**TRANSDUCER** - The element of a sonar system that converts the electrical energy from the transmitter into ultrasonic sound waves. When a return echo strikes the transducer, it converts the sound waves into electrical energy which is received and displayed by the sonar unit.

**TRANSOM MOUNT** - A method of mounting transducers or other sensors on the transom of the boat.

**UPPER/LOWER LIMIT** - These are the range limits displayed on the sonar screen or paper. The upper limit is shown at the top of the display, while the lower limit is at the bottom. For example, a 20 to 30 foot range has 20 feet as the upper limit and 30 feet as the lower limit.

**VIDEO GRAPH** - A sonar unit that uses a CRT or television type display.

**WINDOW** - A segment of the depth range. For example, an upper limit of 20 feet and a lower limit of 50 feet creates a 30 foot window.

**ZOOM** - A feature that enlarges targets on the display.

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**TABLE OF CONTENTS**

- **INTRODUCTION** 1
- **INSTALLATION** 1
- **POWER CONNECTIONS** 2
- **TRANSDUCER** 3
- **NOISE** 5
- **KEYBOARD BASICS** 6
- **DISPLAY INTERPRETATION** 8
- **OPERATION** 9
- **ON** 9
- **OFF** 9
- **POSITION** 10
- **LEFT-CENTER-RIGHT-ALL** 11
- **SCAN - LOCK** 12
- **AUTO** 13
- **SENSITIVITY** 13
- **AUTOMATIC SENSITIVITY** 14
- **CHART SPEED** 15
- **SCALE** 16
- **RANGE** 16
- **LOWER LIMIT** 16
- **ZOOM** 17
- **AUTO BOTTOM TRACKING** 18
- **GRAYLINE** 18
- **DIGITAL** 19
- **ZONE ALARM** 20
- **FISH L.D.** 22
- **LIGHT** 22
- **COMMAND** 22
- **MENU #1 - ALL MODE** 23
- **MENU #2 - FISH SIZE** 25
- **MENU #3 - SURFACE CLARITY CONTROL (SCC)** 25
- **MENU #4 - DISCRIMINATION** 26
- **MENU #5 - SPEAKER VOLUME** 27
- **MENU #6 - UNITS (FEET-FATHOMS-METERS)** 28
- **MENU #7 - DIGITAL DISPLAY** 28
- **MENU #8 - DIGITAL SIZE** 29
- **MENU #9 - TENTHS** 29
- **MENU #10 - DIGITAL AVERAGING** 30
- **MENU #11 - FAST SCROLL** 30
- **MENU #12 - ZONE BAR** 31
- **MENU #13 - SHALLOW ALARM** 32
- **SIGNAL INTERPRETATION** 32
- **FISH SIGNALS** 33
- **WATER TEMP. AND THERMOCLINES** 34
- **SURVEYING A LAKE** 36
- **BAIT FISH** 37
- **SCHEMATIC AND PARTS LIST** 37
- **SPARE PARTS** 38
- **SPECIFICATIONS** 38
- **GLOSSARY** 39

Copyright © 1987 Eagle Electronics, Inc. All Rights Reserved.
REMOTE - An intelligent "repeater" unit that receives depth information from another sonar unit. A remote doesn't have a transmitter or receiver. However, it does have its own features that are adjustable and operate separately from the master.

RESOLUTION - The ability of a sonar unit to separate targets from each other or the bottom.

RMS - A standard rating of transmitter power output.

SCALE - The markings on a sonar unit's display. To determine the depth of a target, simply compare the target's location to the location of the scale markers on the display.

SECOND ECHO - Another echo that registers at roughly twice the depth of a target echo. This is caused by the sound waves reflecting off the bottom, striking the surface of the water, travelling to the bottom again, and returning to the surface.

SECOND FUNCTION KEY - A button that converts the functions of the primary keys on the keyboard. Sonar units with a second function key have other keys with two functions. You can switch functions with the second function key.

SENSITIVITY - The ability of a sonar unit's receiver to display targets. Increasing the sensitivity allows weaker targets to be displayed. Also called "gain".

SCROLL SPEED - See CHART SPEED.

