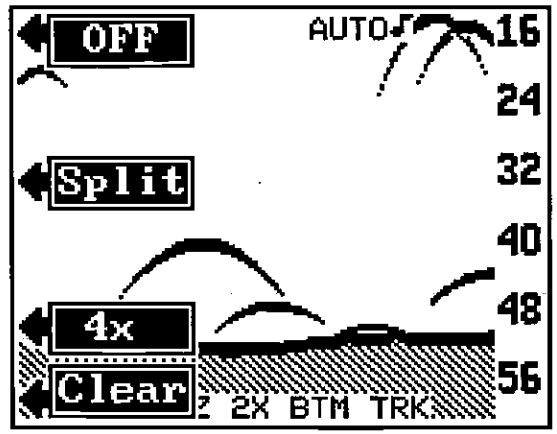
This feature zooms all echoes and tracks the bottom signal at the same time. It can be used in the split screen, full screen, 2X or 4X modes, and in automatic or manual.

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

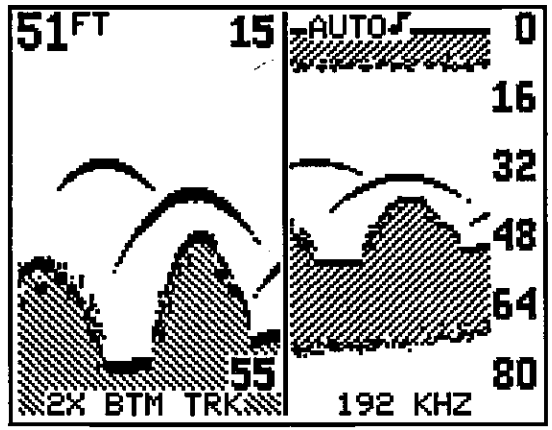
4x This key changes the zoom from twice normal size to four times normal size. Simply press the key and the zoom size changes immediately.

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

2X BOTTOM TRACK



2X SPLIT SCREEN BOTTOM TRACK



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.

CLEAR. Press this key to erase the menus.

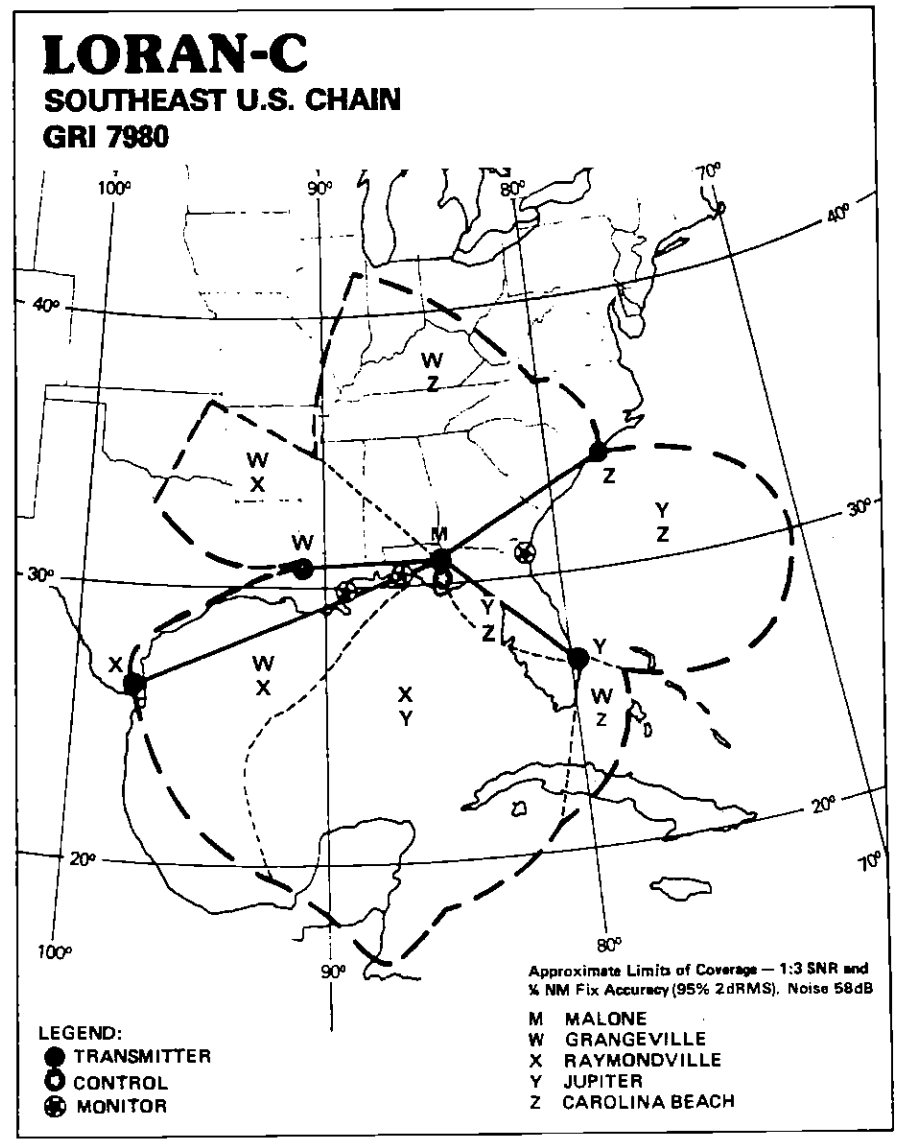
SONAR ALARMS

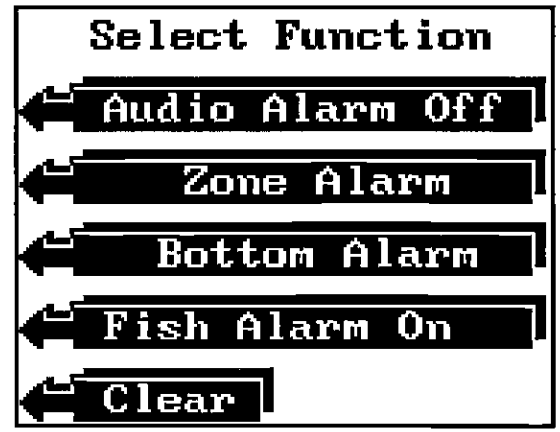
The Z-9500 has three different sonar alarms. The Zone Alarm consists of a bar that appears on the screen. Any echo that appears inside this bar triggers the alarm. Another alarm is the Bottom Alarm. Only the bottom signal will "trip" this alarm. This is useful as an anchor watch, a shallow water alert, 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 ALARM key. The screen shown at the top of the next page appears. Now press the key next to the Zone Alarm label. The screen at the bottom 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.



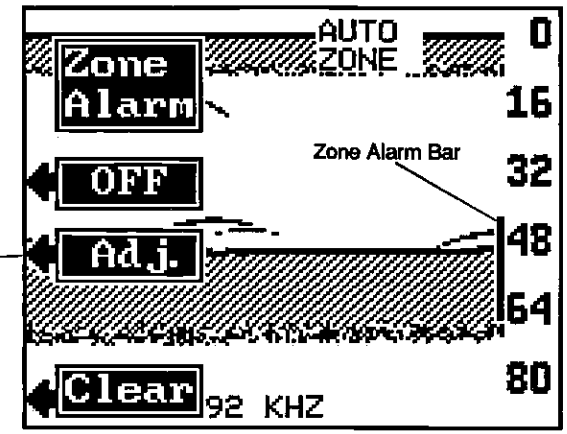


SOUTHEAST U.S. LORAN-C CHAIN FR1 7980
REGIONAL MANAGER COMMANDER. ATLANTIC AREA. NEW YORK, NY
CHAIN MANAGER COMMANDER. ATLANTIC AREA. NEW YORK, NY
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORSTA MALONE, FL
CONTROL SITE: LORSTA MALONE, FL

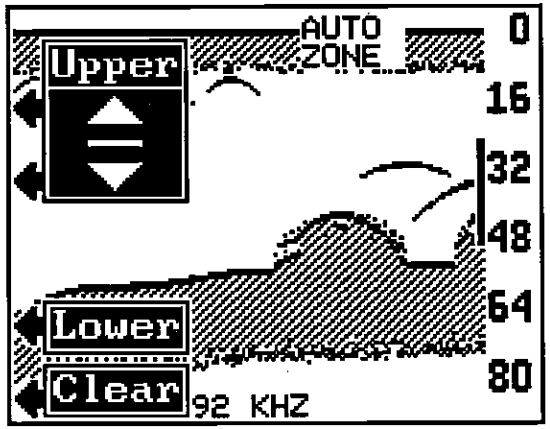
DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	MALONE, FL	30 59 38.7N 85 10 09.3W		AN/FPN-64 (56 HCG'S)	800	700 FT MONOPOLE	0.0	DUAL RATE W/GRI 8970
WHISKEY	GRANGEVILLE LA	30 43 33.0N 90 49 43.6W	11000/ 1809.54	AN/FPN-64 (56 HCG'S)	800	700 FT MONOPOLE	-0.5	
XRAY	RAYMOND-VILLE, TX	26 31 55.0N 97 50 00.1W	23000/ 4443.38	AN/FPN-64 (32 HCG'S)	400	700 FT MONOPOLE	0.0	
YANKEE	JUPITER, FL	27 01 58.4N 80 06 53.4W	43000/ 2201.89	AN/FPN-42	325	625 FT MONOPOLE	0.0	
ZULU	CAROLINA BEACH, NC	34 03 46.1N 77 54 46.7W	59000/ 2542.73	AN/FPN-42	550	TIP	0.0	DUAL RATE W/GRI9960

To adjust the zone alarm bar, first press the key next to the Adj. label. The menus shown at the top 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 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 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.



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

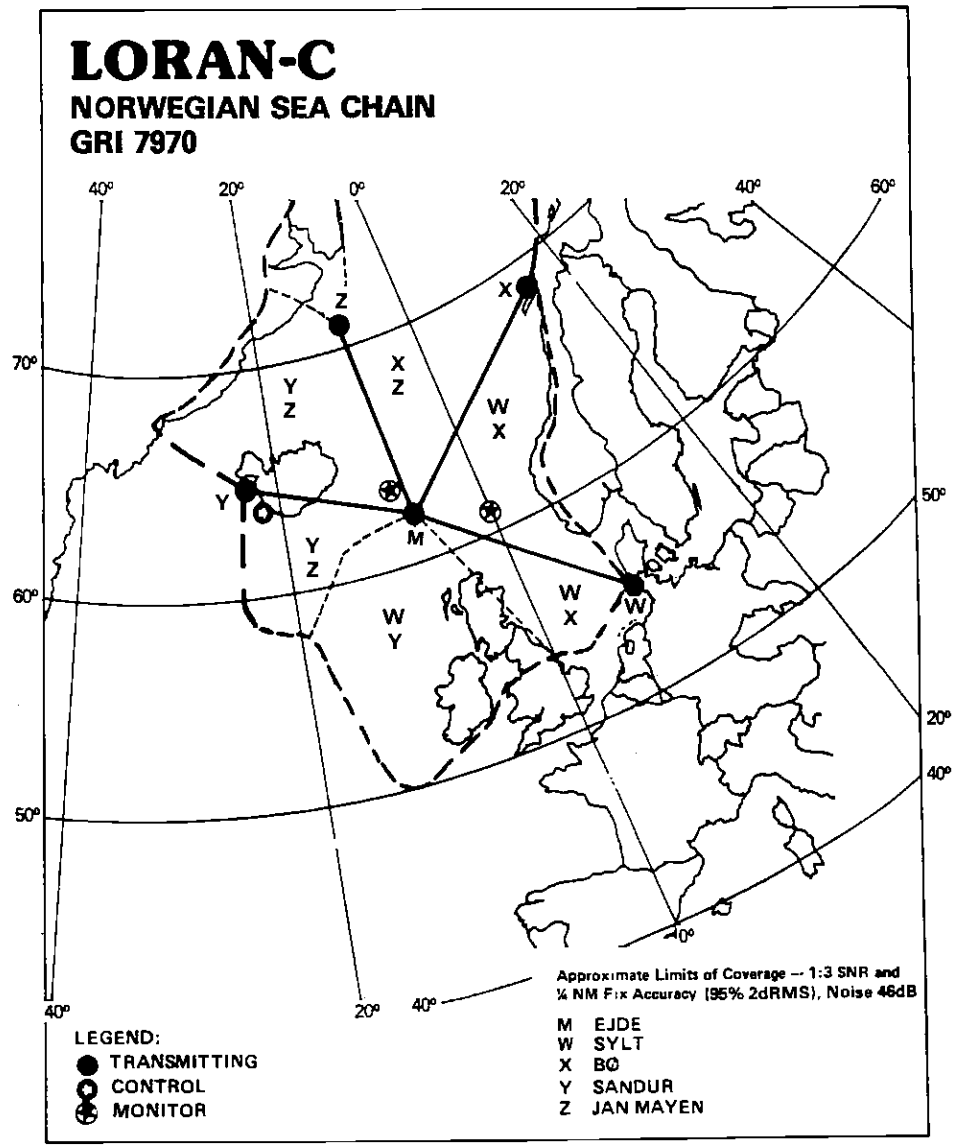
NOTE: The Zone Alarm will not operate and is not available when the Z-9500 is in the Full Screen Bottom Track mode, but it can be used in the Split Screen mode. To use the Zone Alarm in the Split Screen Bottom Track mode, first enable the Split Screen Bottom Track, then turn the zone alarm on.

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.

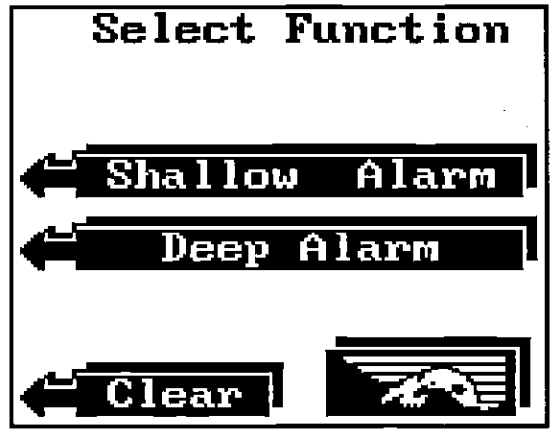
The shallow and deep alarms adjust identically, although through different menus.

To turn the Bottom Alarm on, first press the ALARM key. Next, press the key adjacent to the "Bottom Alarm" label. The screen shown at the top of the next page 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



NORWEGIAN SEA LORAN-C CHAIN GRI 7970
REGIONAL MANAGER. COMMANDER, COAST GUARD ACTIVITIES EUROPE, LONDON, UK
CHAIN MANAGER COMMANDER, COAST GUARD ACTIVITIES EUROPE, LOND, UK
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORAN-C DETAIL KEFLAVIK, ICELAND
CONTROL SITE: LORMONSTA DEFIAVIK, ICELAND

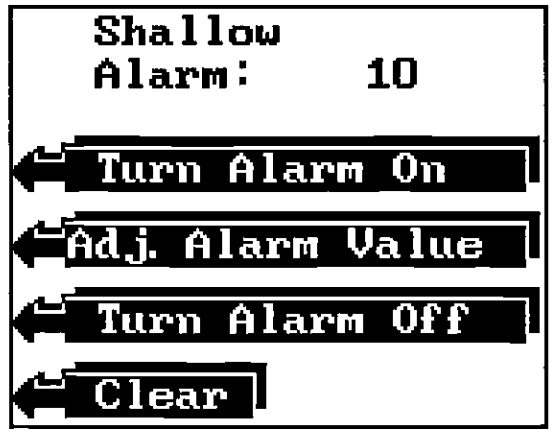
DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	EJDE,FAEROE IS..DENMARK	62 17 59.6N 07 04 26.5W		AN/FPN-44	325	625 FT MONOPOLE	0.0	DUAL RATE W/GRI7930
XRAY	BO,NORWAY	68 38 06.2N 14 27 47.0E	11000/ 4046.10	AN/FPN-39	165	625 FT MONOPOLE	0.0	
WHISKEY	SYLT GERMANY	54 48 29.9N 08 17 36.3E	26000/ 4065.62	AN/FPN-42	325	625 FT MONOPOLE	0.0	
YANKEE	SANDUR ICELAND	64 54 26.6N 23 55 21.8W	46000/ 2944.54	AN/FPN-45	1500	1350FT MONOPOLE	0.0	DUAL RATE W/GRI7930
ZULU	JAN MAYEN NORWAY	70 54 52.7W 08 43 58.7W	60000/ 3216.31	AN/FPN-39	165	625 FT MONOPOLE	0.0	



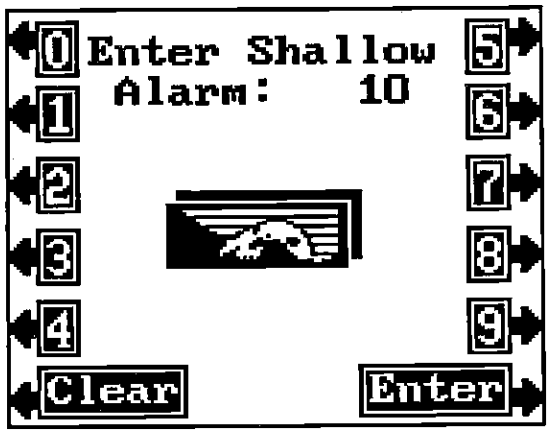
Shallow Alarm label was pressed. The screen shown at the top of the next page appears. The current shallow alarm setting is displayed at the top of the screen.

To set the shallow alarm press the key adjacent to the "Adj. Alarm Value" label. The screen shown at the top 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 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.



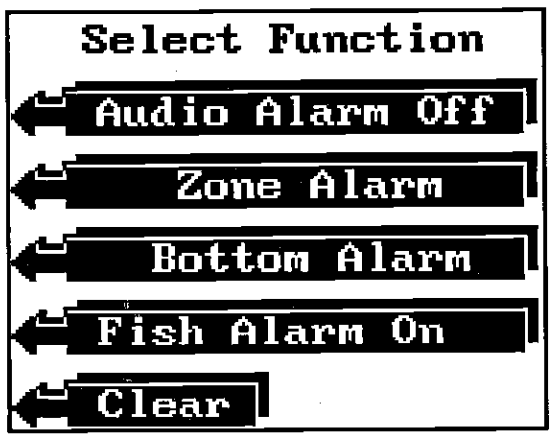
SHALLOW ALARM DEPTH ENTRY MENU

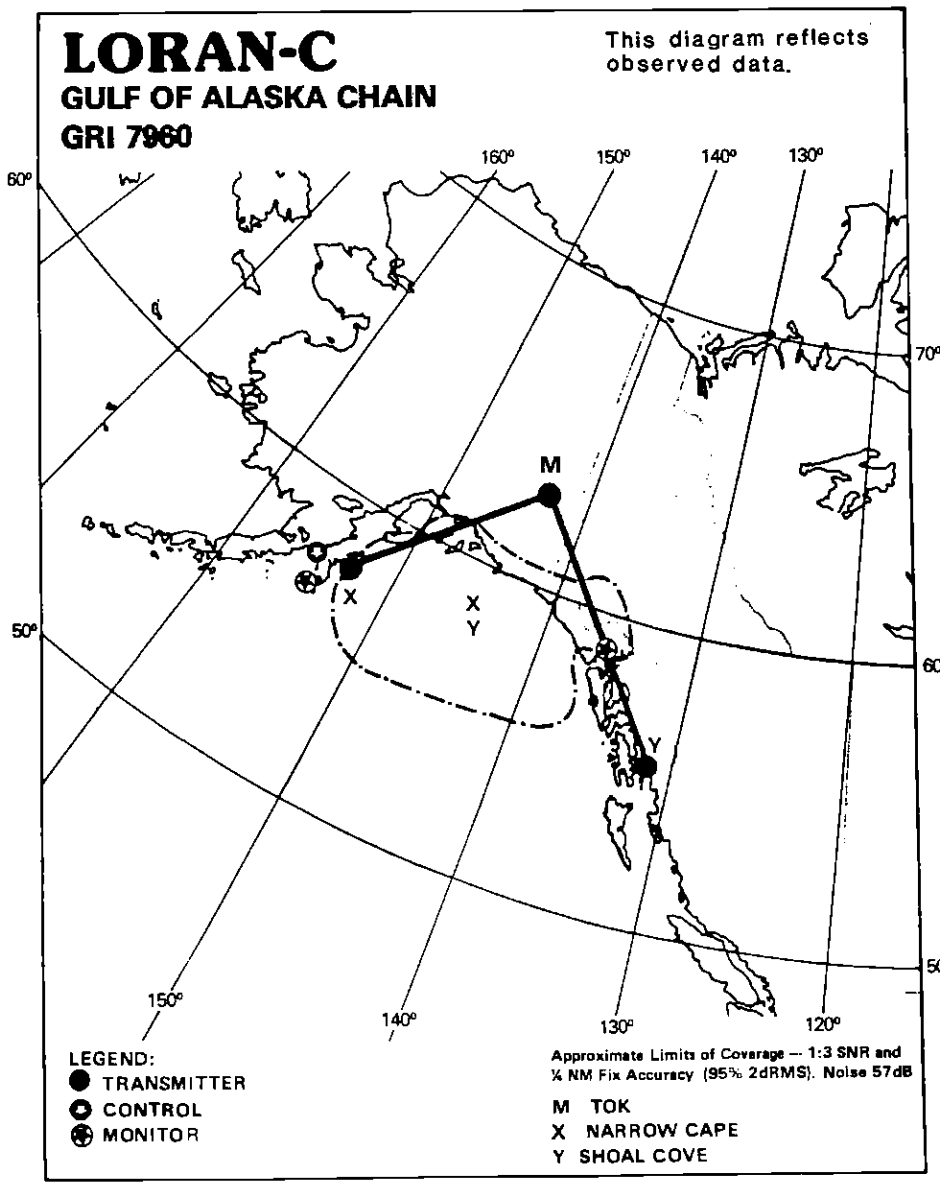


FISH ALARM

To use the Fish Alarm, first make certain the Fish ID feature is on. Now press the ALARM key. Next, press the key adjacent to the "Fish Alarm On" label. This enables the Fish Alarm. Every time the Z-9500 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.