SHOOT-THROUGH-HULL - A transducer installation which allows the sonar signals to pass through a fiberglass hull without cutting a hole in the hull.

SUPPRESSION - A method used in some sonar units to eliminate interference or noise.

SURFACE CLARITY CONTROL - Reduces or eliminates undesirable signals displayed near the water's surface. Also called "SCC".

THERMOCLINE - A layer of water caused by the meeting of warm and cool layers of water. The thermocline provides the temperature most fish prefer.
displayed in black, stronger targets are gray. It also gives clues to the composition of the bottom. In other words, you can tell if the bottom is soft or hard. A hard bottom returns a strong signal causing a wide gray line. A soft, muddy or weedy bottom returns a weaker signal which is emphasized with a narrow gray line.

IN-DASH - A sonar unit installed through a hole in the boat’s dash. Usually, the face of the sonar is flush or nearly so with the dash.

kHz - Kilohertz. A measurement of frequency. Your Eagle sonar operates at 192 Kilohertz. (192,000 cycles per second).

LCD - Liquid crystal display. The screen or display of a Liquid Crystal Graph sonar instrument.

LCG - Liquid Crystal Graph.

NOISE - Any undesired signal. Electrical noise is caused by engine ignitions systems, radios, etc. Acoustic noise is caused by the vibration of the engine or other mechanical sources. It appears on the display as random dots or lines.

OPERATING FREQUENCY - Frequency that the sonar unit’s transmitter and receiver are tuned to.

OUTPUT POWER - The amplitude of electrical energy transmitted from the sonar unit to the transducer. Measured in watts, the higher the output power, the deeper a sonar unit can read, and more detail can be displayed.

PEAK-TO-PEAK - A measurement of the transmitter’s power output.

PIXEL - The small dots or squares on a liquid crystal display or CRT.

PIXEL DENSITY - The number of pixels per square inch on a liquid crystal display. The best resolution is obtained when a high number of pixels are in the vertical.

PULSE LENGTH - The amount of time that the sonar transmits. This is measured in micro-seconds. The shorter the pulse length, the better the resolution. For example, a 30 micro-second pulse length is equal to a one inch resolution.

RANGE - The section of water shown on the sonar display. For example, a 60 foot range has zero for the upper limit and 60 for the lower limit.

INTRODUCTION

The revolutionary Eagle 3D-100 boasts a 3-element transducer that gives three dimensional elements of depth, distance, and direction. Fish are located to the right, left, or in the center, even in shallow water. This wide range means you can see more of the underwater world at a glance regardless of depth.

The 3D-100 also features an advanced Fish I.D. system that identifies fish from other targets by flashing their echoes on the liquid crystal display.

When the 3D-100 is turned on, it automatically finds and displays the bottom signal and other targets. As the bottom depth changes, the 3D-100 changes the range and sensitivity to keep the bottom signal on the display. If desired, the only key that needs to be touched is the ON key. However, disabling the automatic mode allows manual adjustment of the 3D-100.

The 3D-100 is nitrogen filled and sealed for complete waterproof protection. The liquid crystal display and keyboard are backlit for easy use at night. Plus, it’s covered by a full one year warranty. This includes all parts and labor for one year from the date of purchase.

To get started with your 3D-100, first read the installation section. This is where it all begins, and improper installation can cause problems down the road. After you’ve read these instructions and installed your 3D-100, read the rest of this manual in detail. The more you know when you get to the water, the more your 3D-100 will do for you.

INSTALLATION

Mounting
Install the 3D-100 in any convenient location, provided there is clearance when tilted for the best viewing angle. Holes in the bracket base allow wood screw or through bolt mounting. Attach the bracket to aluminum panels with sheet metal screws. 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.

You can route the power and transducer cables through the 1" hole in the base of the gimbal bracket. Then pass them through a hole in
the mounting surface. The smallest hole that will pass the transducer connector through is 1". Pass the transducer connector and cable up through the hole and gimbal bracket. Then push the power cable wire down through the bracket and dash. After routing the cables, fill the hole with silicone rubber adhesive (RTV). Offset the bracket to cover the majority of the hole.