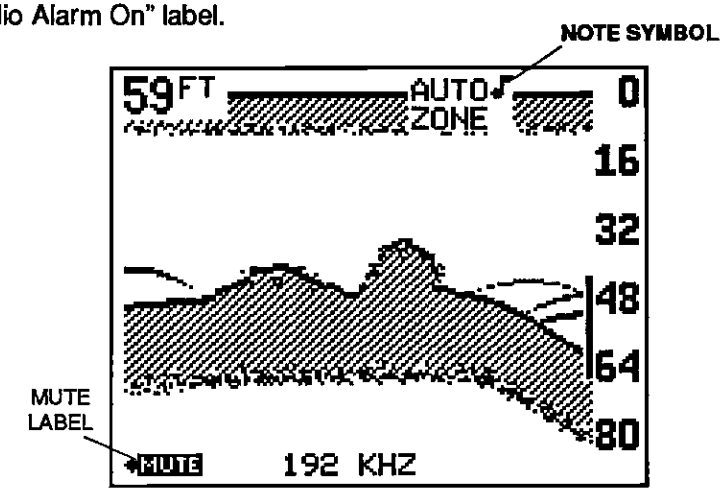
GULF OF ALASKA LORAN-C CHAIN GR1 7960
REGIONAL MANGER COMMANDER. PACIFIC AREA. ALAMEDA, CA
CHAIN MANAGER: COMMANDER 17TH COAST GUARD DISTRICT. JUNEAU, AK
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORMONSTA KODIAK, AK
CONTROL SITE: LORMONSTA KODIAK, AK

DESIG.	STATION	COOR.	CD/SLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	TOK AK	63 19 42.6N 142 48 31.9W		AN/FPN-44A	540	SLT	+1.0	
XRAY	NARROW CAPE, AK	57 26 20.2N 152 22 11.3W	11000/ 2804.45	AN/FPN-44A	400	625 FT MONOPOLE	0.0	DUAL RATE W/GRI9990
YANKEE	SHOAL COVE AK	55 26 20.9N 131 15 19.6W	26000/ 3651.14	AN/FPN-44A	540	SLT	0.0	DUAL RATE W/GRI5990

Audio Alarm On/Off

When the Z-9500 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

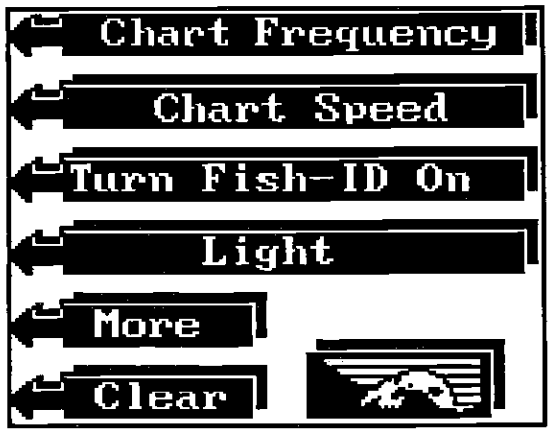
When any sonar or loran alarm sounds (except the Fish Alarm), the 'Mute' label appears at the bottom of the screen. Pressing the key adjacent to this label silences the alarm until it is triggered again.

MENU

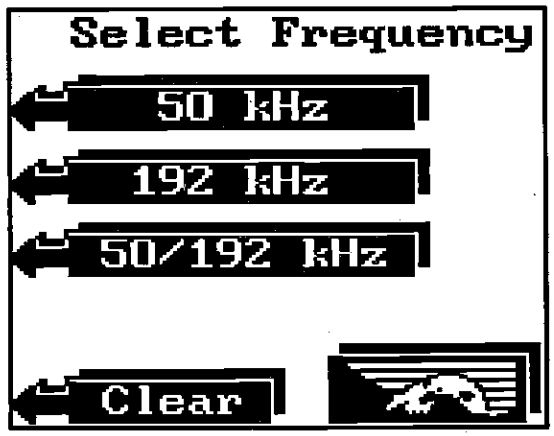
The Z-9500 uses menus extensively to guide you through the functions and features of the unit. The MENU key accesses many of these features, allowing you to customize the unit to your particular needs and water conditions. Although you may have to leave one menu and enter another to reach the desired 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.

CHART FREQUENCY

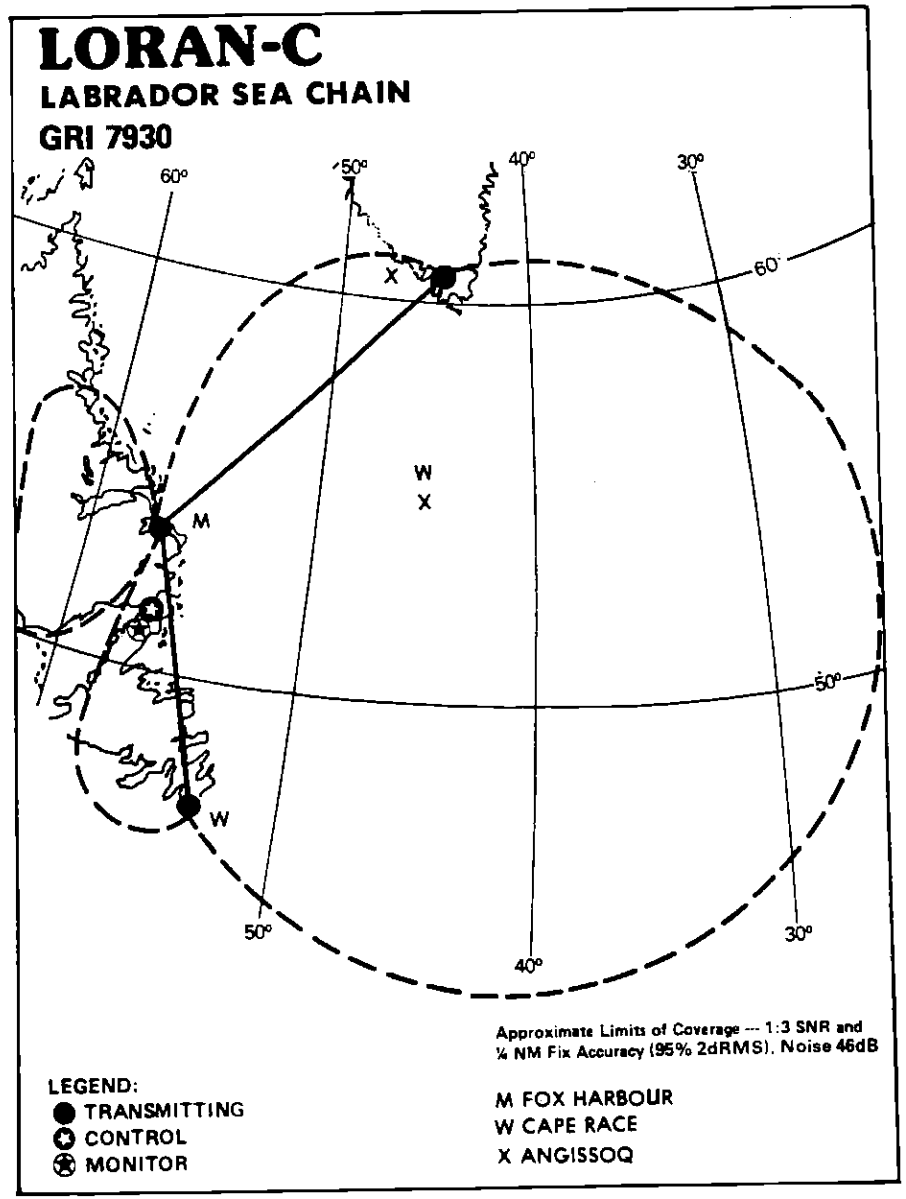
The Z-9500 operates from 50 or 192 kHz, either independently or simultaneously. The sonar unit comes with a 192 kHz transducer, other optional transducers are available. See the transducer diagram on page 3 for single or dual transducer connections. The chart can operate from a different frequency than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



The Z-9500 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.



LABRADOR SEA LORAN-C CHAIN GRI 7930
REGIONAL MANAGER COMMANDER ATLANTIC AREA NEW YORK, NY
CHAIN MANAGER COMMANDER, ATLANTIC AREA, NEW YORK, NY
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORMONSTA ST. ANTHONY, NEWFOUNDLAND, CANADA
CONTROL SITE: LORMONSTA ST. ANTHONY, NEWFOUNDLAND

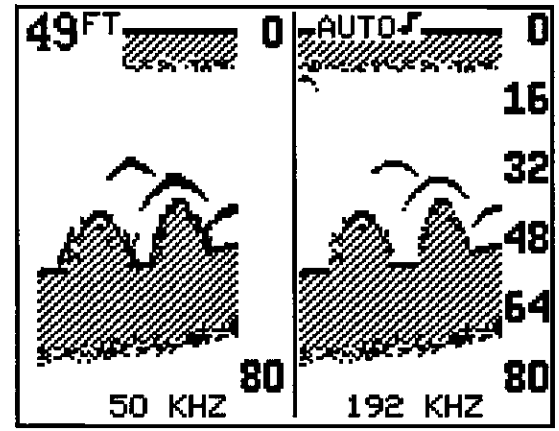
DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	FOX HARBOUR NFLD, CANANDA	52 22 35.2N 55 42 28.4W		AN/FPN-64 (56 HCG'S)	800	700 FT MONOPOLE	0.0	DUAL RATE W/GRI5930
WHISKEY	CAPE RACE NFLD. CANADA	46 46 32.2N 53 10 28.2W	11000/ 2167.31	AN/FPN-45	1500	1350 FT MONOPOLE	0.0	DUAL RATE W/GRI5930
XRAY	ANGISSOQ GREENLAND	59 59 17.3N 45 10 27.5W	26000/ 3585.39	AN/FPN-45	750	625 FT MONOPOLE	0.0	DUAL RATE W/GRI9960

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-9500 is turned on for the first time. For more information about the digital sonar frequency, please read the "Digital Sonar" section.

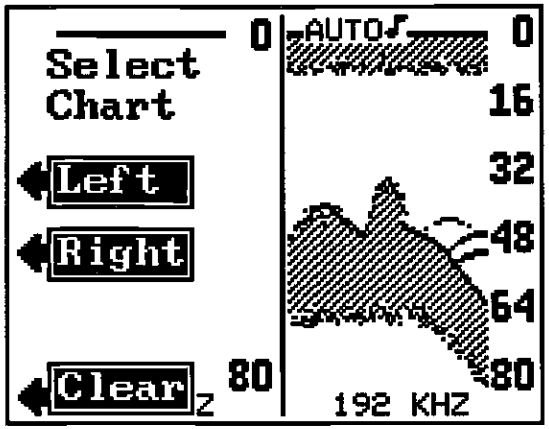
CHART DUAL FREQUENCY OPERATION

The Bottom Track and Zoom features are not available when the Z-9500 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.



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

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 at the top of the next 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.



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.

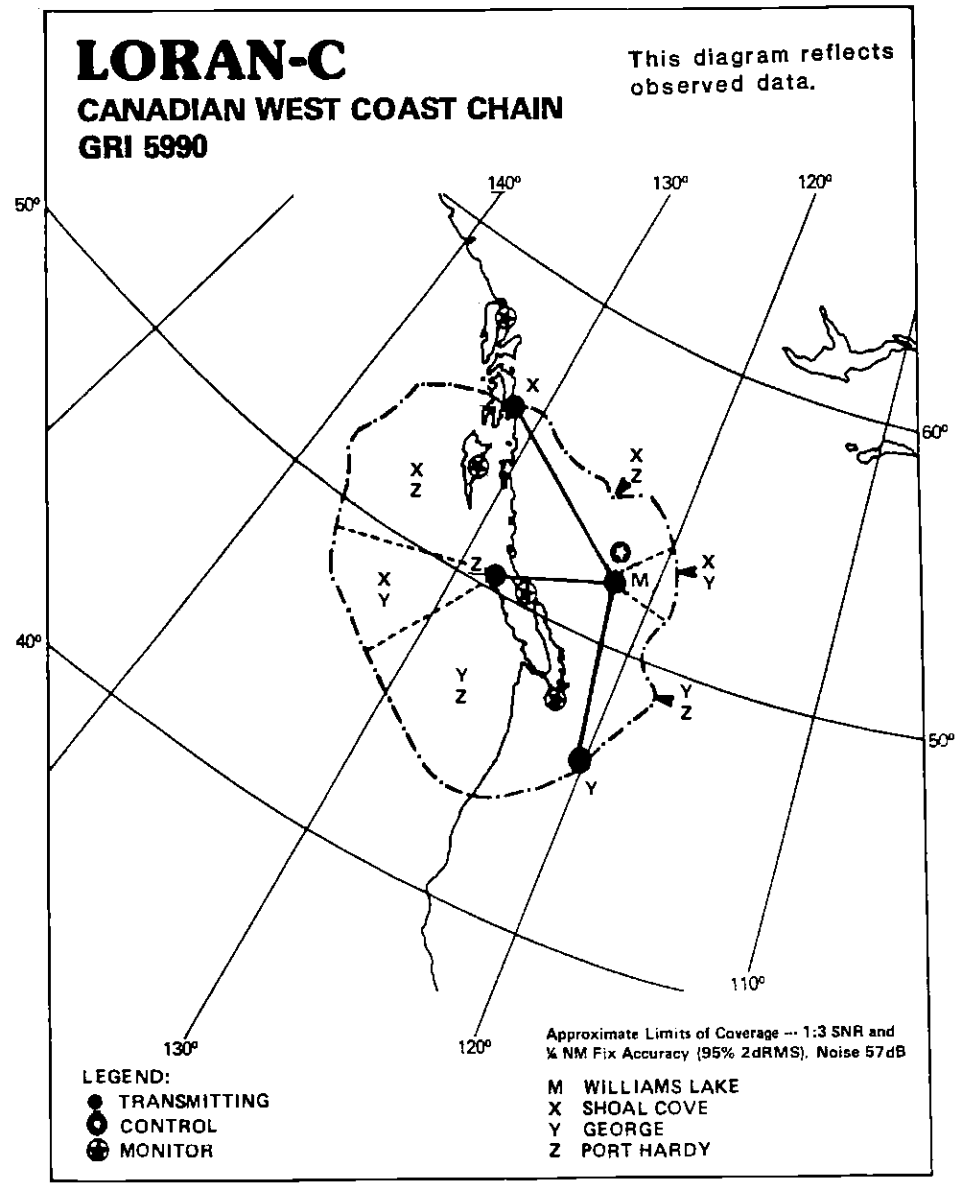
SURFACE CLARITY CONTROL (SCC)

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.

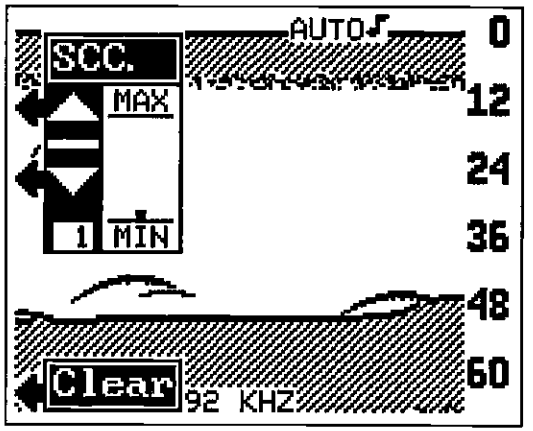
NOTE: SCC is available only when the Fish ID feature is off. The SCC menu doesn't appear when the Fish ID feature is on.

There are 10 levels of SCC available on the Z-9500. 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.



CANADIAN WEST COAST LORAN-C CHAIN GR1 5990
REGIONAL MANAGER COMMANDER, PACIFIC AREA, ALAMEDA, CA
CHAIN MANAGER COMMANDER, PACIFIC AREA, ALAMEDA, CA
COORDINATOR OF CHAIN OPERATIONS LOCATION: LORSTA MIDDLETOWN, CA
CONTROL SITE: LORSTA WILLIAMS LAKE, BC, CANADA

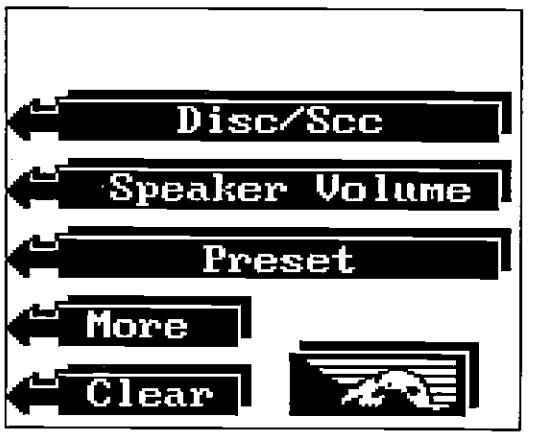
DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	WILLIAMS LAKE, BC, CANADA	51 57 58.8N 122 22 02.2W		AN/FPN-44A	400	625 FT MONOPOLE	+ 1.0	
XRAY	SHOAL COVE AK	55 25 29.9N 131 15 19.7W	11000/ 2343.60	AN/FPN-44A	540	SLT	0.0	DUAL RATE W/GRI 7960
YANKEE	GEORGE, WA	47 03 48.0N 119 44 39.5W	27000/ 1927.36	AN/FPN-45	1600	SLT	+0.5	DUAL RATE W/GRI 9940
ZULU	PORT HARDY BC, CANADA	50 36 29.7N 127 21 29.0W	41000/ 1266.61	AN/FPN-64 (32 HCG'S)	400	625 FT MONOPOLE	0.0	ALERT BAY



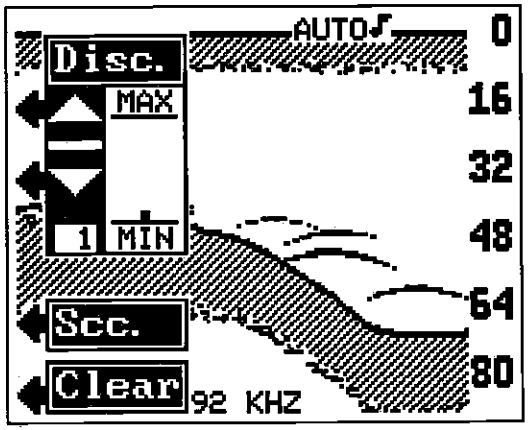
This brings up the SCC adjustment menu. To increase the SCC, press the key adjacent to the up arrow. The bar graph increases each time you press the up key. The number in the lower left portion of the SCC menu also changes as you change the level. To decrease the SCC, press the key adjacent to the down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



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.



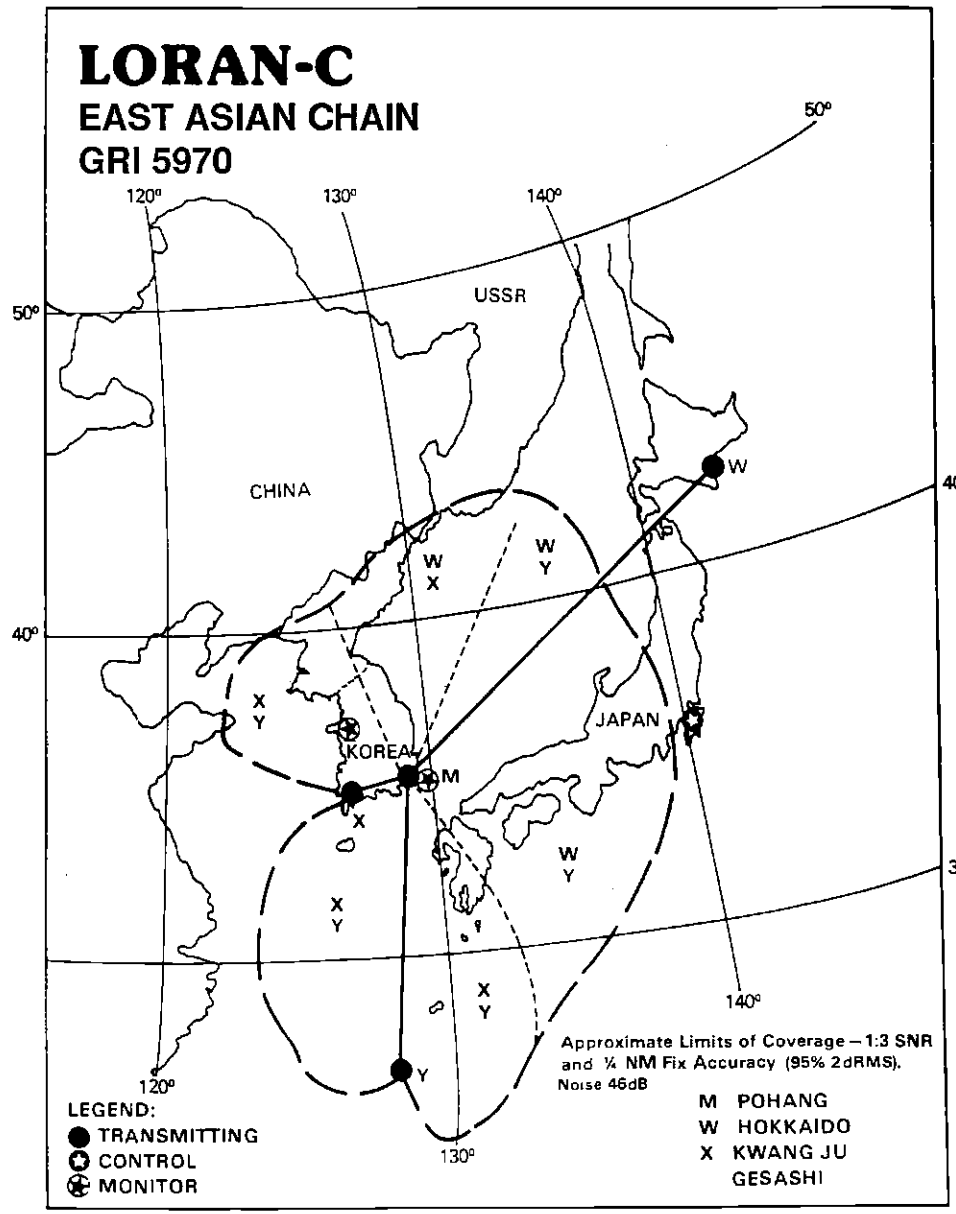
There are 10 levels of Discrimination available on the Z-9500. When it's first turned on, the Discrimination level is one. To change it, press the MENU key. Next press the key adjacent to the "More" label until the Disc/Scc label appears. Now press the key adjacent to that label. The screen shown above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

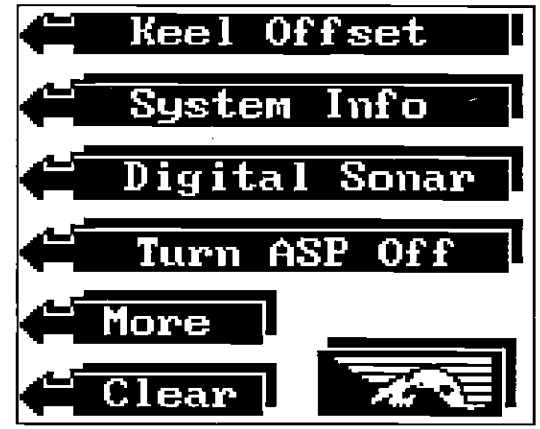
The newest technology in noise rejection systems is Advanced Signal Processing or ASP. This system constantly evaluates the incoming sonar signals, rejects noise signals, and displays true echoes with a minimum of interference. To our knowledge, this is the most advanced noise rejection system available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



EAST ASIAN LORAN-C GRI 5970
REGIONAL MANAGER: PACIFIC AREA, ALAMEDA, CA
CHAIN MANAGER: COMMANDER, 14TH COAST GUARD DISTRICT, HONOLULU, HI
COORDINATOR OF CHAIN OPERATIONS LOCATION: COMMANDER, FAR EAST SECTION, YOKATA, JAPAN
CONTROL SITE: LORMONSTA YOKOTA, JAPAN

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	POHANG KOREA	36 11 05.8N 129 20 27.3E		AN/TRN-38	35	400 FT MONOPOLE	-1.5	USAF MANNED
WHISKEY	HOKKAIDO JAPAN	42 44 37.1N 143 43 09.2E	11000/ 4783.68	AN/FPH-45	1000	625 FT MONOPOLE	+0.5	DUAL RATE W/GRI 9970
XRAY	KWANG JU KOREA	35 02 23.9N 126 32 26.7E	31000/ 947.02	AN/TRN-38	35	400 FT MONOPOLE	-1.75	USAF MANNED
	GESASHI JAPAN	26 36 25.0N 126 08 56.4E	42000/ 3585.56	AN/FPN-45	1000	625 FT MONOPOLE	0.0	DUAL RATE W/GRI 9970

However, 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-9500 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.

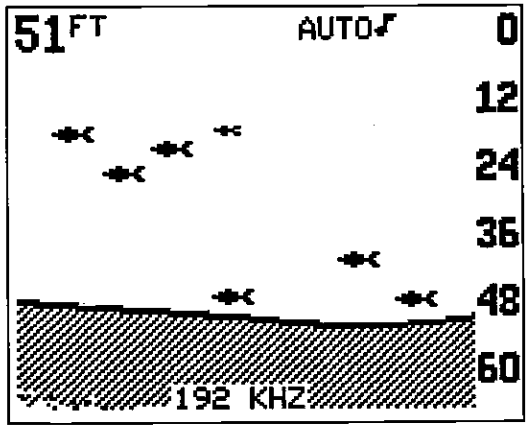
FISH I.D.

The Fish I.D. feature identifies targets that meet certain conditions as fish. The micro-computer analyzes 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. 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-computer determines are fish will be displayed as fish symbols.
The Fish I.D. feature cannot be used when the Z-9500 is in the manual

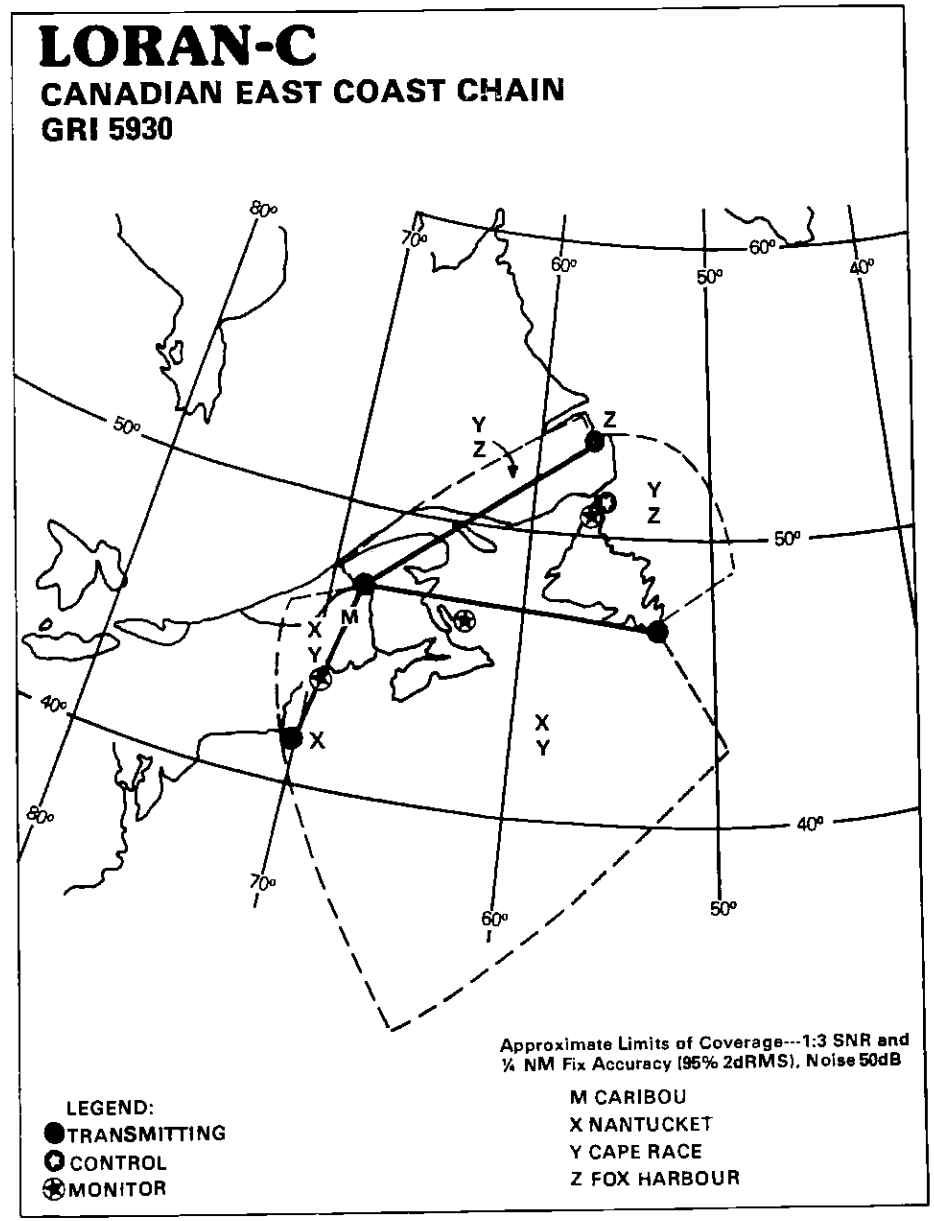


FISH I.D. ON

mode. If you turn the Fish I.D. feature on when the Z-9500 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.



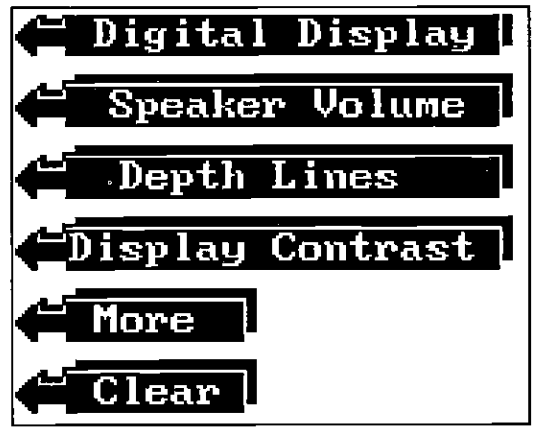
CANADIAN EAST COAST LORAN-C CHAIN GR1 5930
REGIONAL MANAGER COMMANDER ATLANTIC AREA. NEW YORK, NY
CHAIN MANAGER COMMANDER ATLANTIC AREA, NEW YORK, NY
COORDINATOR OF CHAIN OPERATIONS LOCATION LORMONSTA ST ANTHONY, NEWFOUNDLAND, CANADA
CONTROL SITE: LORMONSTA ST. ANTHONY, NEWFOUNDLAND, CANADA

DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	CARIBOU ME	46 48 27.2N 67 55 37.7W		AN/FPN-42	350	SLT	0.0	DUAL RATE W/GRI9960
XRAY	NANTUCKET MA	41 15 11.9N 69 56 39.1W	11000/ 2131.88	AN/FPN-42	325	625 FT MONOPOLE	0.0	DUAL RATE W/GRI9960
YANKEE	CAPE RACE NFLD CANADA	46 46 32.2N 53 10 28.2W	25000/ 3755.02	AN/FPN-45	1500	1350 FT MONOPOLE	0.0	DUAL RATE W/GRI7930
ZULU	FOX HARBOUR NFLD CANADA	52 22 35.2N 55 42 28.4W	3600/ 3594.59	AN/FPN-64 (55 HCG'S)	800	700 FT MONOPOLE	0.0	DUAL RATE W/GRI7930

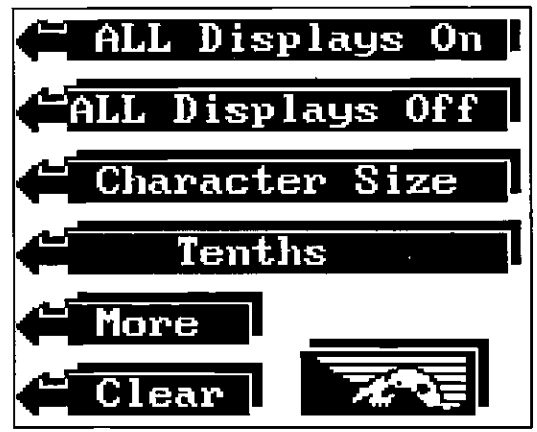
DIGITAL DISPLAYS

The Z-9500 can display the depth, speed, surface water temperature, distance log, and loran 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.



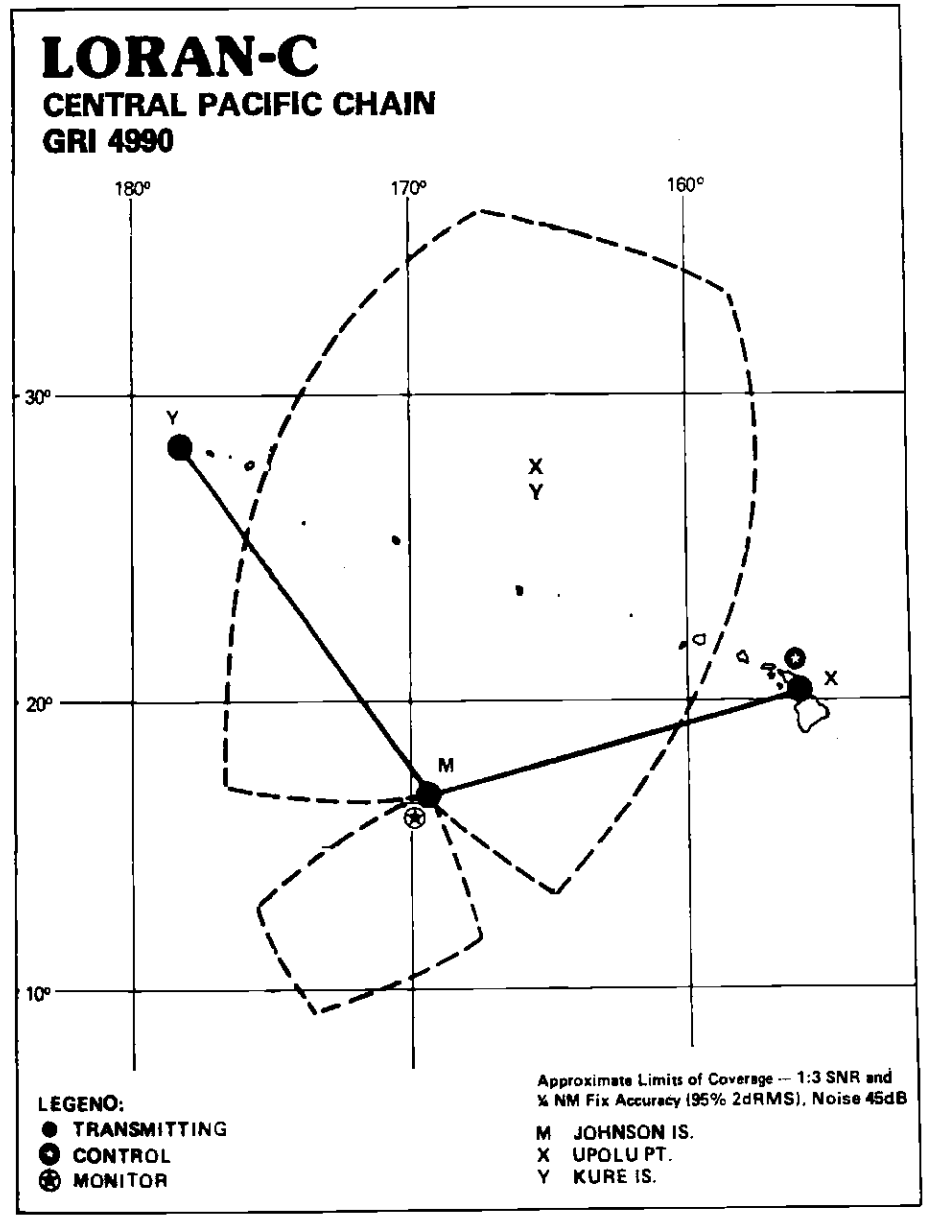
DIGITAL DEPTH DISPLAY

When the Z-9500 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-9500. 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-9500 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.

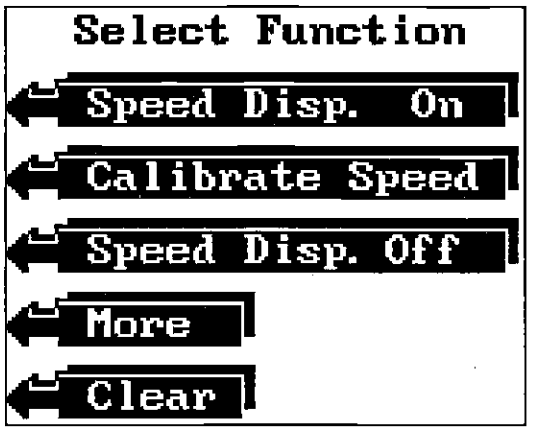


CENTRAL PACIFIC LORAN-C CHAIN GRI 4990
REGIONAL MANAGER: COMMANDER. PACIFIC AREA. ALAMEDA, CA
CHAIN MANAGER 14TH COAST GUARD DISTRICT. HONOLULU, HI
COORDINATOR OF CHAIN OPERATIONS LOCATION: OMSTA KANEOHE, HI
CONTROL SITE:OMSTA KANEOHE, HI

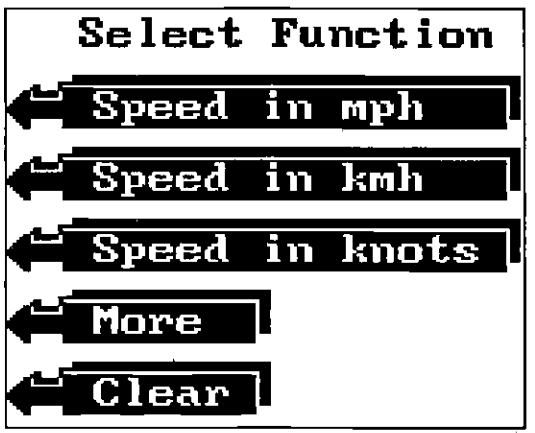
DESIG.	STATION	COOR.	CD/BLL (us)	XMITTER	PWR (KW)	TRANSMIT ANTENNA	NOM ECD	NOTES
MASTER	JOHNSTON ISLAND, HI	16 44 44.0N 169 30 31.2W		AN/FPN-42	325	625 FT MONOPOLE	0.0	
XRAY	UPOLU POINT HI	20 14 19.2N 155 53 09.7W	11000/ 4972.23	AN/FPN-42	325	625 FT MONOPOLE	0.0	
YANKEE	KURE ISLAND HI	28 23 41.8N 178 17 30.2W	29000/ 5253.16	AN/FPN-42	325	625 FT MONOPOLE	0.0	

SPEEDOMETER

The Z-9500 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. The menu shown below appears. Press the key next to the "Speed Disp. On" label to turn the digital speed display on.



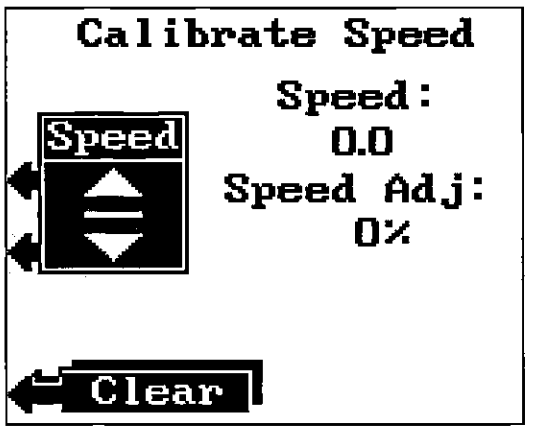
The digital speedometer reads in statute miles per hour when it's first turned on. To change to kilometers per hour or knots, repeat the above steps to get the Speed menu. Then press the key adjacent to the "More" label. The menu shown below appears.



Press the key adjacent to the desired speed label. For example, it you wish to display the speed in knots, press the key adjacent to the "Speed in knots" The Z-9500 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.



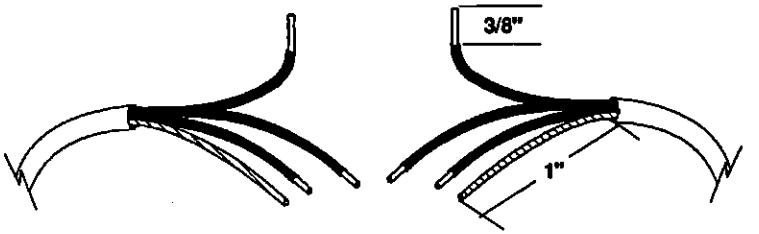
The current boat speed is displayed on the right side of the screen. To increase the displayed speed, press the key adjacent to the up arrow on the "Speed" menu. To decrease it, press the key adjacent to the down arrow. As the displayed speed changes, the amount of the change in percent also displays 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/Time=Speed. Now make the run through the mile in

LORAN CABLE SPLICING INSTRUCTIONS

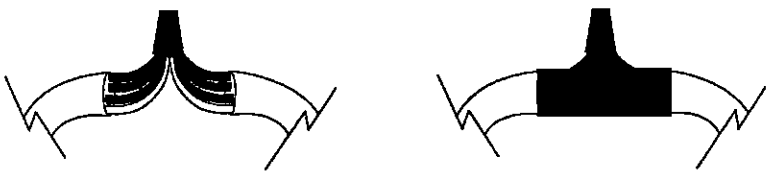
1. Cut the cable in a location that will be in a protected area in the boat. The splice shouldn't be exposed to rain or spray, nor should it be allowed to lay in the bilge. Route the cable as desired.

2. Carefully cut and strip the outer jacket 1" from the end of each cable. Unwrap the shield from the four wires. Remove the shield, as it isn't needed. You should have four wires remaining; three insulated and one uninsulated.



3. Strip the insulation from the wires about 3/8" from the end. Twist one wire from each cable together, making sure that you match the colors of the wires. Damage can occur to the loran module or the display unit if you wire the cable incorrectly. Solder the connection, then wrap it with a good quality electrical tape. Do the same for the other three wires.

4. Finally, wrap the entire splice with electrical tape. Wrap the cables together at the same time. This creates a strain relief for the splice. The loran is now ready for use.



Z-9500 SONAR SPECIFICATIONS

Z-9500 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

NMEA 0183 SENTENCES

RMA ..... Minimum Recommended Sentence, Part A
RMB ..... Minimum Recommended Sentence, Part B
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)

EAGLE ELECTRONICS
P O BOX 669
CATOOSA, OKLAHOMA 74015
(918) 234-1452

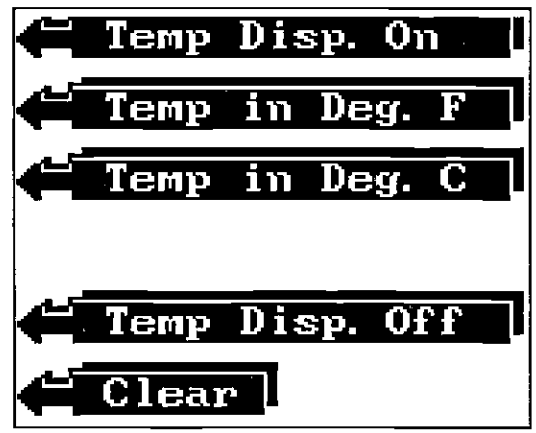
the opposite direction. Again calculate your actual speed. Now add your two speeds together and divide by two. This will cancel out any wind or current effects on the boat. Use this result to correct the speedometer.

Now either calculate the percentage the Z-9500'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-9500 can display the surface water temperature in degrees Fahrenheit or Celsius with the optional temperature sensor installed. When the Z-9500 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 apears.



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-9500 automatically keeps track of the distance traveled.

When the Z-9500 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.

b. Attach the Z-9500's power cable directly to the battery
c. Try an alternator filter
d. Add the external ground wire to the loran module.

LORAN MODULE EXTERNAL GROUND INSTRUCTIONS

A ground lug is attached to the side of the loran module. To use the external grounding system, the following grounding techniques are listed in order of their preference.

1. The best technique is to use a grounding plate with the external ground attached to this plate placed in the water.

2. The next preferred is to externally ground to the lower unit of the motor or inboard/outboard.

3. The ground on the boat battery may also be used for external grounding.

4. Any part of the hull of the boat that is metallic and in contact with water is also acceptable for attaching the external ground.

We do not recommend that you ground under the console of the boat.

To test the degree of improved function of the Loran, the following test should be conducted:

1. Start your unit with the external ground of the coupler disconnected. At a known latitude and longitude, allow the unit to lock onto the known stations (check to make sure that the TD's are correct for this known location) and acquire and convert to the known latitude and longitude of your location.

2. Allow the unit to run for several minutes and make note of the strengths (SNR's) of the stations you are using.

3. Connect the external ground according to a technique listed above and power up your unit. Allow the unit to again run for 3 to 5 minutes and make note of the strengths of the stations you are using. If the signal strengths increase, the external ground is preferred. If you notice no change in signal strengths or the signals decrease, you should recheck where you have the external ground connected. If you see no difference with or without the external grounding, you really do not need this added ground.