Power Connections

The 3D-100 operates from a 12 volt battery system. Attach the power cable to an accessory or power buss. If you have problems with electrical interference, then attach the cable directly to the battery. Electrical interference shows as random dots on the display whenever the boat’s engine or an accessory is on.

The power cable has two wires, red is the positive lead and black is negative or ground. Attach the in-line fuse holder to the red wire on the power cable with the crimp connector. The other end of the fuse holder attaches to the battery or accessory buss. If the cable is not long enough, splice ordinary #18 gauge wire onto it. Be certain that the fuse holder is as close to the power source (battery or accessory buss) as possible. This protects the power cable and your 3D-100 in the event of a short. Use a 3-amp fuse.

The 3D-100 has reverse polarity protection. No damage will occur if the wires are reversed. (However, the unit will not work until the wires are attached correctly.)

GLOSSARY

ANCHOR WATCH - A setting of the sonar unit’s alarm. The alarm activates when the boat drifts into shallower or deeper water than the alarm set points.

BACK-LIGHTED - A display or keyboard illuminated from behind by a light. Back-lit displays and keyboards are essential when night fishing or navigating.

CAVITATION - Air bubbles created by the high speed movement of a boat or transducer through water.

CHART SPEED - (1) The speed of the chart paper on a paper graph recorder. (2) The speed of an image across the screen of a liquid crystal graph. (Also called “scroll speed”).

CONE ANGLE - Width of the transducer’s cone of sound. Eagle has transducers with cone angles from 8 to 45 degrees to suit the varying needs of fishermen.

CRT - Abbreviation for Cathode Ray Tube. See Video Graph.

DEFINITION - The ability of a sonar unit’s display to show detail. A high resolution display can show more detail than a low resolution one.

DISCRIMINATION - A feature that allows the sonar to eliminate noise and display only true target information. Discrimination on Eagle products cuts out false signals from other sonar, noise, thermoclines, and more.

FISH ALARM - An alarm that activates when a fish is detected.

FISH ARCH - A sonar with good resolution displays fish signals with an upside down “V” or arch. This distinguishes fish signals from other targets.

FLUSH MOUNT - A transom mount transducer that is installed with the bottom of the transducer flush with the bottom of the hull.

GIMBAL BRACKET - A bracket used to install a sonar unit permanently. The sonar unit can rotate in the bracket for the best viewing angle.

GRAYLINE - This function shows the relative strength of signals displayed on the screen. Signals weaker than the GRAYLINE setting are
SPARE PARTS

The following is a list of the most commonly needed parts. To order, simply write the list of parts required on a slip of paper and mail it to the above address.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>151-0071-00</td>
<td>Power Cable</td>
</tr>
<tr>
<td>003-2250-00</td>
<td>Gimbal Knobs (w/washers, 2 ea.)</td>
</tr>
<tr>
<td>003-2223-00</td>
<td>Gimbal Bracket</td>
</tr>
<tr>
<td>003-2181-00</td>
<td>Fuse Holder (w/3 amp fuse)</td>
</tr>
<tr>
<td>988-0106-12</td>
<td>Owner’s Manual</td>
</tr>
</tbody>
</table>

SPECIFICATIONS

Dimensions: 5 3/4"H x 8 3/16"W x 2 5/8"D

Weight: 1 3/4 pounds

Transmitter:
- Frequency: 192 kHz
- Output Power: 500 watts peak to peak typical
  63.5 watts RMS

Receiver Sensitivity: > 85 db temperature stabilized

Operating Current:
- 200 ma (lights off)
- 500 ma (lights on)

Operating Voltage: 9-15 vdc

Number of pixels: 82 x 32 (vertical x horizontal)
  2624 Total

Depth Capability: 300'-600' (typical)

Display Scroll Speed: .5" per minute (minimum)

TRANSDUCER

The 3D-100 transducer is the product of years of experience and careful design. It is a unique transducer, not used by any other sonar manufacturer. The plastic housing is impervious to corrosion. The stainless steel brackets and hardware are designed to compensate for the angle of the transom. This transducer must be installed point forward, below the hull. It cannot be mounted in a shoot-thru-hull installation.

1. The transducer bracket has several mounting variations. If the transom is "notched" or has a step, use the extension bracket. Assemble the bracket as shown in the illustrations. Place as many internal tooth lock washers on each side of the "U" shaped transom bracket as necessary to fill the space. Eight washers are supplied for both the "U" bracket and the transducer extension bracket. However, it may not be necessary to use all of them. Just make certain the spaces are filled with the lock washers. Attach the bracket to the transducer. Do not tighten the hardware at this time.

2. Locate the bracket where the flow of water is smoothest. There should be minimum turbulence and air bubbles coming out from under the transom when the boat is moving. Also, the transducer should not interfere with the trailer, nor should it be mounted directly in line with the engine’s lower unit.
3. Place the bracket against the transom in the selected area. The top of the transducer should lightly touch the bottom of the hull, but it is not absolutely necessary for it to do so. When the boat is on a plane, the transducer should be at least half submerged. The transducer should hang straight down, parallel with the ground - not at an angle. Using the bracket as a template, mark the transom for the mounting holes. Make certain to use all four mounting holes.

4. Drill holes in the hull in the positions marked in the last step. Stainless steel #12 wood screws are the smallest allowed for fiberglass hulls. Use 1/4-20 stainless steel machine screws on aluminum hulls. You may need to attach a plate to the inside of the transom on thin hulls.

5. Mount the bracket to the transom. Adjust the transducer so that it is parallel with the ground. Tighten all hardware.

School of fish when you're over it, you may not be able to find it again.

BAIT FISH

The importance of bait fish to successful fishing can't be overemphasized. They are the principle food of all game fish in most waters.

Bait fish are the plankton feeding forage fish, such as minnows and shad. Bait fish can also be the young of game fish, such as crappies, bluegill, and bass.

Most bait fish concentrate within five feet of the surface where sunlight promotes the growth of the plankton on which they feed. One method of fishing is to use the 3D-100 to find the bait fish first. A school of bait fish will look like a "cloud" on the 3D-100's display. Usually, game fish will be nearby, often directly beneath the school of bait fish.
The temperature of water in the lake is seldom constant from top to bottom. Layers of different temperatures form, and the junction of a warm and cool layer of water is a thermocline. The depth and thickness of the thermocline can vary with the season or time of day. In deep lakes there may be two or more at different depths. Thermoclines are important to fishermen because they are areas where fish are active. Many times bait fish will be above the thermocline while larger game fish will suspend in or just below it.

The 3D-100 can detect this invisible layer in the water, but the sensitivity will probably have to be turned up to see it.

A knowledge of the water temperatures various fish prefer, and in which they usually remain, helps you get the most from your 3D-100.

SURVEYING A LAKE

The most successful anglers on any body of water are those who fish it day after day and year after year. Eventually, they learn the hot spots that produce fish consistently. They discover through experience where, and at what depth, they can expect to find the fish they want at any season. And they realize that these productive areas change throughout the year depending on water level, temperature, food, and other factors.

With the 3D-100, anyone can eliminate guesswork and concentrate on the areas where fish are likely to be. Even if it's the first time on the lake!

The most efficient way to become acquainted with a body of water is to survey it with your 3D-100. Start with a map of the lake, if possible, and indicate the promising spots in relation to landmarks on shore.

As you go about your survey, your 3D-100 will tell you the depth and type of bottom. It will also reveal suspended fish. Multiple signals on the dial usually indicate a good school of fish and it's worth it to stop and fish for them. You may not get any further.

Keep a few marker buoys in the boat, ready to toss overboard. When the 3D-100 indicates a school of fish, throw the buoy out. The string will unwind until the sinker hits bottom. Then, because of the marker's flat shape, it won't unwind any further. With the school thus marked, you can make your turn and come back to fish in exactly the right spot. This is essential when you're far from shore on a big lake. Unless you mark the

6. Drill a 1" hole in the transom above the water line to pass the transducer cable through. Seal the hole with RTV silicone rubber adhesive. Route the cable forward to the sonar unit, keeping it away from engine, bilge pump, or other wiring that has high amounts of electrical noise. VHF radio power wires and antenna cables also should be routed away from the transducer cable.