INTERFERENCE SOURCES or BAD RECEPTION

Land Sources:

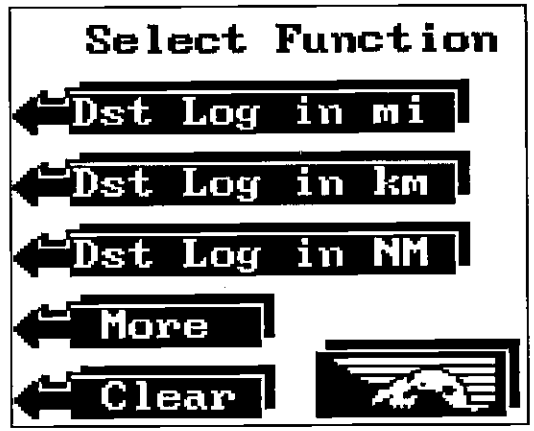
1. Military installations. (High power transmitters in the loran band.)
2. Hydro-electric plants. (Dams)
3. High voltage power lines. These radiate noise at high levels.
4. Storms. A storm between you and the loran station can interfere with the signals, even if it's many miles away.
5. Mountains, trees, buildings. These reflect the signals. Try to stay in an open area.

Boat Sources:

1. Boat engine. Resistor spark plugs help, alternator noise filter may also be required.
2. Power cable routed to fuse panel instead of directly to battery. Route the power cable directly to the battery.
3. Bad antenna placement. The antenna should be placed in an open area on the boat, away from other antennas or structure.
4. Fluorescent lights.

Symptoms of noise or interference problems:

1. Loran won't lock on to stations
2. Accuracy is not repeatable or erratic
   a. Try using the manual mode
3. XTE, Bearing, Heading, SOG, or TTG erratic or inaccurate
4. Cross Track arrows move too much
   a. Waypoint must be recalled to use cross track error feature.
5. Loses lock while boat is moving:
   a. Try resistor spark plugs



Now press the key adjacent to the desired label. The Z-9500 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.

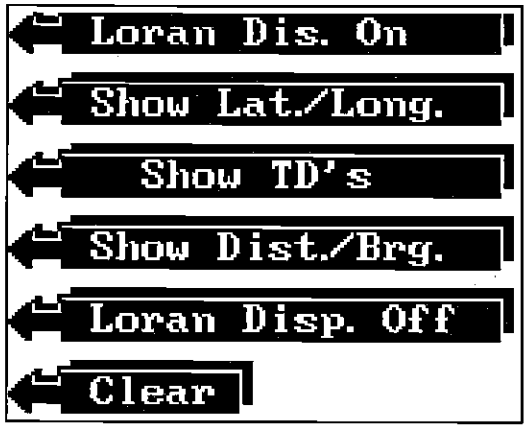
To turn the distance log off, go to the distance log menu, then press the key adjacent to the "Dst Log Disp Off" menu.

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

LORAN DISPLAY

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

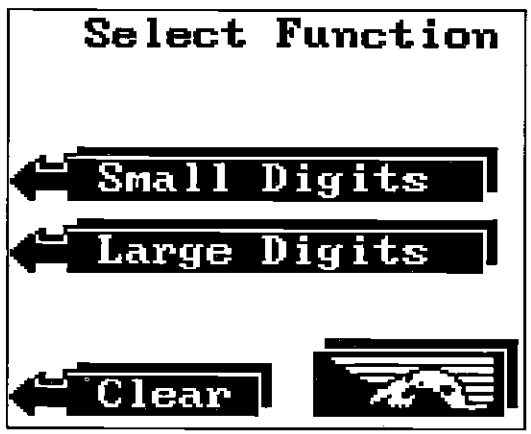
To display position information on the sonar screen, press the MENU key. Next, press the key adjacent to the "More" label. Now press the key next to the "Digital Display" label. Press the key next to the "More" label until the screen shown at the top of the next page appears. Now press the key adjacent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

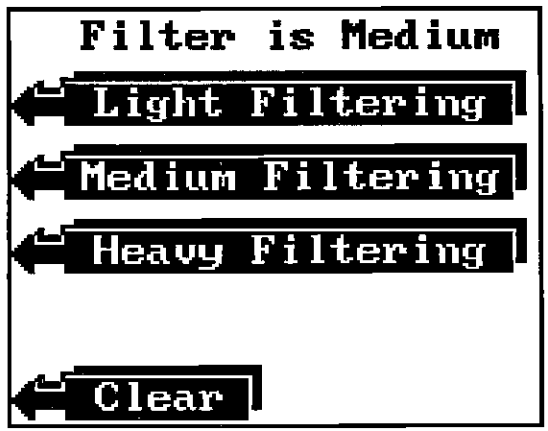


label causes the unit to display your current latitude/longitude on the sonar screen. Other menu selections let you display distance and bearing to a waypoint, turn the navigation displays on or off. After pressing the desired feature, the Z-9500 returns to the sonar screen.

CHARACTER SIZE

The digital number displays have two sizes; small and large. The displays are shown in the large size when the Z-9500 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 "Large Digits" as shown below. 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.





LORAN TROUBLESHOOTING

1. You must have an 8' antenna. Preferably, the entire length of the antenna should be higher than anything else on the boat.

2. For best results, wire the power cable directly to the battery, preferably the main engine's cranking battery. This assures the boat will be grounded, since the lower unit is in the water. If you're using an isolated battery, wire a grounding plate to the ground side of the battery. The loran will work better if it's grounded to water.

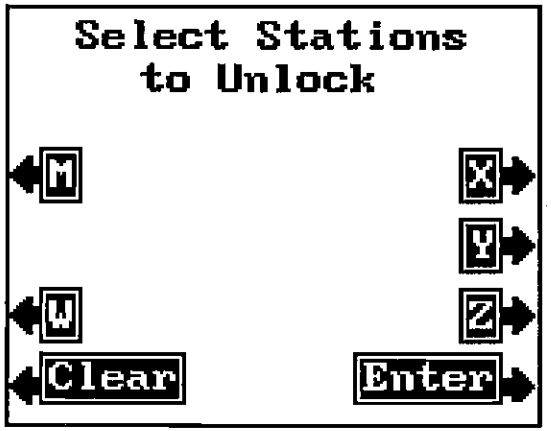
3. If you're using the loran on land, keep away from trees, buildings, and (most important) power lines. The loran will not work inside a building, or under a metal carport, shed, etc.

   (NOTE: These units are designed for marine (boating) purposes and generally work best on the water.)

4. If you're having trouble with the unit locking on to the stations, you may have a piece of gear such as a radio, bilge pump, or engine that is causing interference. First turn everything in the boat off, then try initializing the unit. Enter the initial position first. If that doesn't work, then try the GRI. If the unit still doesn't lock on, then look for other sources of interference. (see next page.)

UNLOCK STATIONS

To "Unlock" the station(s), first press the MENU key, then press the key adjacent to the "Change Setup" label. Now press the key adjacent to the "More" label until the "Unlock Stations" menu appears. Press the key next to that label. The screen shown below appears.



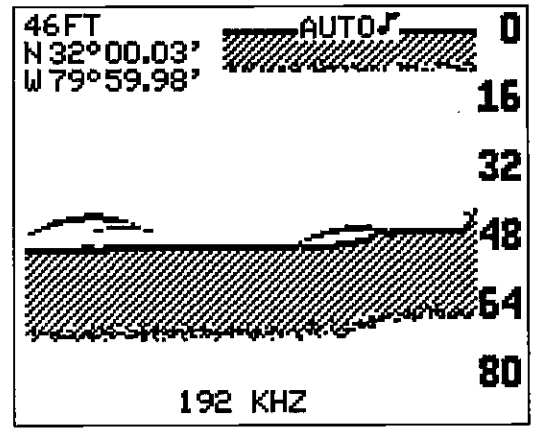
Simply press the key next to the station or stations that you wish to unlock, then press the key next to the "Enter" label. The Z-9500 will return to the last-used loran screen. The stations you selected are now locked on to the current cycle.

Remember, turning the unit off, resetting the unit, or entering a new GRI or initial position erases all cycle jumps and locks.

SPEED FILTER

The speed constant is the amount of filtering done by the receiver. There are three levels: light, medium, and heavy. If you select light, the amount of "jitter" shown on the plotter and navigation displays will increase, however this will also give you the fastest updates. Consequently, medium and heavy gives less jitter and slower update times. The receiver will default to the medium mode. To change the speed constant, press the MENU key, then press the key adjacent to the "Change Setup" label. Now press the key next to the "More" label unitil the "Speed Filter" label appears. Press the key next to that label. The screen shown at the top of the next page appears. Simply press the key next to the desired speed filter. The Z-9500 returns to the last-used loran screen using the speed constant you selected.

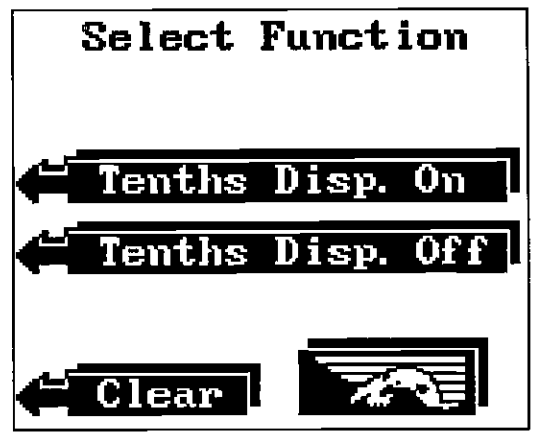
SMALL DIGITS



TENTHS

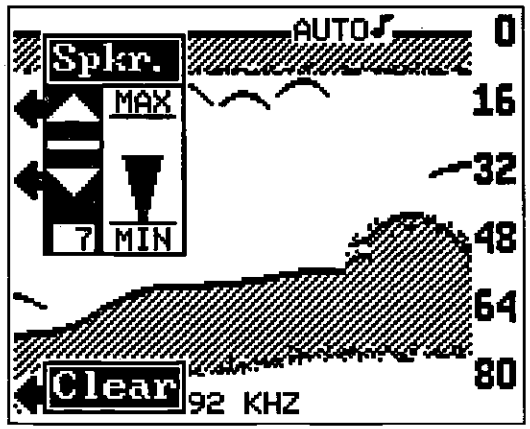
The Z-9500 has the capability to show all digital numbers in tenths. In other words, it can display the depth in tenths of a foot, speed in tenths of a mile per hour, etc. Tenths for all functions are turned on or off with a menu selection.

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. The screen shown below appears. 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.

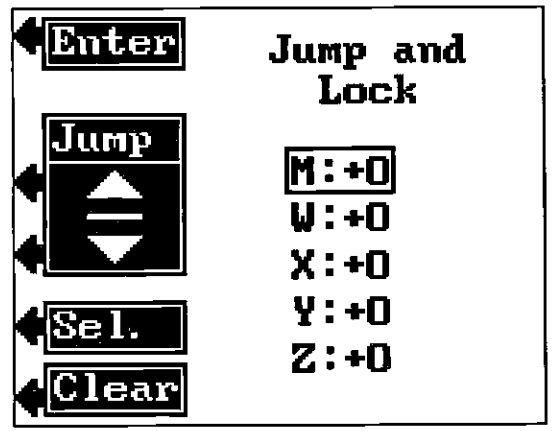


To adjust the speaker volume, press the MENU key. Next, press the key adjacent to the "More" label until the "Speaker Volume" label appears. Now press the key adjacent to the "Speaker Volume" label. The Speaker menu appears on the left side of the display. Use the key adjacent to the up arrow to increase 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-9500 is first turned on, the speaker volume is set to 7. The range is 1 to 10. Press the CLEAR key to erase this menu.

DISPLAY CONTRAST

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

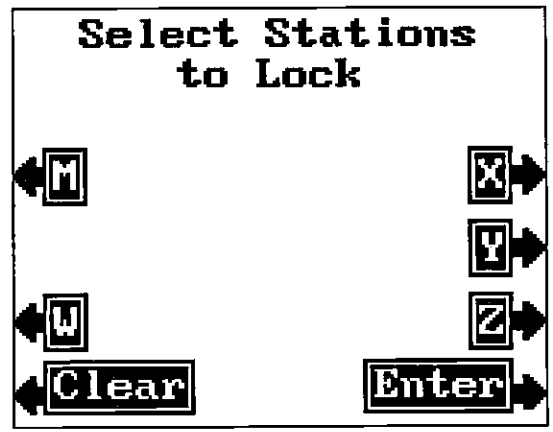
To change the contrast, press the MENU key. Next, press the key adjacent to the "More" label. Now press the key adjacent to the "Display Contrast" label. The Disp. menu appears. Press the key adjacent to the up arrow to increase the display contrast. The key adjacent to the down arrow decreases it. The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



adacent to the "Enter" label. This changes the TD of the selected station by the amount you entered, and it locks the station at that value.

LOCK STATIONS

If the loran receiver won't settle on the correct cycle, use the "Lock" feature to force it to stay on the correct cycle, once it lands on it. To use this feature, press the MENU key, then press the key adjacent to the "Change Setup" label. Now press the key adjacent to the "More" label until the "Lock Stations" menu appears. Press the key next to that label. The screeen shown below appears.



Simply press the key next to the station or stations that you wish to lock, then press the key next to the "Enter" label. The Z-9500 will return to the last-used loran screen. The stations you selected are now locked on to the current cycle.

the position screen to see if ASF's are in use. The letters "ASF" appear next to the latitude/longitude display on the position screen when ASF's are in use.

JUMP AND LOCK

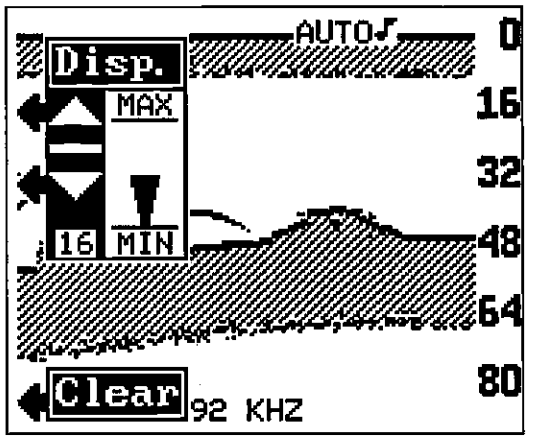
All loran receivers have to lock onto the third cycle of the signal transmitted from the stations. The Z-9500 may have trouble finding the third cycle if you operate the unit under high noise conditions, or at the extreme limit of its range.

You can force the unit to jump to the proper cycle. You can do this using the "Jump and Lock" menu selection. However, we caution you that it requires an intimate understanding of loran signals and shouldn't be used carelessly. Basically, you have to know precisely what the TD's for your exact location should be. If the TD for each station you wish to use is off by ten or more micro-seconds, you can move it using the jump and lock menu. You move the TD by ten micro-seconds each time you jump one cycle. For example, suppose the Z-9500 displays a TD of 45349.33 micro-seconds for station X. If the correct value for that station at your location is 45359.33, then the displayed TD is ten micro-seconds or one cycle low. Using the Jump and Lock stations menu, you jump the station by +1 cycle. This causes the Z-9500 to display the correct value of 45359.33. The unit will now track the station using this cycle correction.

The Z-9500 will stop using the cycle data you used in the jump and lock menu if you do a new GRI or initial position initialization, a preset, or when you turn the unit off.

To change the cycle, first press the MENU key, then press the key adjacent to the "Change Setup" label. Press the key adjacent to the "More" label until the "Jump & Lock Sta." label appears. Press the key next to that label. The screen shown at the top of the next page appears.

Press the key next to the "Sel." to move the box to the station letter that you wish to change. For example, to jump the cycle on station Z, press the key adjacent to the "Sel." label until the box surrounds letter "Z". Now press the key next to the up arrow in the "Jump" menu to increase the cycle, or the down arrow to decrease it. As you press the key, the number in the station's label will reflect the change. When the cycle change is at the desired setting, move the box to the next station's letter that you wish to change. After making the changes, press the key

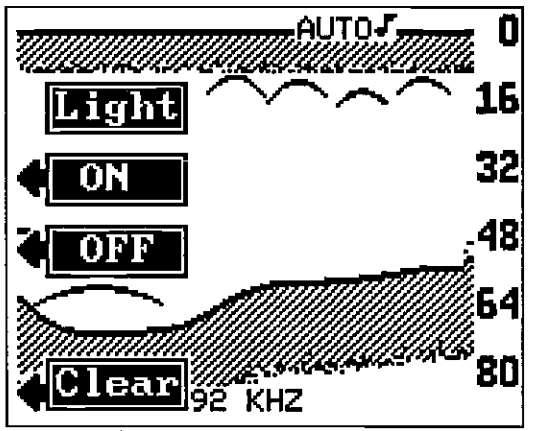


LIGHT

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

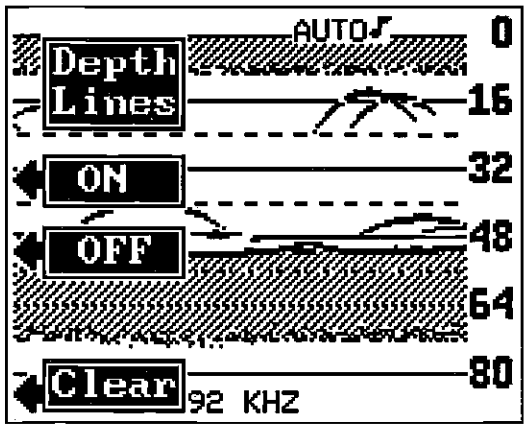
To turn the lights on or off, press the MENU key. Next, press the key adjacent to the "Light" label. This displays the light menus. Press the key adjacent to the "ON" label to turn the lights on. Press the key adjacent to the "OFF" label to turn the lights off. Press the CLEAR key to erase the menu.

The light menu also appears each time the Z-9500 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 easier to turn the lights on at night when the Z-9500 is first turned on.



DEPTH LINES

The Z-9500 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.

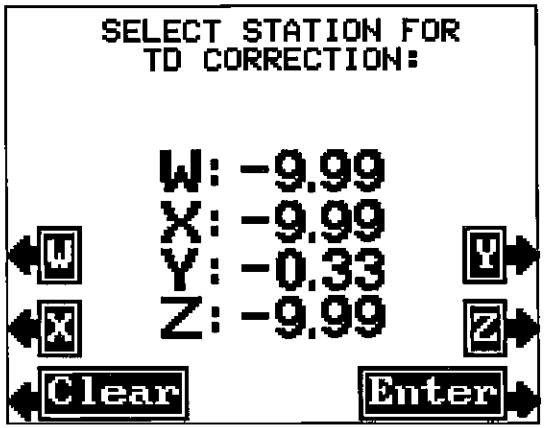
Negative Keel Offset

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-9500) read water depth from the face of the transducer.

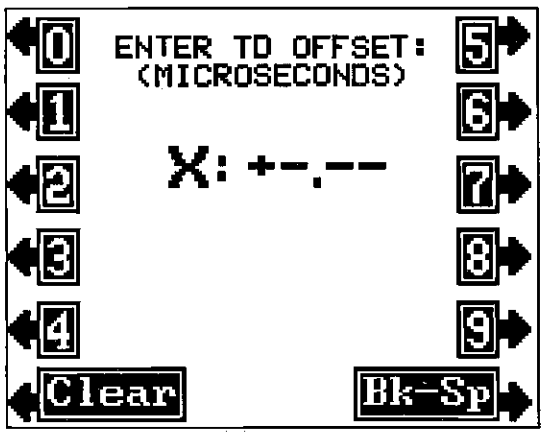
However, the Z-9500 gives you an solution: Keel Offset. Measuring the distance between the lowest part of the boat and the face of the transducer, then inputting this value into the Z-9500, lets you compensate for the depth of the boat.

TD ASF CORRECTION

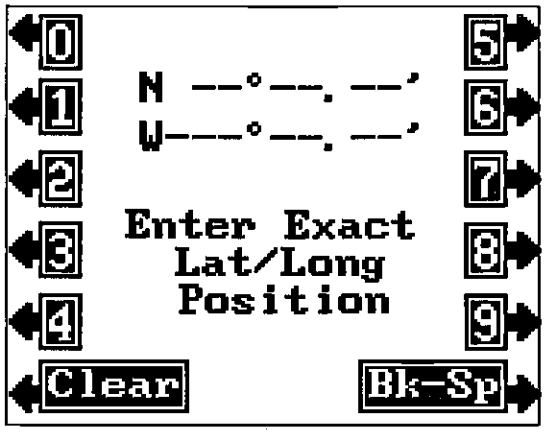
To change the ASF using the TD offset method, press the key adjacent to the "Set TD Offset" label on the ASF menu. The menu shown below appears.



The offset or correction in micro-seconds is shown for each secondary in the chain. Press the key adjacent to the station's letter that you wish to change the TD offset. For this example, the key next to the "X" label was pressed. The screen shown below appears next.



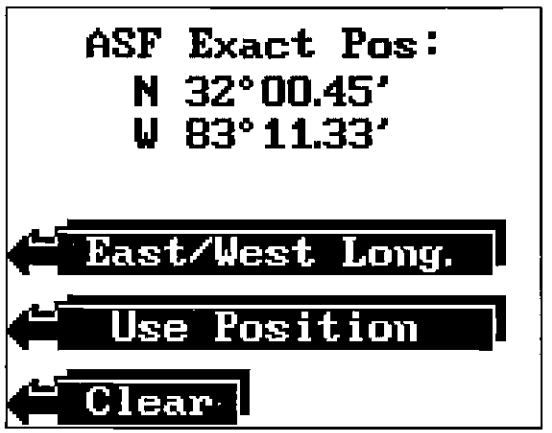
Now enter the desired TD offset. After entering the values, press the key adjacent to the "Clear" label. The Z-9500 returns to the screen at the top of this page. When the offsets for the stations have been entered, press the key next to the "Enter" label. The Z-9500 returns to thte last used loran screen, using the corrections you entered. Switch to



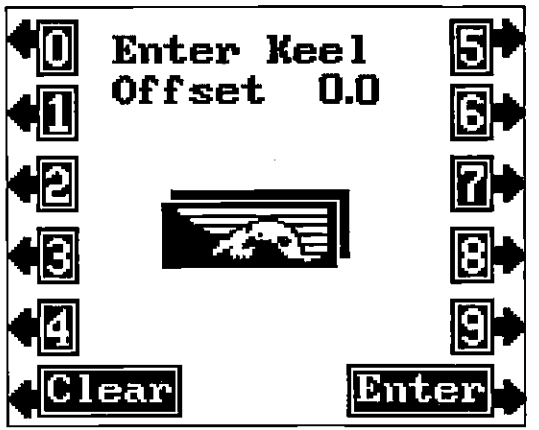
"Set Lat/Long ASF" label. The screen shown above appears.

Now enter the exact latitude/longitude for your position. Remember to enter a zero at the beginning of the longitude if it's less than 100 degrees. The screen below appears after the last longitude number is entered.

If you're east of Greenwich, England (east longitude), press the key adjacent to the "East/West" label. Otherwise, if everything on the screen is correct, press the key adjacent to the "Use Position" label. The Z-9500 will return to the last used loran screen, using a position offset based on the latitude/longitude you entered.



For example, lets 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-9500 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" as shown below.



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-9500 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-9500 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-9500 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-9500 thinks the bottom is only eight feet deep. Using Positive Keel Offset, two feet can be added to this, making the Z-9500 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.

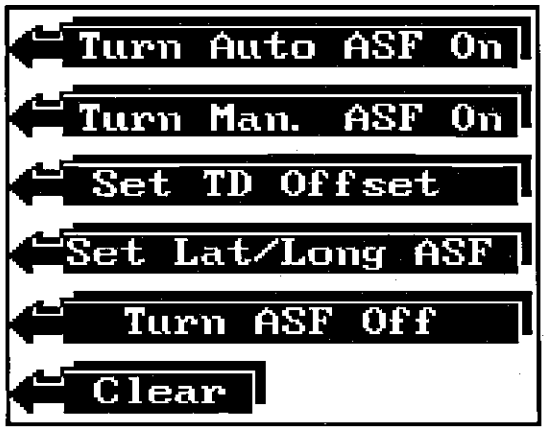
To use the Positive Keel Offset, press the MENU key. Next, press the key next to the "More" label two times. Now press the key adjacent to the "Keel Offset" label. Finally, press the key adjacent to the "Pos. Keel Offset" label. A menu appears over the sonar screen that says "Enter Keel Offset 0.0" Since 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-9500 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-9500 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-9500 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-9500
Version: 3.0
Copyright 1990
Eagle Electronics

If a loran module is connected to the Z-9500, then it's version number is included, also. Press the key adjacent to the CLEAR label to erase this message and return to the sonar screen.



turn the automatic ASF feature on, or turn ASF's off. Manually entering the ASF correction automatically turns the ASF feature on.

Automatic ASF

If you wish to use the automatic ASF feature, simply press the key adjacent to the "AUTO ASF ON" label. If you're in an area that is covered by the ASF table built into the Z-9500, it will automatically add the ASF's to your present position. The ASF indicator will also appear on the position screen on the latitude/longitude position display. If the Z-9500 doesn't have ASF tables for your location, the ASF indicator won't show and ASF will be off. A message appears warning you that ASF's are not available. You will have to manually enter the ASF as shown below.

Latitude/Longitude ASF Correction

Use the lat/long ASF correction if the latitude/longitude position shown on the display is slightly different than your known, precise position. (If the displayed position is off by a large margin, the Alternate/Primary feature may need to be switched.) For example, suppose your actual latitude/longitude is 38-25-40/81-34-10, but the Z-9500 displays 38-24-30/81-35-20. Simply enter your actual position, and the Z-9500 will handle the rest.

To change the ASF using the latitude/longitude correction, *you first must be in the location you are changing.* Next, press the key adjacent to the

ASF Correction

Loran signals are affected by the terrain they travel over. Plains, lakes, mountains, and cities affect the signal and they each affect it in different ways. This effect is called the additional secondary phase factor, or ASF. It's usually factored in when a loran chart is made. However, ASF's vary from place to place, so there can be differences between the chart and the real world.

There can also be a difference in your actual position and the one displayed by the loran, due to ASF. In this case, the loran signals are distorted from their theoretical position. Since the measured TD's are shifted, the loran shows a TD or latitude/longitude that is not the actual position.

The Z-9500 has an correction feature that lets you change the ASF. This forces the loran to use a new ASF instead of the one that resides in its memory. You can shift the ASF by changing the TD offset or by entering your actual latitude/longitude position.

IMPORTANT!

ASF corrections entered by the user are good only for the stations in use at the time and location being corrected. If you travel away from the area, the ASF correction may not be valid. ASF corrections may not be usable if you change stations, or if the unit automatically changes stations. This especially holds true if you enter a latitude/longitude position to change ASF. The Z-9500 will only apply the ASF correction to the stations in use - not all of them. Remember, if you change stations, especially if you change GRI's, the ASF will have to be re-entered.

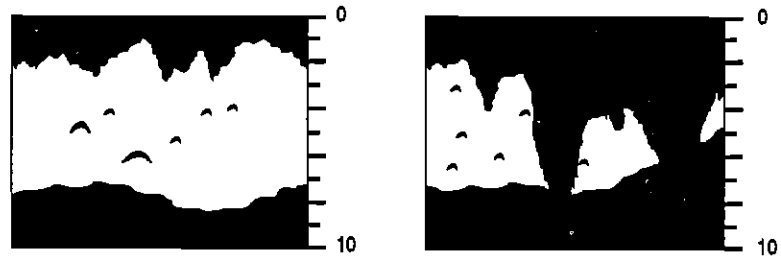
The Z-9500 also has automatic ASF selection. TD's and latitude/longitude are automatically corrected when the Automatic ASF feature is on. However, not all areas in all GRI's are covered by the Automatic ASF feature. If you enable this feature and the ASF's aren't available in your area, a warning message appears in the message box. You will have to manually enter an ASF.

To change the ASF, first press the MENU key. Next, press the key adjacent to the "Change Setup" label. Now press the key next to the "More" label. Finally, press the key next to the "ASF Correction" label. The screen shown at the top of the next page appears. This menu lets you change the ASF using TD offsets or latitude/longitude correction,

TURN AUTOMATIC/DIGITAL SONAR ON/OFF

Your Z-9500 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 elimihate 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.



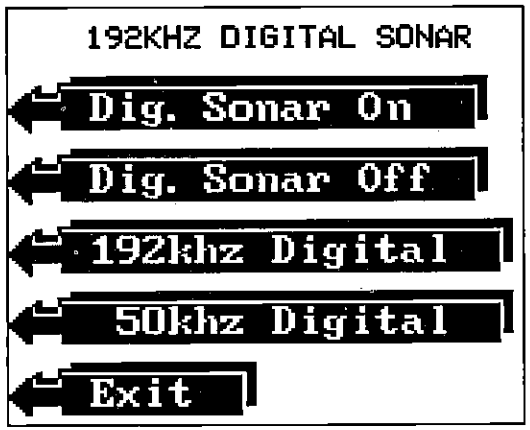
Problems occur when the surface clutter extends to the bottom as shown on the right. The digital sonar cannot distinguish between surface clutter and the bottom and so it becomes "lost." It may flash the last known bottom depth or it may lock onto an unrealistic depth such as 900 feet in a lake that 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-9500 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-9500 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 simply pressing the AUTO key.

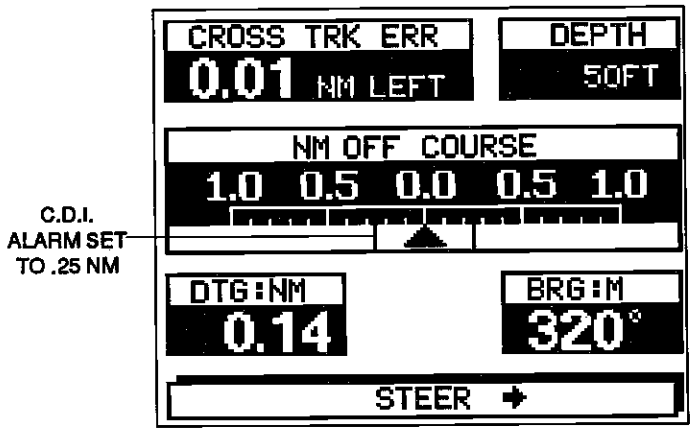
DIGITAL SONAR FREQUENCY SELECT

The Z-9500's digital has the capability of using the 192 kHz or 50 kHz frequency. Please note that the frequcency 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 it's 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-9500.

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 below appears. Finally, 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.

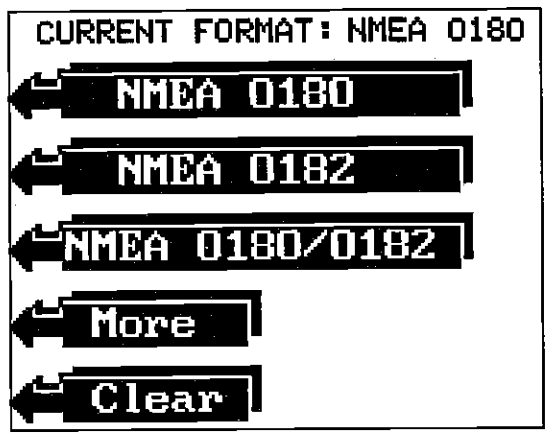


NMEA INTERFACE

The Z-9500 can send data out according to NMEA 0180, 0182, or 0183 formats. The NMEA output is 0180 when the Z-9500 is turned on for the very first time.

To select the NMEA output, press the MENU key while a loran screen is displayed. Now press the key adjacent to the "CHANGE SETUP" label. Next, press the key next to the "More" label. Finally, press the key adjacent to the "NMEA Data Output" label. The screen shown below appears. Press the key next to the "More" label to see more NMEA selections.

Simply press a key adjacent to the desired output. The Z-9500 will return to the last loran screen and output data on the white serial data wire. (See the Power Connections section for wiring instructions.)



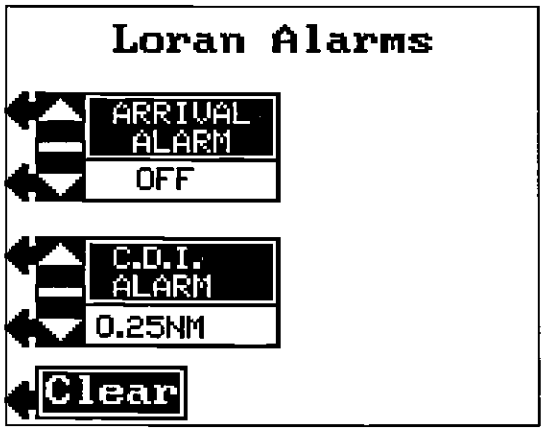
LORAN ALARMS

The Z-9500 has two loran alarms. One is an arrival alarm that sounds when you come within a preset distance to a waypoint. The other is a C.D.I. alarm that sounds when you move off course more than the alarm's set point.

ARRIVAL ALARM

The arrival alarm sounds a tone when your position is within the alarm's radius of a waypoint. For example, the alarm will sound if you come with .1 nautical miles of a waypoint if the arrival alarm's setting is .1 nautical mile.

To adjust the arrival alarm, simply press the ALARM key. The screen shown below appears. Press the key adjacent to the up arrow on the arrival alarm's menu to increase the radius, the down arrow to decrease it or turn it off. Press the key adjacent to the "Clear" label to return to the loran screen.

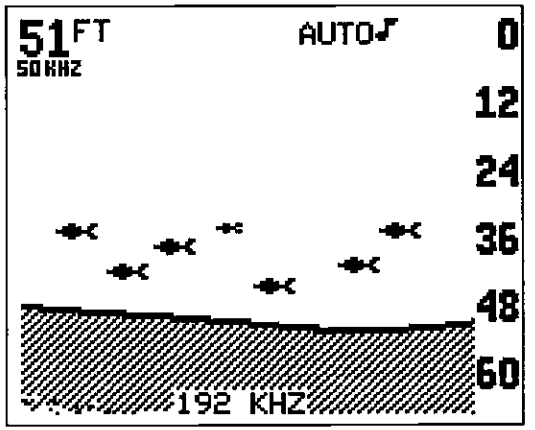


C.D.I. ALARM

The C.D.I. alarm sounds when you are off course by the same amount as the alarm setting. For example, if the alarm setting is .1 nautical miles, then the alarm will sound if you're off course by .1 nautical miles.

To adjust the C.D.I. alarm, first press the ALARM key. The screen shown above appears. Now press the key adjacent to the up arrow on the C.D.I.'s alarm menu to increase it, the down arrow to decrease it or turn it off. Press the key adjacent to the "Clear" label to return to the loran screen.

50 kHz Digital Sonar



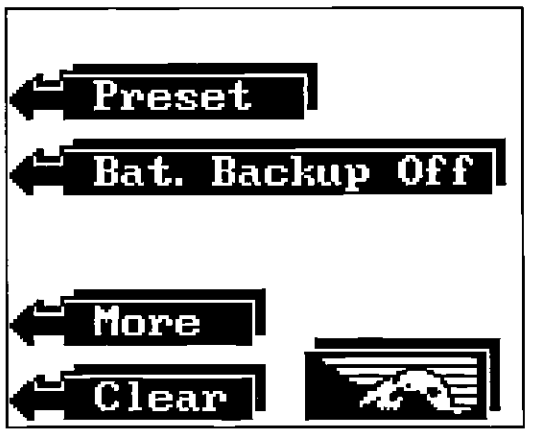
MEMORY - PRESET

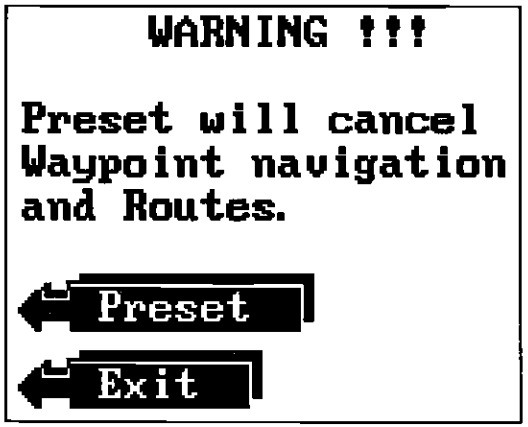
The Z-9500 saves all settings such as sensitivity, chart speed, alarm settings, and more in battery-backed-up memory. This memory is retained even if power is disconnected from the unit. If you need to return the unit to the factory settings, use the Preset function.

IMPORTANT!

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

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, naviga-





tion to waypoints and routes are 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-9500 will start scrolling echoes across the screen, and all features will return to their factory settings.

The memory function can be turned off by pressing the MENU key, then pressing the key adjacent to the "More" label three times. Next, press the key adjacent to the "Bat. Backup Off" label. If you wish to turn the Battery Backup feature on again, press the MENU key, then press the key adjacent to the "More" label three times. Now press the key adjacent to the "Bat. Backup On" label.

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-9500 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.

The Z-9500 will show navigation information to each of the waypoints in the route. As you come within the arrival alarm's radius of each waypoint, the Z-9500 will automatically switch to the next waypoint on the list. This continues until you've travelled the entire route.

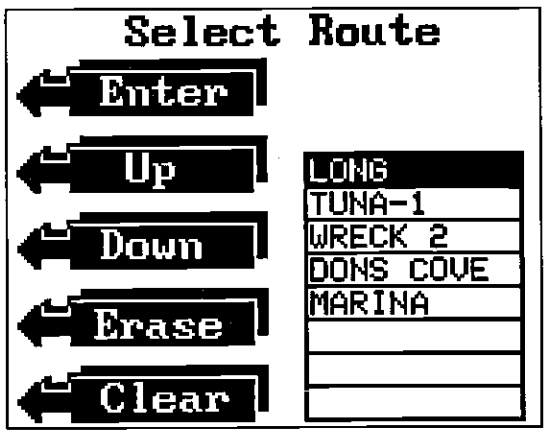
Canceling a Route

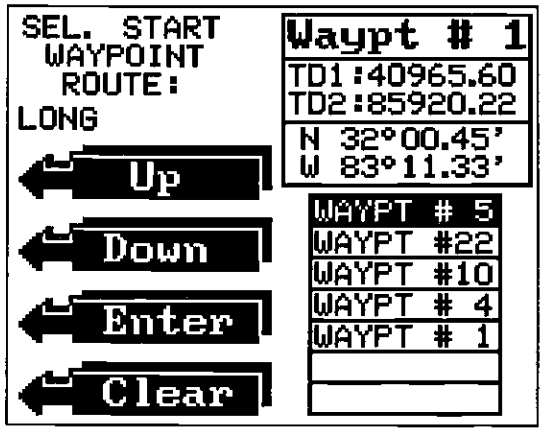
To stop the Z-9500 from navigating a route, press the MENU key, then press the key adjacent to the "More" label. Now press the key adjacent to the "Route Planning" label. Finally, press the key adjacent to the "Cancel Route" label. The Z-9500 will stop sequencing through the waypoints on the route. However, it will still show navigation data to the last waypoint in use.

Erasing a Route

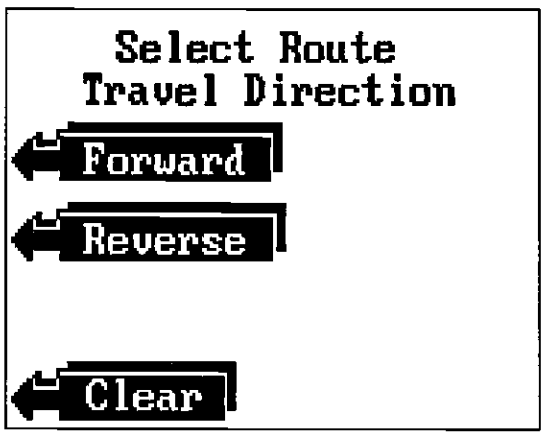
To erase a route, press the MENU key, then press the key adjacent to the "More" label. Next, press the key next to the "Route Planning" label. Now press the key adjacent to the "Erase Route" label. The screen shown below appears.

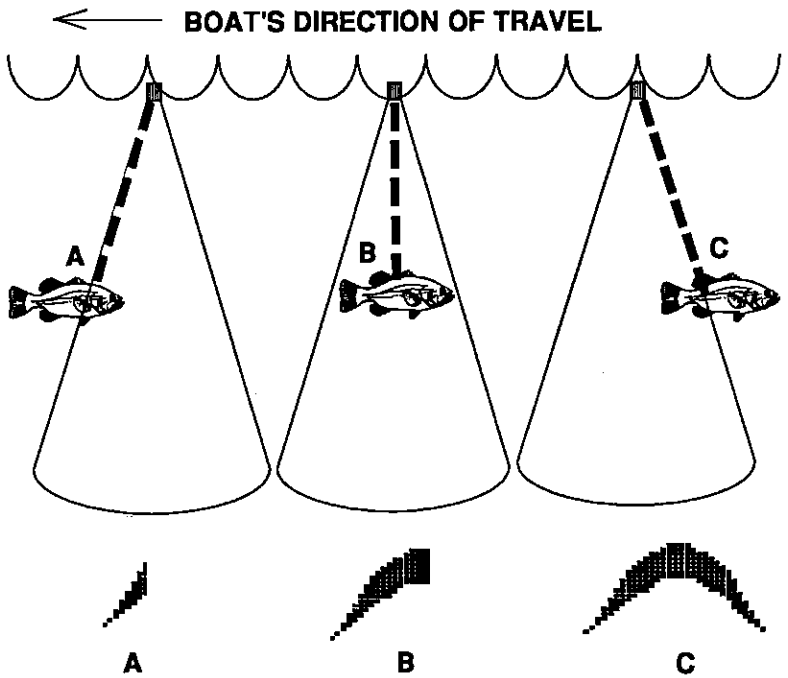
This is the "Erase Route" selection menu. Choose the route to erase by pressing the keys adjacent to the "Up" or "Down" labels to move the box over the desired route name. In the example below, the route "LONG" is selected. Press the key next to the "Enter" label to erase the route. Then select another route to erase or press the key adjacent to the "Clear" label to exit this screen.





This screen shows the first seven waypoints in your route. Select the waypoint in the route that you want to travel to first. The Z-9500 will show navigation information to that waypoint, then switch to the next waypoint in the list and so on until all of the waypoints on the list have been reached. Press the key adjacent to the "Up" or "Down" labels until the black box is on the starting waypoint. Then press the key next to the "Enter" label. A new screen appears as shown below. Press the key next to the "Forward" label if you wish to travel through the route from the first to the last waypoints in the route's list. Press the key next to the "Reverse" if you wish to travel through the route from the last waypoint to the first waypoint in the list. The Z-9500 returns to the loran screen with navigation information to the first waypoint in the route.





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-9500 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.

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:

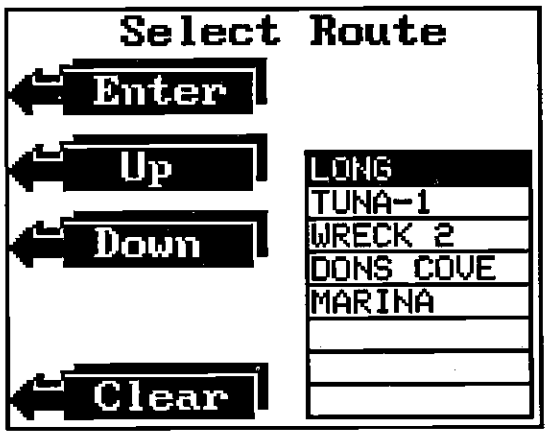
1. Make certain transducer is pointing straight down. Clean the face of the transducer. Oil, dirt, and fuel can cause a film to form on the transducer, reducing its effectiveness. If the transducer is mounted

This is the waypoint selection menu. It lets you pick the waypoints to be used in the route. Press the keys adjacent to the up or down arrows to scroll through the list of waypoints. When the first waypoint to be used in the route appears in the selection box at the top of the screen, press the key adjacent to the "Enter" label. Continue selecting waypoints in the order you wish to travel in the route until all of the desired waypoints have been picked for the route. Then press the key next to the "Clear" label. The route is now ready for use.

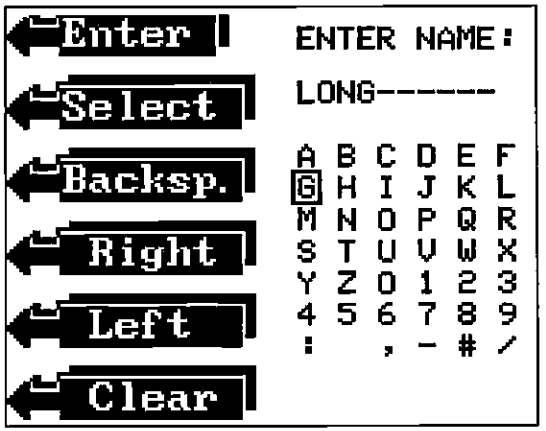
IMPORTANT!
You must select waypoints for the route in the order that they are going to be used. In other words, suppose you want a route that consists of waypoint numbers 1, 3, and 5. But you wish to travel to 3 first, then 1, and finally 5. In this case, you must select waypoint 3,1, and 5 (in that order) when selecting waypoints for the route.