7. Connect the transducer cable to the 3D-100 unit and make a test run. If the unit doesn't operate well at high speeds, try raising the nose of the transducer 1/16" - 1/8".

NOTE:
Periodically wash the transducer with soap and water to remove any oil film that may collect. Oil and dirt on the transducer will reduce sensitivity and can prevent sounding.

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 that runs from the engine to the instrument panel. This harness usually contains a wire for the tachometer which radiates RF (radio frequency) energy. For best results, keep the power and transducer cables away from the engine wiring. Also, bilge pump wiring can sometimes radiate noise so try to keep the 3D-100's cables away from those wires.

VHF radio antenna cables radiate RF energy at higher power levels than even the engine's wiring harness. It is important to keep the 3D-100's power and transducer cables as far away as possible from VHF radio cables.

If interference begins at slow boat speeds, worsening as the boat speed increases, then a probable cause is acoustic noise, or cavitation. This noise is not electrical, but rather mechanically induced noise from the transducer. Stop the boat, put the engine in neutral, and increase the RPM. If the noise does not increase on the display, then it is cavitation. Usually, air bubbles passing over the face of the transducer create this acoustic noise. The faster a boat travels, the more air bubbles increase and generate noise on the display. To solve this problem, the transducer must be moved to a location that has smooth water flow, or it must be lowered beneath the turbulent water.
KEYBOARD BASICS

This section gives a brief explanation of the keyboard. Read the Operation section for a detailed description of each key's operation.

**GRAYLINE ON/OFF** This key turns the GRAYLINE function on and off.

**AUTO** The AUTO key switches the 3D-100 in or out of the automatic mode. The 3D-100 automatically adjusts the sensitivity and range selection at power on. Pressing the AUTO key allows you to take control of the 3D-100, making manual adjustments as desired. When the 3D-100 is in the automatic mode, the word "AUTO" displays immediately below the sensitivity bar.

**COMMAND FUNCTION** The 3D-100 has "menus" of features that are accessed with this key.

**ZOOM** Targets on the display are enlarged to twice normal size or "zoomed" with this key.

**ON/OFF** These keys turn the 3D-100 on and off. To turn it on, simply press the ON key. To turn it off, press the OFF key.

Pressing any key generates a tone or "beep." This is the 3D-100's way of telling you that it has accepted a command.

Most fish don't spawn unless the water temperature is within rather narrow limits. To find the different temperatures, a surface temperature meter, such as the EDT-20 is a valuable aid to your boat. This unit provides an extremely quick response to identifying the desired surface water spawning temperatures for various species. Trout can't survive in streams that get too warm. Bass and other fish eventually die out when stocked in lakes that remain too cold during the summer. While some fish have a wider temperature tolerance than others, each has a certain range within which it tries to stay. Schooling fish suspended over deep water lie at the level that provides this temperature. We assume they are the most comfortable here.
If a partial arch occurs most of the time on your unit (the mark curves up, but not back down, or vice-versa) it could be the transducer is not pointing straight down. Adjust a transom mounted transducer until the fish show the distinctive arch. This may take some trial and error until you achieve the correct mounting.

Remember, there must be some movement between the boat and the fish to develop the arch. Usually, this means trolling at very slow speeds with the main engine in gear at a minimum throttle setting.

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 3D-100 may not arch at all. This is due to the narrow cone diameter and the resolution limitations of the display. Even the 20 degree transducer has only a 3 foot diameter at this depth.

Compared to a paper graph, a 3D-100 cannot show as fine of detail. The reason for this is the pixels (dots on the screen) are much larger than a paper graph's markings. Therefore, the 3D-100 cannot show fish arches as well as a graph. Plus, it requires a bit more work initially to read and interpret the screen than a paper graph.

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.

One of the best ways to get fish arches is to expand or "zoom" a segment of the water. For example, 40 to 60 feet. The smaller the segment, the better the screen resolution will be. Then, turn up the sensitivity 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.

WATER TEMPERATURE AND THERMOCLINES

Water temperature has an important if not controlling influence upon the activities of all fish. Fish are cold blooded and their bodies are always the temperature of the surrounding water. During the winter, colder water slows down their metabolism. At this time, they need about a fourth as much food as they consume in the summer.