Following a Route

To follow a saved route, press the MENU key, then the key adjacent to the "More" label. Now press the key adjacent to the "Route Planning" label. Next, press the key adjacent to the "Follow Route" label. The screen shown below appears.

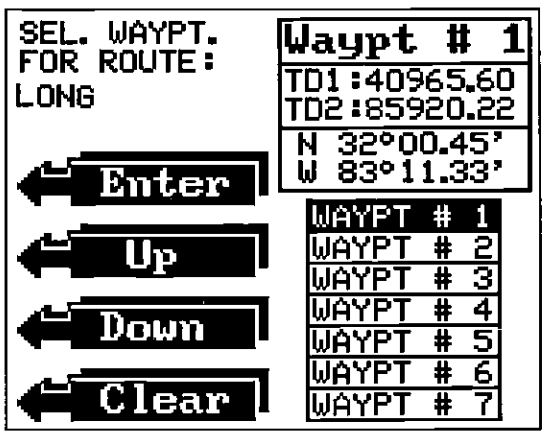


This is the route selection menu. Choose the route to follow by pressing the keys adjacent to the "Up" or "Down" labels to move the box over the desired route name. In the example above, the route "LONG" is selected. Press the key next to the "Enter" label to select the route. The screen at the top of the next page automatically appears next.



This is the "Name Route" menu. A box surronds the letter "O" in the middle of the screen. Using the keys adjacent to the "Left" and "Right" arrows, move the box to the letters or numbers that you need to spell the route's name. Once you've moved the box over the desired leter, press the key next to the "Select" label. The letter appears in the space below the "ENTER NAME:" message at the top of the screen. If you need to erase a letter, simply press the key next to the "Backsp." (backspace) label. For example, to name a route "LONG", move the box to the "L", press the key next to the "Select" label, move the box to the "O", press the key next to the "Select" label, and so forth until the word "LONG" appears at the top of the screen.

When the desired name appears, press the key next to the "Enter" label at the top left corner of the screen. The screen shown below automatically appears next.



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.

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.

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-9500 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

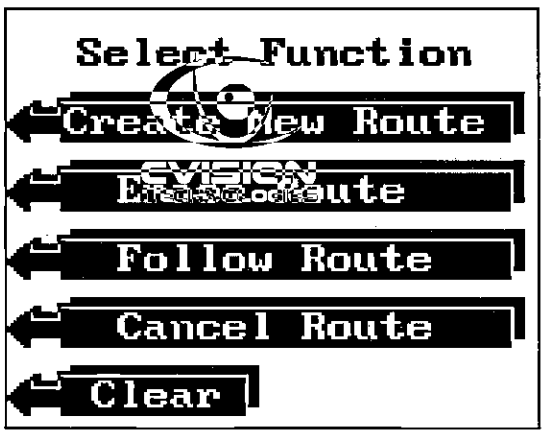
ROUTES

The Z-9500 gives you the ability to go to several waypoints in a row. This feature is called Routes. A route consists of two or more waypoints. When you run a route, the Z-9500 gives you navigation information to the first waypoint in the route. As you reach the first waypoint, the arrival alarm sounds, then the next waypoint is automatically selected by the unit. Navigation information is displayed for this waypoint until the arrival alarm sounds and the process repeats for the next waypoint. This happens until you've travelled to all the waypoints in the route.

There are two steps necessary to create a route. First you must name the route. Then pick the waypoints to use in the route. To follow a route, you simply determine the starting waypoint, then decide whether to follow the route forward or backward. After these steps are completed, the Z-9500 will start navigating on the route.

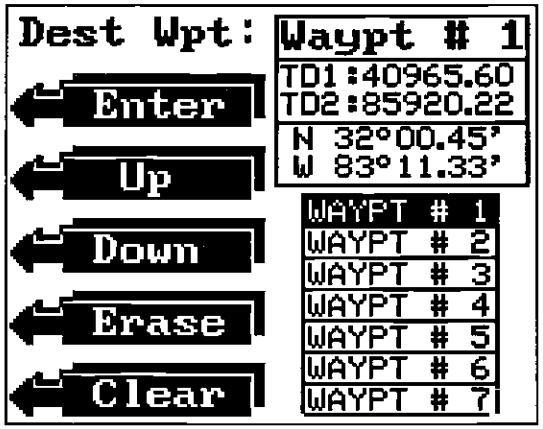
Creating a Route

To create a route, first press the MENU key .Now press the key adjacent to the "More" label. Now press the key next to the "Route Planning" label. The screen shown below appears. Next, press the key adjacent to the "Create New Route" label. The screen shown at the top of the next page appears.



View and Go To Waypoint

The View and Go To Waypoint menu lets you select the waypoint you wish to recall from the list of waypoints. To use this menu, first press the Waypoint Recall key, then press the key next to the "View/Go To Waypt" label. The screen shown below appears.



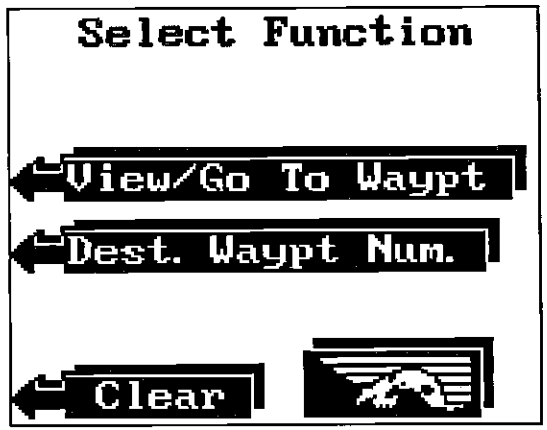
Seven waypoints display on this screen. Waypoint number one's position shows at the top of the screen. To recall this waypoint, simply press the key next to the "Enter" label. To view other waypoints, simply press the key next to the "Up" or "Down" labels. This moves the black box up or down the list of waypoint numbers. When the desired waypoint number appears at the top of the screen, press the key next to the "Enter" label. The waypoint displayed at the top of the screen will be recalled and the Z-9500 will return to the loran screen. To exit from this screen without recalling a waypoint, simply press the key adjacent to the "Clear" label.

Erase a Waypoint

To erase a waypoint, first press the Waypoint Recall key. The screen shown above appears. Next, press the keys next to the "Up" or "Down" labels until the desired waypoint number appears at the top of the screen. Now simply press the key next to the "Erase" label. This instantly erases the position from the waypoint location. To exit this screen after erasing the desired waypoints, press the key next to the "Clear" label.

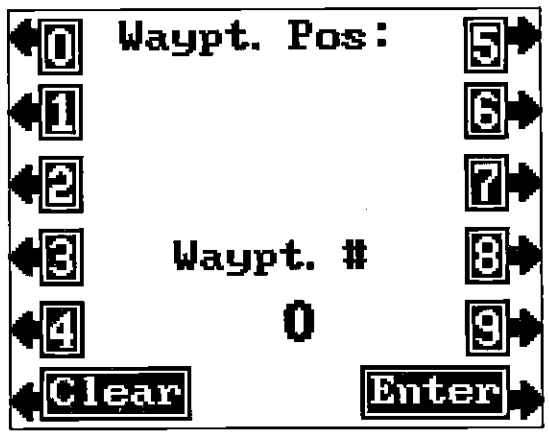
appears on the display, the problem could be one of three things; spark plugs, alternator, or tachometer wiring. Try using resistor spark plugs, alternator filters, or routing the sonar unit's power cable away from engine wiring. Again, routing the power cable directly to the battery helps eliminate 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.



Enter Destination Waypoint Number

Use this menu when you know the waypoint number you wish to recall. The screen shown below appears after you press the key next to the "Dest. Waypt Num." label.



Now simply press the key(s) adjacent to the waypoint number that you want to recall. For example, if you want to recall waypoint number one, press the key next to the "1" label, then press the key next to the "Enter" label. If you wish to recall waypoint number 30, press the key next to the "3", then "0", and finally, "Enter". After pressing the last key, the Z-9500 returns to the loran screen, showing navigation data to the position you recalled.

Now simply press the key(s) adjacent to the waypoint number that you wish to assign the position. For example, if you want to assign the position at the top of the screen to waypoint number one, press the key next to the "1" label, then press the key next to the "Enter" label. If you wish to save the position under waypoint number 30, press the key next to the "3", then "0", and finally, "Enter". After pressing the last key, the Z-9500 returns to the loran screen, saving the position under the waypoint number you specified.

GO TO WAYPOINT

The Z-9500 gives you the option of entering a position, then going to the position without saving it. To do this, first press the Waypoint Save key. Next, enter a position using the "New Waypoint Position" method. After entering the position, press the key next to the "More" label until the screen shown below appears.

Now press the key adjacent to the "Go to Waypoint" label. The Z-9500 returns to the loran display showing navigation data to the position you entered.

WAYPOINT RECALL

You must recall a waypoint to use the Steering or Navigation screens. To recall a waypoint, first press Waypoint Recall key. The menu shown at the top of the next page appears.

If you already know the waypoint number you wish to use as a destination, press the key next to the "Dest. Waypt. Num" label. If not, press the key next to the "View/Go To Waypt" label.

Z-9500
LORAN OPERATION

(REQUIRES OPTIONAL ELC-1 LORAN MODULE)

WARNING!
USE THIS LORAN RECEIVER ONLY AS AN AID TO NAVIGATION. A CAREFUL NAVIGATOR SHOULD NEVER RELY ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION.

NOTICE!
MAKE CERTAIN THE LORAN IS DISPLAYING THE CORRECT POSITION IN *LATITUDE/LONGITUDE* COORDINATES BEFORE NAVIGATING WITH THIS UNIT. THE POSITION MUST BE CORRECT FOR THE NAVIGATION FEATURES TO WORK PROPERLY.

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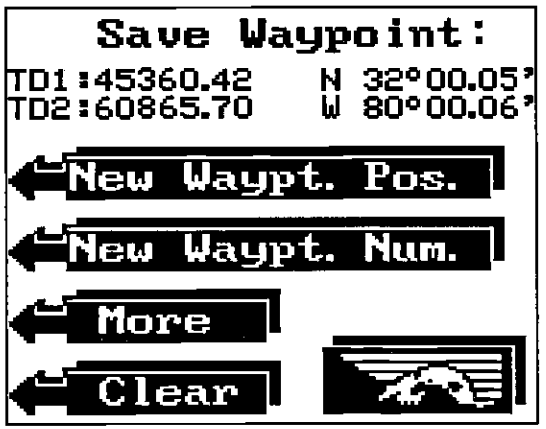
key adjacent to the "More" label, then pressing the key next to the "GO TO WPT" label on the next page. Simply press the key adjacent to the desired label to save or goto the position you entered.

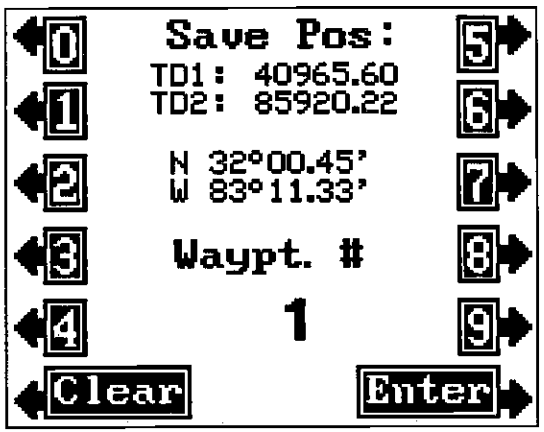
NEW WAYPOINT NUMBER

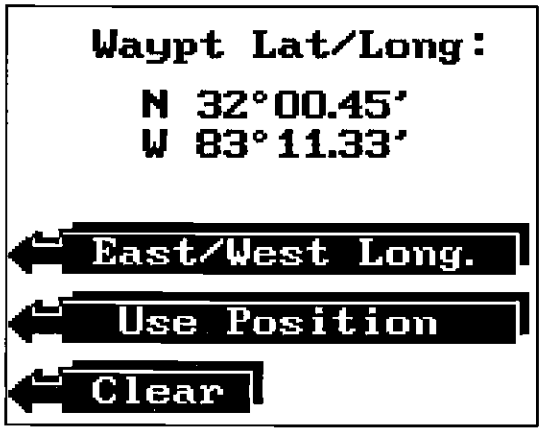
The "New Waypoint Number" menu gives you another method to save your position. This option lets you enter the waypoint number that you want the position saved under.

To use this feature, first press the Waypoint Save key, then either enter a position or you use your present position. Next, press the "More" key. The screen shown below appears.

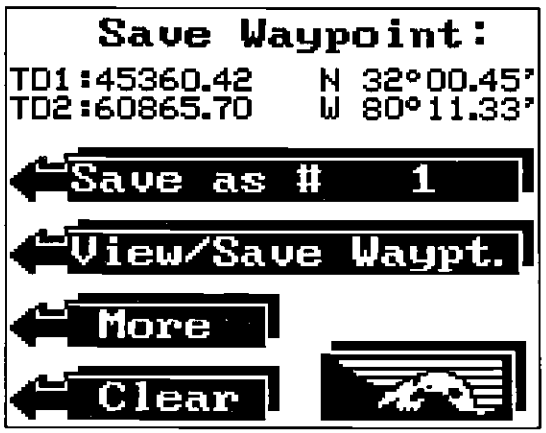


Now press the key next to the "New Waypt. Num." label. The screen shown below appears.





If you are east of Greenwich, England (east longitude), press the key adjacent to the EAST/WEST label. Otherwise, if everything on this screen is correct, press the key next to the "Use Position" label. The screen at the bottom of this page appears next.



This menu gives you two choices. There are more choices on other menu pages. You can save the waypoint under the next available number, using the "SAVE AS #" label at the top of the screen. The VIEW/SAVE menu stores the waypoint under any number you desire. (See the Saving Present Position -View and Save Method.) Pressing the key next to the "More" label brings up the "New Waypt. Num." label which lets you save the position under any waypoint number. Finally, you can travel directly to the waypoint and not save it by pressing the

NOTE:
This sections covers the Z-9500's loran operation. The ELC-1 loran module must be attached to the Z-9500 for position data.

LORAN - General

Loran is short for LOng RAnge Navigation. It's a navigation system that uses powerful low frequency (100 kHz) radio transmitters and sensitive receivers. Thus, you can determine your position over long distances.

Loran was developed and used during World War II. At that time it was called Loran-A and operated at a higher frequency. Research and development continued during the fifties. The current Loran version, Loran-C, was introduced in the sixties. It works over longer distances than Loran-A and it's easier to use.

ACCURACY

The absolute accuracy of Loran is between 0.1 and 0.25 nautical miles, depending on your location. Repeatable accuracy (your ability to return to the same spot) is 100 feet or better. The difference between the two types of accuracy is important. Absolute accuracy tells you where you are on the map. Repeatable accuracy lets you find your way back to the same site time after time.

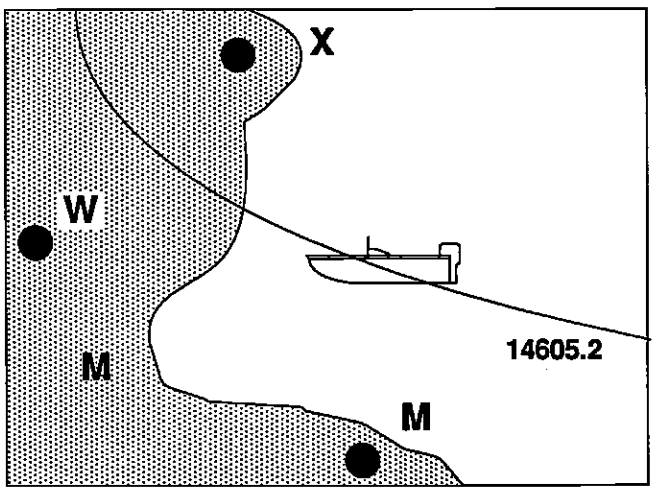
However, the accuracy you experience may not be as good as the numbers above suggest. The crossing angle of the lines of position affects the accuracy. The sharper the crossing angle, the more chance for position error. A ninety degree crossing angle is best, but it can vary down to thirty degrees without a large position error.

If you wish to double check your Loran, first pick a spot on the chart that is clearly marked with latitude/longitude marks. Then go to it. Once you arrive, let the Loran settle, then compare the position information on the Z-9500 to the chart. It should be very close.

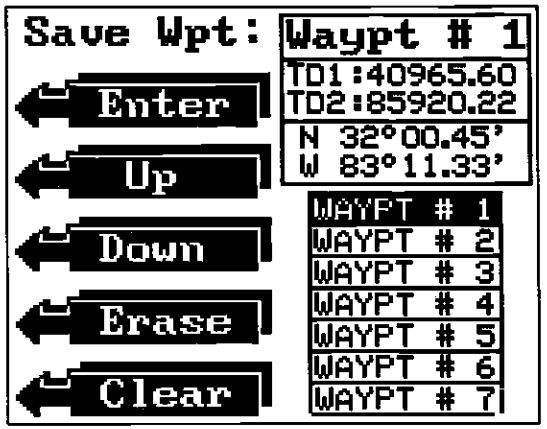
HOW LORAN-C WORKS

The Loran system consists of three to six transmitter stations. These are called a "chain." The letter "M" designates the master station inside the chain. The other stations in the chain are the secondaries. Their names are V, W, X, Y, and Z, although not all chains have five secondary stations. The secondary transmitters are synchronized with the master which transmits at precise time intervals. This time interval is called the Group Repetition Interval (GRI). Each chain has a different GRI.

The secondary stations transmit at precise time intervals after the master station transmits. Since these transmitters are located hundreds of miles apart, it takes a different time for the signals from each transmitter to reach you. The Loran receiver measures this time difference between the master and two of the secondaries. The Z-9500 automatically chooses the best master-secondary pairs for your location. The time difference or (TD) is measured in micro-seconds. Plotting the TD on a chart with Loran-C lines results with your position somewhere on a line of position (LOP). A line of position is an imaginary line on which the time delay between the master and one of the secondaries is the same. In this example the boat is located somewhere on the 14605.2 Line Of Position.

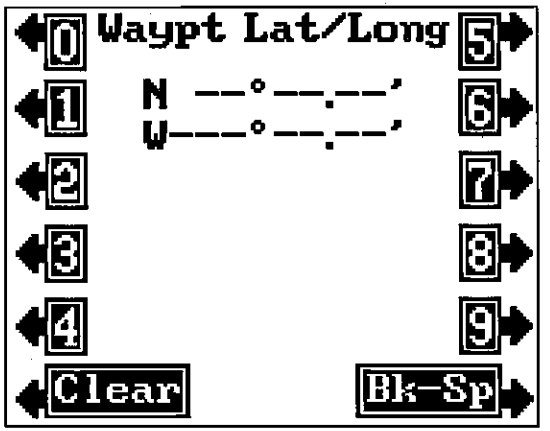


The Loran receiver then measures the time difference between the master and another secondary. The example on the next page is 31882.8. If you plot this LOP on a chart, you'll notice that it crosses the first line-of-position. Your position is at the intersection of the two lines.



Enter New Waypoint Position

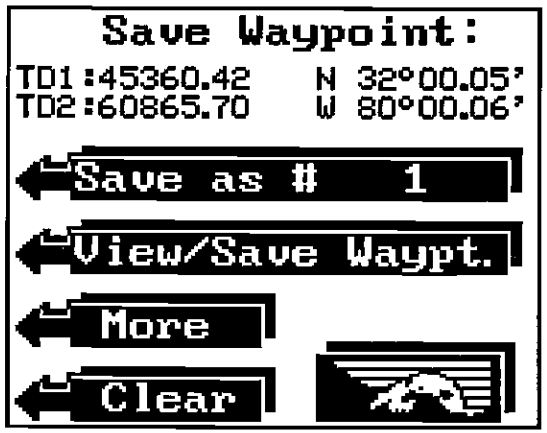
To save a waypoint other than your present position, first press the Waypoint Save key. The waypoint save menu appears. Now press the key next to the "More" label. Finally, press the key next to the "New Waypt. Pos." label. A new menu appears. If you wish to save the waypoint using latitude/longitude, press the key adjacent to the "ENTER LAT/LONG" label. To save a waypoint using TD's, press the key adjacent to the "Enter TD's" label. The steps to save a waypoint are identical. For this example, we'll use the latitude/longitude method. The screen shown below appears.



Now enter the waypoint location. Remember to add a zero to the longitude if it's less than 100 degrees. The screen shown at the top of the next page appears after the last longitude number is entered.

Saving Present Position as a Waypoint (Save As #)

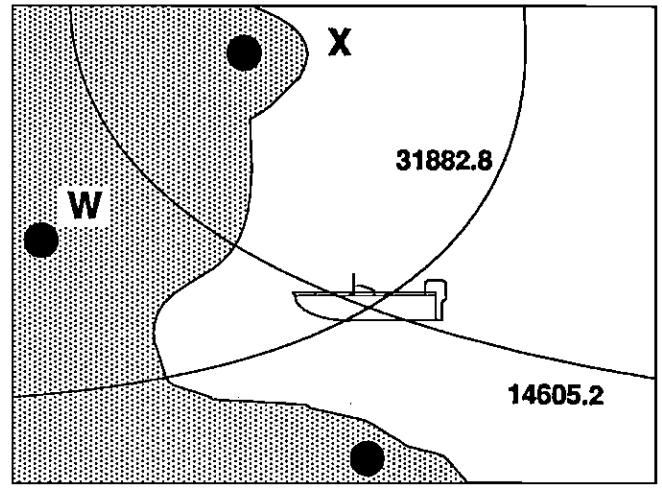
To save your present position using this feature, first press the Waypoint Save key. The menu shown below appears. Now press the key adjacent to the "SAVE AS #" label. The Z-9500 stores your present position under the waypoint number shown on the label. The waypoint number increments each time you save a waypoint, so you don't have to keep track of the waypoint numbers. Once you've stored the waypoint, the Z-9500 returns to the loran display.



Saving Present Position - View and Save Method

The"Save As #" feature doesn't allow the selection of a waypoint number. You have to use the next available number when using that method. To save your present position under any waypoint number, 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.

Your present position in both TD's and latitude/longitude displays at the top right corner of the screen. The first available waypoint number is shown in a black box. In the example screen on the next page, waypoint number one is the first available waypoint. If you want to save this waypoint under a number other than the one displayed, simply press the key adjacent to the up or down labels. This moves the box up or down the list of waypoint numbers. The position saved under each waypoint number appears in the boxes in the upper corner of the display. When the black box is over the desired waypoint number, press the key next to the "Enter" label. The waypoint displayed at the top of the screen will be saved under this number, then the Z-9500 will return to the loran screen. To exit from this screen without saving a waypoint, simply press the key adjacent to the "Clear" label.



All Loran-C receivers work on this principle. Most modern receivers also display latitude/longitude. The receiver takes the TD information and, using a complex mathematical formula, converts it to latitude/longitude position data. You can display both TD's and latitude/longitude on the Z-9500 to determine your position.

GETTING STARTED - INITIALIZATION

The Z-9500 must be initialized or "told where it is" the first time it's turned on. Once it locks on to the proper stations and shows a position, the initialization process won't have to be repeated. The Z-9500 stores the present position, GRI, and stations used in memory each time it's turned off. Therefore, the next time it's turned on it has the necessary data to search for the proper stations for the area you're in. If you travel a long distance with the Z-9500 turned off (over 100 miles), you will need to re-initialize the unit.

There are three different ways to initialize the Z-9500. You can give it a GRI only, a position only, or both. There are advantages and disadvantages to each.

INITIAL POSITION ONLY

If you initialize the Z-9500 using the Initial Position only starting mode, the unit will first pick the best GRI to use in your location. It then looks for the loran stations in that GRI chain. Once it finds them, the Z-9500 will automatically switch stations until it can give a good "fix" and posi-

tion. This is the most automatic initialization format. It requires only the entry of the present position from the operator. You don't have to know which stations are best or the GRI to use the initial position only startup.

However, when the Z-9500 is in the automatic mode, it can change stations at any time if it decides one or more stations are better to use than others. This can result in small position inaccuracies. For example, suppose you use the loran one day and save a waypoint. The next day you decide to navigate to that waypoint. If the Z-9500 uses a different set of stations on the second day than the ones used on the first, you could end up at a location that is a small distance away from the desired one. You can avoid this by switching the Z-9500 into the manual mode after it has locked on to the stations in the chain and has both a good fix and shows a position. Using the manual mode forces the unit to use the ones it is currently using or ones you choose. (See the Manual Station Selection section for more information.)

GRI ONLY INITIALIZATION

This method of starting the Z-9500 requires the most thought from the user. Not only will you need to select the best GRI to use for your area, but you will also have to choose the stations for the Z-9500 to use. Using the GRI only method forces the Z-9500 into the manual mode.

PRESENT POSITION AND GRI INITIALIZATION

Giving the Z-9500 both your present position and the GRI typically lets it find the stations faster. Therefore, it can give you a position faster using this initialization procedure. However, you may need to select stations, since the unit could start in the manual mode.

The reason for this is there are areas of the world that are covered by more than one GRI. One of the GRIs is better to use than the others (depending on your location), due to crossing angles and signal strengths. If the GRI you enter happens to be the preferred GRI for your location, the Z-9500 will switch to automatic and choose the stations to use. If the GRI is not preferred, then the unit will switch to the manual mode and you will have to choose the stations. Based upon the GRI used, you can always switch the Z-9500 into the manual mode, but you can't always use automatic.

Maps of most loran coverage areas are listed in the back of this manual to help you choose a GRI. Many of the maps show the preferred stations to use within the GRI for different locations. Use these stations when initializing the Z-9500 for the best results.

appears.To select a radius, simply press the key adjacent to the up or down arrows in the "PLOTTER RADIUS" menu until the desired radius shows. Then press the key next to the "Clear" label. The Z-9500will return to the plotter with the new radius.

Plotter Update Interval

The plotter shows your track by drawing a solid line behind your present position. When the unit is turned on for the very first time, the position is updated once every ten seconds. You can vary this time from 2 seconds to 20 minutes.

As each dot is placed on the track line, one is erased from the end after a certain length has been achieved. This shortens the plotted line, but still shows the history of your passage. If you plot a course that's a long distance away and use a short update time, the line may not reach from the starting location to the destination.

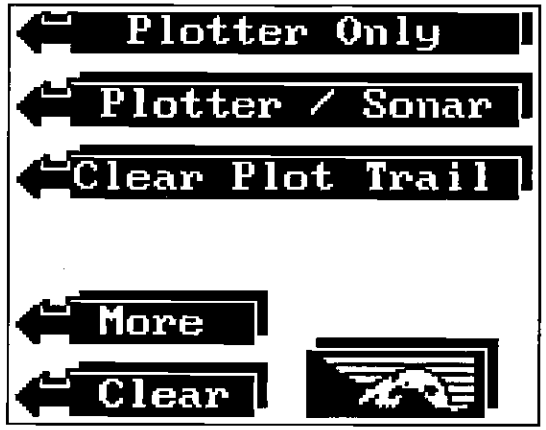
To keep a continuous line plotted, you may want to experiment with the update interval. Lengthening the interval between plots gives you a better chance to see more history.

To change the plotter time, first press the MENU key while the plotter is displayed. Next, press the key adjacent to the "More" label on the plotter menu screen. To select an update interval, simply press the key adjacent to the up or down arrows in the "UPDATE INTERVAL" menu. When the desired time appears in the menu, press the key next to the "Clear" label. The screen will clear, returning to the plotter with the new time. The available times are: 2, 5, 10, 20, and 30 seconds and 1, 2, 5, 10, and 20 minutes.

WAYPOINT NAVIGATION

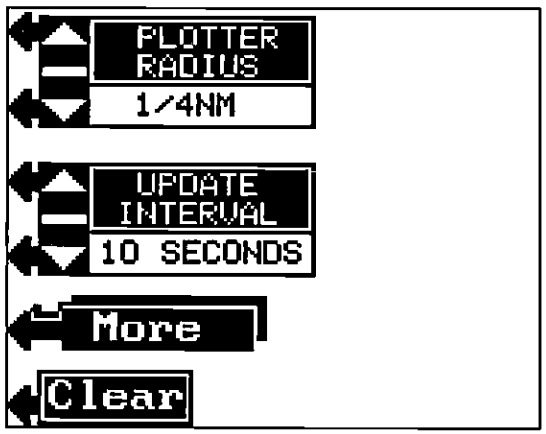
HOW TO SAVE A WAYPOINT

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



Clear Plot Trail

The "Clear Plot" label clears the solid track line. The plotter will continue to draw your track after this key is pressed, however the location of your present position will be centered on the screen.



Plotter Radius

Since the split-screen plotter doesn't have a radius menu, this menu allows the changing of the circle's radius. The plot radius is 1/4 nautical mile when the Z-9500 is turned on for the very first time. The available plot radii are: 1/4, 1/2/, 1, 2, 5, 10, 20, 50, 100, and 200 nautical miles. This lets you zoom in or zoom out the plotter's display. To change the radius, first press the MENU key while the plotter is displayed. Now press the key next to the "More" label. The menu shown above

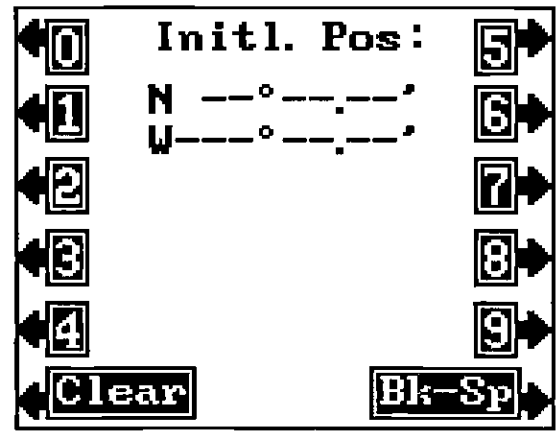
HOW TO INITIALIZE THE LORAN

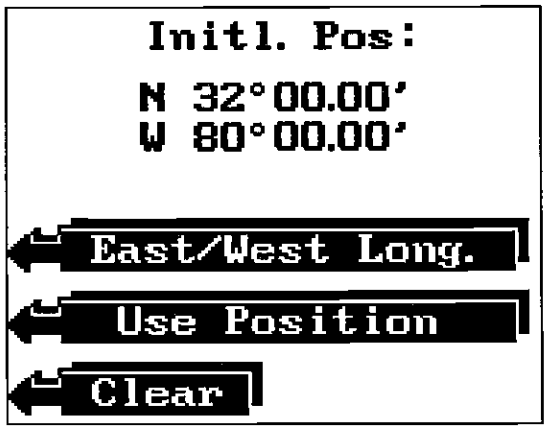
When the Z-9500 is turned on for the very first time, and you press the LORAN key, the screen shown at right appears. To initialize the loran using the GRI search, simply press the key adjacent to the up or down arrows in the GRI box in the center of the screen. If you know your present position, and you want the loran to choose the GRI, press the key adjacent to the "NEW POS" arrow.

(Note: You can re-initialize the loran at any time using the "INITIAL SETTINGS" menu. It's available through the "Change Setup" menu.)

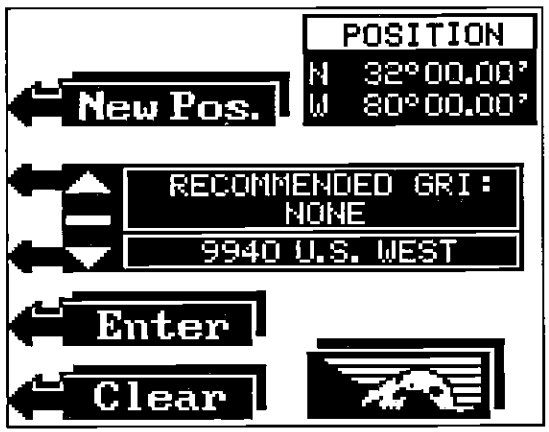
CHANGE INITIAL POSITION

To initialize the Z-9500 using the initial position method, press the key adjacent to the "CHANGE POS" arrow. The screen shown below appears. Now enter your present position in latitude/longitude coordinates. Remember to enter a zero at the beginning of the longitude if it is less than one hundred degrees. The screen shown at the top of the next page appears after the last longitude number is entered.

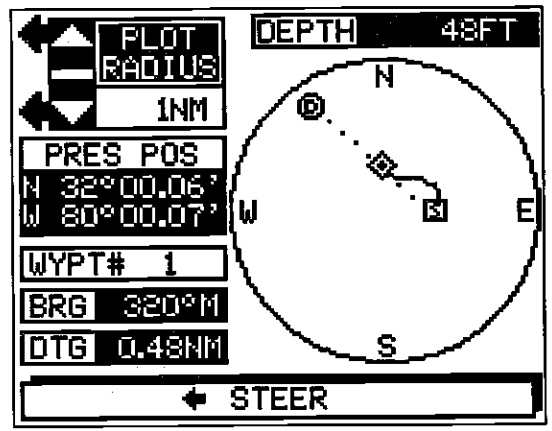




If you are east of Greenwich, England (east longitude), press the key adjacent to the "East/West Long." label. Otherwise, if everything on this screen is correct, press the key adjacent to the "Use Position" label. The screen shown below appears. Ignore the GRI in the center of the screen. Now press the key adjacent to the "Enter" label. The screen



shown at the top of the next page appears. Now press the key next to the "Use Position" label. The unit will start searching for the preferred GRI and place the following message in a window on the screen; "Searching for Stations". The Z-9500 then looks for the stations within the preferred GRI. Once it finds the stations, the postion screen shown on the next page appears. The unit processes the signals until it "locks on" to each station in the chain. It doesn't need to find and lock onto all the stations in a chain to determine the latitude/longitude. However, it does need to lock onto three stations with good signals to calculate a



"D" is the destination. The destination is the recalled waypoint's position. If you are using a route, it's the first waypoint location in the route. The dotted line is the direct path or course from the starting location to the destination. Follow this line to get to the waypoint.

The destination waypoint number is displayed in the plotter's lower left corner. In this example, waypoint number 1 is the destination.

Distance To Go (DTG) and Bearing to waypoint (BRG) are displayed beneath the waypoint number when a waypoint is recalled.

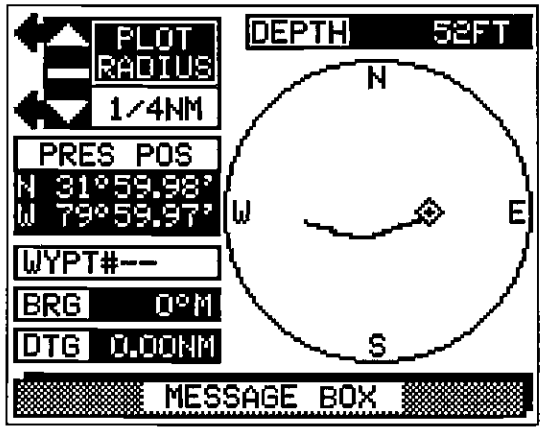
An arrival alarm is available that sounds a tone when you come within a preset distance to the destination. See the section on alarms for more information.

PLOTTER MENUS

Pressing the MENU key while the plotter is displayed gives you a new set of menus, relating only to the plotter. See the menu at the top of the next page.

Split Screen Sonar/Plotter

The Z-9500 can show the plotter in the split screen mode with the plotter on the right side and the sonar graph on the left. To do this, first press the MENU key while the plotter is showing. Now press the key adjacent to the Plotter/Sonar label. To return to the full screen plotter, press the MENU key, then press the key adjacent to the "Plotter Only" label.



depth is displayed at the top of the screen. To the left of the water depth is the plot radius menu. This menu displays the current plot radius (The distance from the center to the outer edge of the circle.) To change the plotter's radius, simply press the key adjacent to the up or down arrow in the "PLOT RADIUS" menu. The available radii are: 1/4, 1/2, 1, 2, 5, 10, 20, 50, 100, 200, and 500 miles. This lets you "zoom" in on your present position, or zoom out to see your whole course, from start to finish. Your present position shows beneath the plot radius menu.

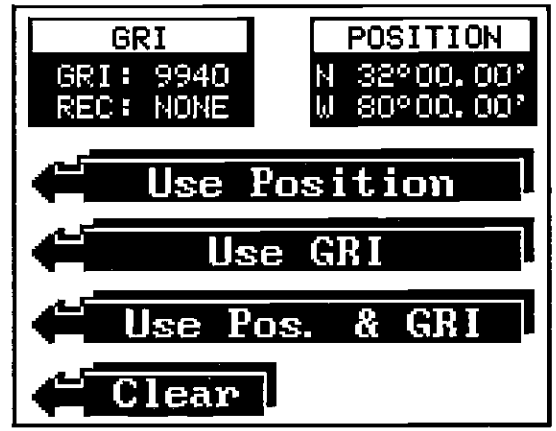
If the diamond representing your present position starts to move outside the circle, the Z-9500 will first clear the display for an instant. Then it will redraw your present position along with a portion of your track near the center of the screen. Your present position will always be on the plotter at all times. You do not have to recall a waypoint to use the plotter.

To clear the plotter, see the Plotter Menus section.

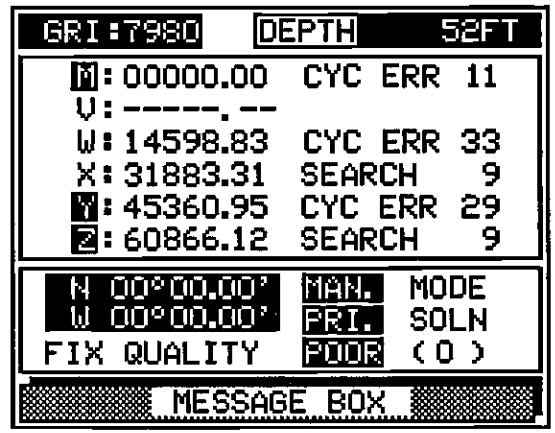
Using the Plotter with a Waypoint

Using the plotter with a recalled waypoint or route is an easy way to see the effects of wind and current on your boat. To use the plotter in this manner, simply recall a waypoint (see the Waypoint Recall section for more information), then press the PLOTTER key. A screen similar to the one at the top of the next page appears.

The "S" is your starting location. This was your position when you recalled the waypoint. The diamond is your present position, and the



latitude/longitude. Since using the Initial Position startup places the Z-9500 in the automatic mode, it will choose the best stations to use. Until the loran finds all of the necessary stations in the chain and locks onto them, it flashes the latitude/longitude. This means the data on the Z-9500's screens are not usable. When the position numbers stop flashing, the loran is ready for use. For more information on the position screen, see page 70.



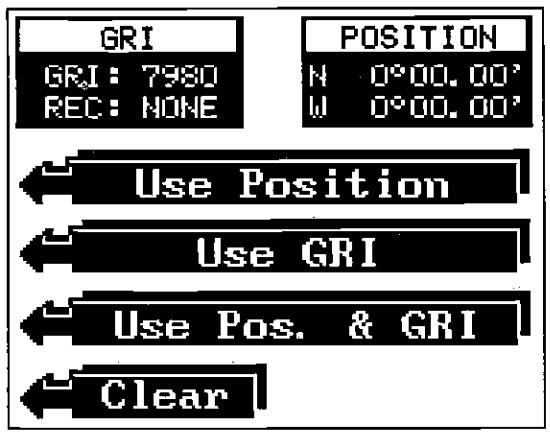
POSITION SCREEN

WARNING: DO NOT NAVIGATE WHEN THE POSITION DISPLAY (EITHER LAT/LONG OR TD'S) IS FLASHING!

CHANGE GRI

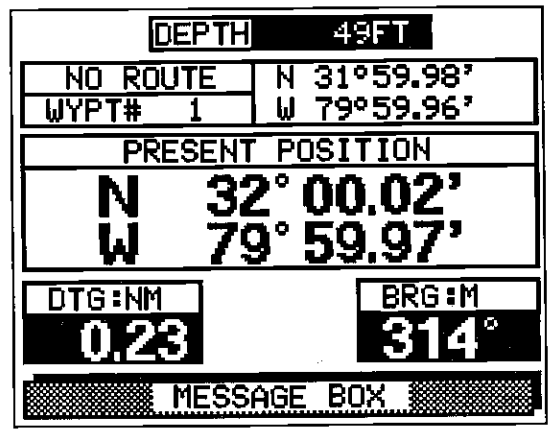
Use this function if you don't know your position. You will need to know both the proper GRI and stations to use. The Z-9500 will calculate your present position using the chain you select. See the charts in the back of this manual for the proper chain and stations to use in your area. Using this initialization procedure switches the Z-9500 into the manual mode. Once you know the chain's number, press the key adjacent to the up or down arrows in the GRI section in the center of the screen. When the desired GRI appears in the box, press the key next to the "Enter" label. In this example, GRI 7980, U.S. SOUTHEAST is used. The screen shown at the bottom of this page appears next.

Now press the key adjacent to the "Use GRI" label. The screen at the top of the next page appears.



NAVIGATION SCREEN - SUMMARY DATA MODE

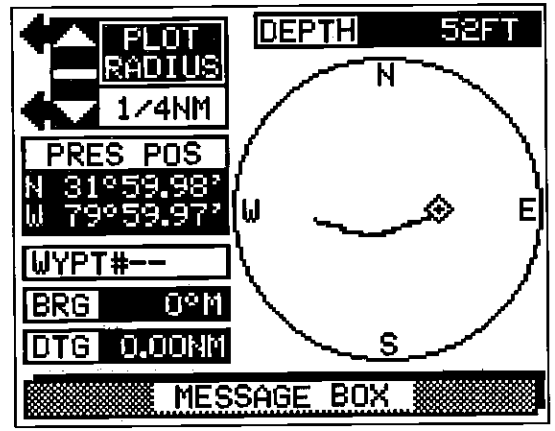
The navigation display in the summary data mode shows bottom depth, route name, waypoint number and position, present position, distance to go, and bearing to waypoint.



PLOTTER

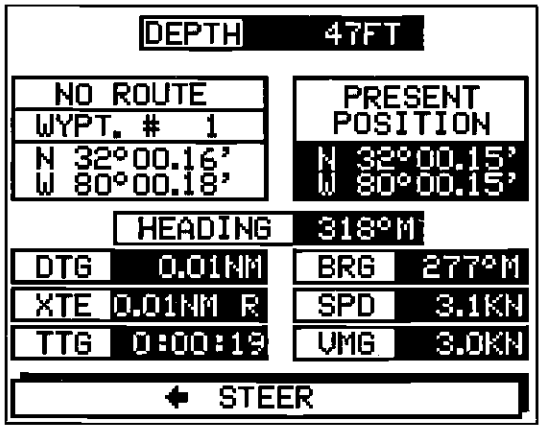
The plotter lets you easily see your course and direction of travel on the screen. The plotter will also show your starting position and destination if you are travelling to a waypoint or on a route.

To use the plotter, simply press the PLOTTER key. A screen similar to the one below appears. The diamond is your present position. The solid line is your track, or path you have travelled. The circle is a compass rose with north, south, east, and west marked. The water



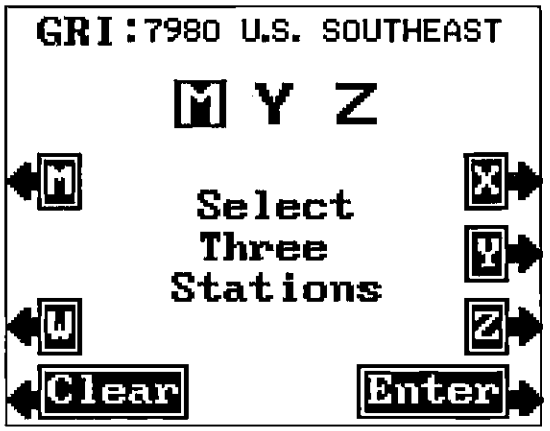
NAVIGATION SCREEN - FULL DATA MODE

This screen shows all navigation information to a waypoint in digital numbers. To display this screen, press the MENU key while the Z-9500 is in the loran mode. Now press the key adjacent to the "Nav. Display" label. The following screen appears.

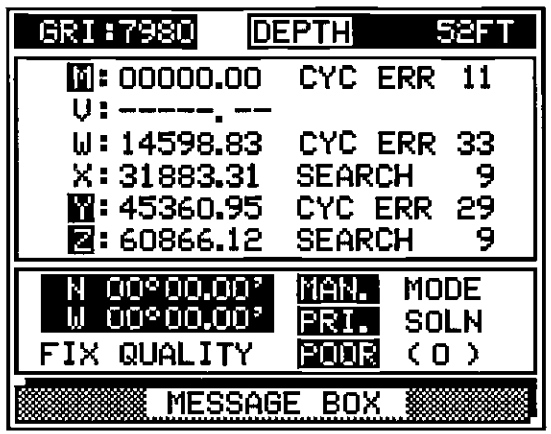


Water depth (Depth) shows at the top of the screen. The route name, waypoint number, and waypoint position are shown on the left side of the screen beneath the depth display. Your present position is shown to the right of the waypoint information boxes. Heading, Cross Track Error (XTE), Time To Go (TTG), Bearing to waypoint (BRG), Ground Speed (SPD), and Velocity Made Good (VMG) show on the lower half of the display.

Heading is the direction you are travelling. Cross track error (XTE) is the distance to the left or right of your course. Time to go (TTG) is the time it will take you to reach the waypoint, based on your current speed. Bearing to waypoint (BRG) is the direction you must travel to reach your waypoint. Ground Speed (SPD) is the averaged speed over ground that you are making. For example, if you are travelling directly against a two knot current and your boat speedometer reads 10 knots, your actually speed over ground is eight knots. The SPD display is calculated from loran data. It doesn't use the optional speed sensor to determine boat speed. Velocity made good (VMG) is the speed you are making towards a waypoint. For example, if you are travelling at ten knots directly at a waypoint and there's no current or wind, then you VMG is ten knots. If you are moving 180 degrees away from the waypoint, then your VMG is -10 knots.



Since using the "Change GRI" feature puts the Z-9500 into the manual mode, you have to select the stations used in the chain. Arrows with the station letters appear on this screen. To select a station, simply press the key next to the desired station's letter. The stations you select appear near the top of the screen. In the above example, stations M, Y, and Z were selected. When you're finished, press the key next to the "ENTER" label. If you simply press the CLEAR key, the Z-9500 returns to the screen at the top of page 62. The Z-9500 automatically switches to the position screen as shown below. Once it locks on to the stations, it should show the proper latitude/longitude on the position display after a short time. To view the station's signal strength and other data, see the "Position Display" section on page 70.

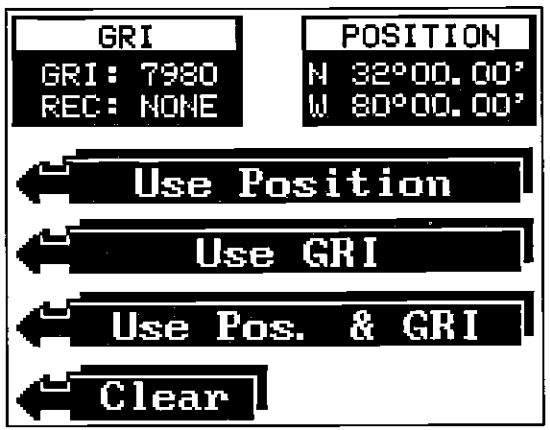


WARNING: DO NOT NAVIGATE WHEN THE POSITION DISPLAY (EITHER LAT/LONG OR TD'S) IS FLASHING!

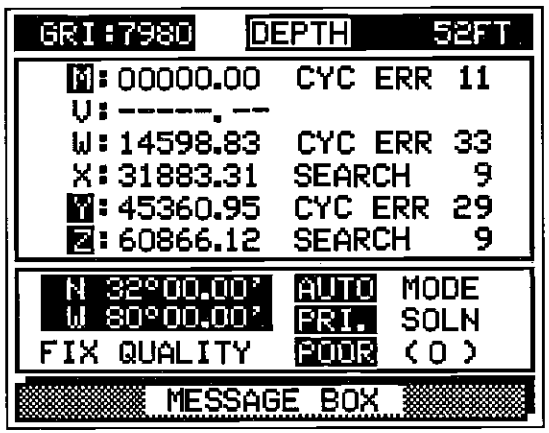
SELECT BOTH INITIAL POSITION AND GRI

As described earlier, using both the position and GRI can help the Z-9500 find and lock on to the loran stations faster. This should allow it to display a position quicker. However, the unit may switch from automatic to manual if a non-preferred GRI is selected. If this happens, you will have to switch to the "Select Loran Stations" screen and choose the proper stations for your location.

To use this feature, first enter your present position and GRI using the methods previously described in the "SELECT INIITIAL POSITION" and "SELECT GRI" sections. After entering these data and pressing the key next to the "ENTER" label, the screen shown below appears.



Now press the key next to the "Use Pos. & GRI" label. The position screen (shown below) appears. The message "Searching For GRI" appears until the Z-9500 finds the stations in the selected GRI.



For example, if the C.D.I. alarm's range is one mile, then the C.D.I. alarm will sound if you are to the left or right of course one mile or more. The C.D.I. alarm ranges are from .25 to 10 nautical miles in .25 nautical mile increments.

To the right of the C.D.I. alarms menu are the Cross Track Error (XTE), Bearing (BRG), and Distance To Go (DTG) displays. The Cross Track Error display shows the distance to the left or right of course in digital numbers. A letter to the side of the number shows if you are to the left (L) or right (R) of course.

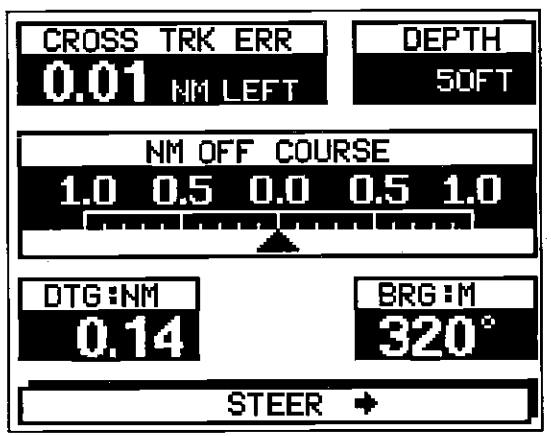
Bearing (BRG) is the direction you are travelling. This is expressed in degrees magnetic.

Distance To Go (DTG) is displayed just below the Bearing display. This is the distance from your present position to the recalled waypoint. The distance is shown in nautical miles.

Your present position shows at the bottom of the screen.

STEERING DISPLAY - SUMMARY DATA MODE

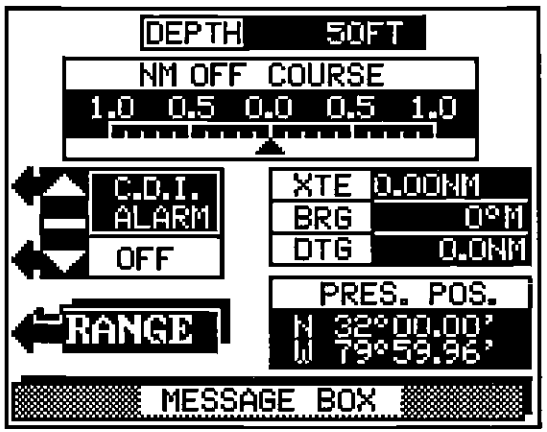
The summary data version of the steering display shows the most important data from the steering display in large numbers. All features on this display work identically to the ones on the full data display. The cross track error in the top left corner of the display. The water depth shows in the upper right corner. The Course Deviation Indicator (CDI) is in the center of the screen. Distance To Go (DTG) and Bearing to waypont (BRG) display at the bottom of the screen.



STEERING DISPLAY - FULL DATA MODE

The steer indicator display shows steering, cross track error, distance and bearing to a waypoint. A waypoint must be saved and recalled to use this display. To display this screen, press the MENU key while the Z-9500 is in the loran mode. Now press the key adjacent to the "Steering Display" label. The screen shown belowappears.

The course deviation indicator (C.D.I.) near the top of the steer indicator screen shows the distance in nautical miles you are to the side of your desired course. (The course is an imaginary line drawn between your starting location and the destination.) This is called "Cross Track Error" or XTE for short. For example, you are a tenth of a mile to the left of course if the C.D.I. arrow points to the 0.1 mark on the left side of the scale. A message also appears at the bottom of the screen: "STEER >". This tells you which direction to steer the boat to get back on course. The cross track error also shows in the "XTE" box on the screen's right side.



The C.D.I. range is 1 nautical mile when the Z-9500 is turned on for the first time. To set it to a different distance, press the key adjacent to the "RANGE" label beneath the C.D.I. alarm menu. This switches the C.D.I. alarm menu to the C.D.I. range menu. Press the key next to the up arrow to increase the C.D.I. range, the down arrow to decrease it. The scale on the C.D.I. indicator at the top of the screen also changes each time you press the key. The available C.D.I. ranges are: 1, 2, 4, and 10 nautical miles.

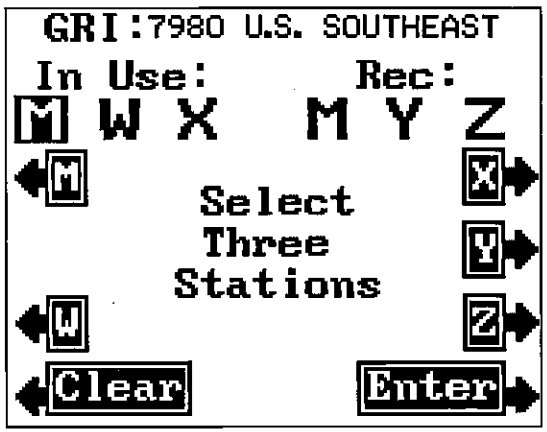
When the Z-9500 is first turned on, the C.D.I. alarm is off. To turn it on, simply press the key adjacent to the up arrow in the C.D.I. alarm menu.

To determine if you need to select stations, watch the indicator in the upper left corner of the screen. If it stays in "AUTO", you won't need to select stations. However, if it switches to "MAN", then you'll need to tell the unit which stations to use. To do this, see the "Manual Station Selection" section below for information on selecting stations.

MANUAL STATION SELECTION

The Z-9500's manual station selection feature lets you decide which stations to use. This also locks the unit in the manual mode.

To manually change stations, first press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the key adjacent to the "SELECT STATIONS" label. The screen shown below appears. The GRI currently used by the Z-9500 shows at the top of the screen. Stations in use are on the left side, stations recommended by the unit (if any) show on the right.



To select stations, simply press the keys adjacent to the desired stations. In this example, the keys adjacent to stations M, W, and X were pressed. If you started the loran using the initial position, or if the loran is showing a latitude/longitude position, then it can recommend stations to use. After selecting the desired stations, press the key adjacent to the "ENTER" label. This activates your selection and returns the Z-9500 to a loran screen. If the stations you've chosen are locked with good crossing angles, the unit should show a latitude/longitude position after a short wait.

AUTOMATIC and MANUAL MODES

The Z-9500's Loran has both automatic and manual modes. This means the unit will select the stations to use when it's in automatic. You must select the stations when it's in the manual mode.

The Z-9500 chooses the stations with the best crossing angles and signal strengths when it's in the automatic mode. It does this by continually monitoring the stations signals to determine the best ones to use. If the unit determines one or more stations are better to use than the current ones, it will automatically switch to the new stations.

However, there are times when you don't want the unit to switch stations. When you're navigating using waypoints is one. You must use the same stations when travelling to a waypoint as the ones used when the waypoint was saved. For example, if the loran was using M,X, and Y when the waypoint was saved, you must use M,X, and Y to navigate back to that waypoint. Otherwise, navigation errors can occur. Placing the unit in the manual mode keeps the Z-9500 from changing stations.

To place the Z-9500 in the manual mode, simply press the AUTO key. The word "MAN" appears at the bottom of the position screen, showing which mode is in use.

Although you can switch from automatic to manual at any time, you can't always switch to automatic. The Z-9500 must be using the preferred GRI for your area in order to use the automatic mode. If you try switching from manual to automatic while a non-preferred GRI is in use, the Z-9500 will simply switch back to the manual mode. (A preferred GRI is one the Z-9500 determines is the best one to use based on your location.) If you are in a location that is covered by multiple GRIs, you won't know which one is the preferred one. However, if the Z-9500 won't let you switch into automatic, you can be certain that you're not using the preferred GRI.

PRIMARY and ALTERNATE SOLUTIONS

The loran normally determines its position by measuring the time difference between the master and two other secondary stations. Each time difference results in a line of position. Your present position is the intersection of the lines of position. This is called a "fix".

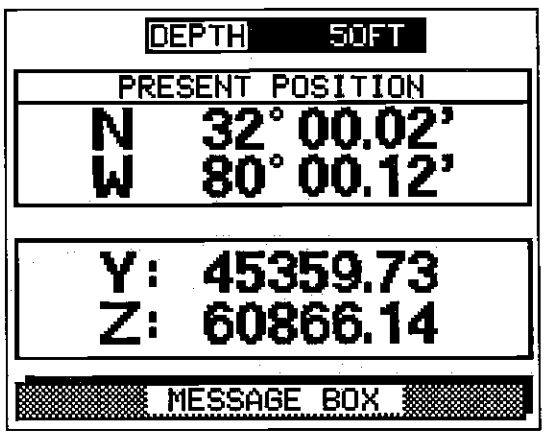
"PRI" appear. "ALT" appear if the unit is in the alternate mode. Fix quality is a measure of the lines of position's crossing angles. If the fix quality is poor, use the displayed information with caution. The displayed position can and will vary with poor crossing angles. The position display flashes the last known latitude/longitude position when the fix quality is not usable. A number to the right of the fix quality message shows the fix quality's value. It's range is from zero (0) to nine (9), with zero the worst and nine the best.

Remember, *do not use the loran for navigation when the position display flashes*! Find and correct the problem before navigating with the unit.

POSITION DISPLAY - SUMMARY MODE

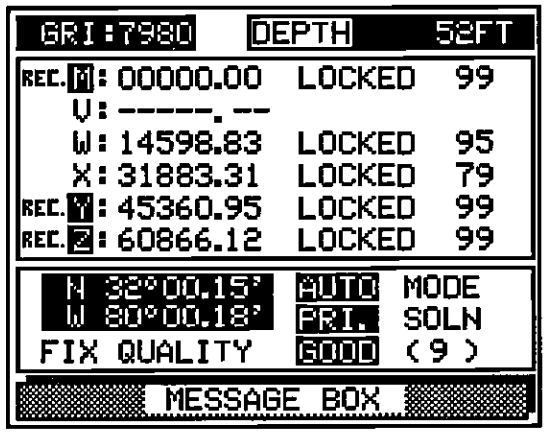
The position display in the summary data mode is shown below. The water depth shows at the top of the screen. Immediately below this is your present position in both latitude/longitude and time differences (TD's). The TD's shown are the ones used by the Z-9500 to calculate the latitude/longitude.

The message box at the bottom of the screen shows pertinent messages when necessary. For example, the cross track error message appears :"STEER >" when you move to the left of course.



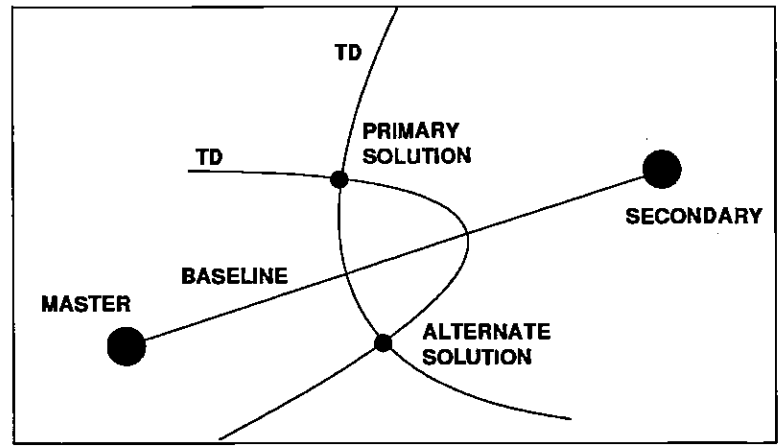
POSITION DISPLAY - FULL DATA MODE

The position display shows GRI in use, water depth (DEPTH), TD's for all stations in the chain, station status, SNR for each station, present position (in latitude/longitude), automatic or manual mode indicator, primary or alternate solution indicator, and fix quality.



The GRI in use and the water depth show at the top of the screen. Immediately beneath these is the station data box. The TD (time difference) for each station shows to the right of the station's letter. The stations in use by the loran to calculate the latitude/longitude have a black box around their letter. In the example above, the Z-9500 is using stations M, Y, and Z to calculate the present position. The letters "REC" to the left of the station letters show which stations the Z-9500 recommends to use. To the right of the TD's the station status shows. This will be one of five messages: BLINK, SEARCHING, LOW SNR, CYC ERR, or LOCKED. Blink is a message from the station warning that it is not usable at this time. Searching means the loran is trying to find the station's signal. Low SNR means the signal-to-noise ratio is low. (See below.) Cyc Err is short for Cycle Error. It means the loran has not locked onto the correct third cycle crossing of the signal. Locked means the unit has locked on to the thrid cycle crossing and is a usable station. *Navigate only with stations showing a "LOCKED" message!* To the right of the station message is the SNR display. This shows the signal-to-noise ratio or SNR. The larger the number, the better. The range is 0 to 99. Beneath the station box is the present position display in latitude/longitude. To the right of the position display are the automatic/manual mode, primary/alternate solution, and fix quality indicators. If the unit is in the automatic mode, the letters AUTO appear. If the letters "MAN" appear, then it's in the manual mode. The primary/alternate solution display is similar. If the unit is in the primary mode, the letters

A mathematical formula in the loran receiver uses TD's to determine the latitude/longitude position. Due to the nature of loran, your position in latitude/longitude can be on either side of a baseline. (The baseline is an imaginary straight line connecting the master and each secondary station.) It's possible for the loran to lock onto the stations, give good fix qualities and signal strengths, but show the latitude/longitude on the other side of the baseline from your present position. These two positions (your present position and the one on the other side of the baseline) are called the primary and alternate solutions. They're usually far apart, making it easy to tell if the loran is displaying a position far from your actual location. However, if you're close to the baseline, the difference between the alternate and primary solution could be only a few miles, or less. For this reason alone, its always important to know your approximate position when initializing or using a loran.

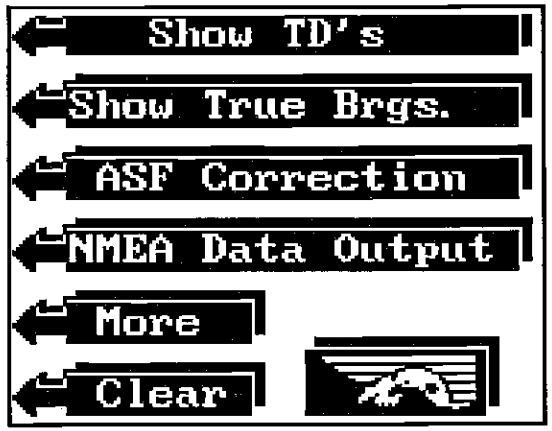


To switch from the primary to the alternate solution, first press the MENU key. Next, press the key adjacent to the "CHANGE SETUP" label. Now press the key adjacent to the "Primary Sol. OFF" label. The Z-9500 returns to a loran screen after this selection. If you're using a screen with the latitude/longitude displayed, the lat/long will flash until a new position displays. If the unit doesn't show the proper latitude/longitude position, you may have to change stations, then try switching the primary and alternate solutions.

The solution currently in use by the Z-9500 is displayed at the top of the position screen. See the "Position Screen" section for more information. Check your position against the loran after it displays a new latitude/longitude. They should be the same. To switch back from the alternate to the primary solution, repeat the above steps. The only difference is the label now reads "Primary Sol. ON".

SHOW TD'S

The Z-9500 shows either latitude/longitude or time differences (TD's) on most screens. To switch between latitude/longitude and TD's, first press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the key next to the "MORE" label until the menus shown below appears. In this example, the Z-9500 is displaying the position in latitude/longitude. To change to TD's, press the key adjacent to the "Show TD's" label. The Z-9500 will revert to the last loran screen and show the position in time differences. To switch the display again, simply repeat the above steps. The menu will now read "Show Lat/Long's". Press the key adjacent to this menu to get latitude/longitude displays.



TRUE and MAGNETIC POSITION

Most navigators realize there is a difference between true and magnetic north. True north is the top of the world. It's where all lines of longitude converge. Magnetic north is the location our compasses point. It lies several hundred miles to the south of true north, at a location in Canada.

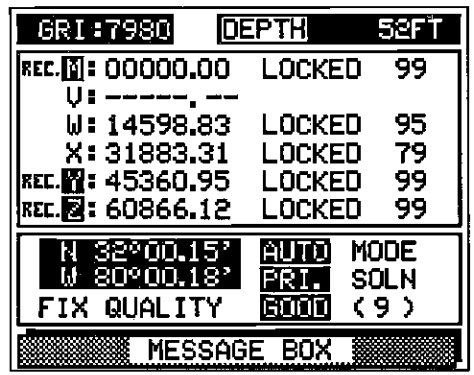
Charts are usually laid out according to a Mercator projection which uses true north. If you plot a course on a chart using the Mercator projection, you'll either have to convert magnetic readings to true or use true readings.

The Z-9500 can display navigation information in magnetic or true. When it's turned on for the very first time, magnetic is used. To switch to true, press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the key adjacent to the "MORE" label. The menu shown above appears. In this example, magnetic is in effect. Now press the key adjacent to the "Show True Brgs." label. The screen will clear and return to the last used loran screen, showing all navigation information in degrees true. Repeat these steps to switch back to magnetic. The menu now reads "Show Mag. Brgs."

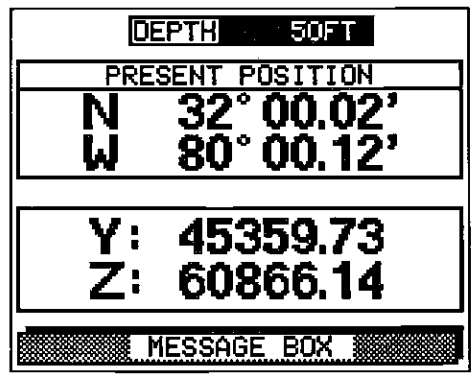
FULL AND SUMMARY DATA MODES

The Position, Navigation, and Steering displays show their information in one of two ways, either full or summary. The full data mode shows all information available for that display in small letters and numbers. The summary data mode shows a partial list of the data in large letters and numbers. The summary data mode doesn't show as much information as the full data mode, but it's easier to read due to the larger characters. The Z-9500 is in the full data mode when it's first turned on or after a preset.

To switch between the full and summary data modes, first press the MENU key. Now press the key next to the "More" label. Finally, press the key adjacent to the "Turn Summary On". This switches all three displays at the same time. To return to the full data mode, repeat the above steps. The menu now reads "Turn Summary Off".



POSITION SCREEN FULL DATA MODE



POSITION SCREEN SUMMARY DATA MODE