SENSTIVITY These keys control the graph's sensitivity. (The digital automatically adjusts its sensitivity.) The receiver sensitivity has 32 steps, allowing adjustment over a wide range of conditions. The left arrow key decreases the sensitivity, the right arrow key increases it.

KEYBOARD BASICS

CHART The CHART group of keys controls the chart speed. The 3D-100 has 32 chart speeds, ranging from very slow to FAST. Pressing the FAST key speeds up the chart speed. The slow key reduces it.

ZONE ALARM KEYS This group of keys controls the 3D-100's zone alarm. It's commonly used as a "fish alarm." A target (such as a fish or school of fish) will set off the alarm if it enters the alarm zone.

RANGE The arrow keys allow the selection of depth ranges. Press the up arrow to decrease the range depth. Press the down arrow to increase the range.

FISH I.D. These keys turn the "fish identification" and the fish alarm on or off.

POSITION These keys control the 3D-100's transducer. You can adjust it to show only the left, center, or right side of the transducer's effective cone angle. It can also automatically scan between all three, or display all three elements at the same time.

Note: The 3D-100 has many more features than the ones just discussed. For a detailed look at the 3D-100's features and operation instructions, read the Operation section of this manual.
DISPLAY INTERPRETATION

Here’s a sample display. First, we’ll turn on the 3D-100 by pressing the ON key. The lights will flash for six seconds. The chart scrolls the return echoes across the screen and the digital is searches for the bottom depth. It flashes 0 until it finds the bottom. Once it finds the bottom, the depth is displayed.

Here the 3D-100 has found the bottom at 48 feet. The range is zero to 100 feet. It automatically chooses a lower limit that places the bottom signal near the bottom of the display.

The bar at the top of the display is the sensitivity bar. It shows the sensitivity in use. The bar extends from left to right. A very short bar indicates minimum sensitivity. Setting the sensitivity to maximum causes the bar to run completely across the top of the display.

The word AUTO indicates the 3D-100 is in the automatic mode.

The top line of the display is always a dashed line. It moves from right to left, showing the chart is moving. As the chart speed increases or decreases, the dashed line changes speed accordingly. Stopping the chart causes the line to flash on and off.

The range has both an upper limit and a lower limit at the top and bottom of the display, respectively. In this example, the range is 0 - 100 feet. Scale markers printed on both sides of the display help determine the actual depth.

The letters "ALF" at the bottom of the screen means All three elements in the transducer are in use, the 3D-100 is Locked onto all three elements and it isn’t scanning, and Fish I.D. is on. This mode is automatically enabled when the 3D-100 is turned on. Depth information from all three elements of the transducer are simultaneously shown on the display.

Brush usually lies on the bottom and shows up as clumps rising above the bottom signal. Brush signals look similar to large rocks, however their signal is not as strong as rock.

FISH SIGNALS

The signals displayed on the 3D-100 by fish are identified by various shaped markings in certain patterns, as opposed to random marks created by noise. Or the solid, continuous markings made by the bottom.

Typically, fish are identified by a characteristic arch that separates them from their stationary surroundings. The reason for this is shown below. The distance to a fish when it moves into the sonar’s cone of sound is shown as “A” in the drawing below. When the fish has moved into the center of the cone, the distance to it will be shorter, “B”. As it moves out of the cone, the distance will increase again as shown in “C”.

BOAT’S DIRECTION OF TRAVEL
MENU #13 - SHALLOW ALARM

The shallow alarm alerts you to shallow water. It only triggers off the bottom signal. For example, set the shallow alarm to 5 feet. If the 3D-100 detects the bottom at five feet or less, it will sound an alarm. The shallow alarm depth ranges are: OFF, 5, 10, 15, 20, 25, 50, 100, 150, 200, 300 feet.

To turn the shallow alarm on, press the CMND FUNCTION key. Then press the up or down arrow keys on the ZONE ALARM section until menu 13 displays. Next press the up or down arrows in the RANGE section of the keyboard to select the desired digital number size.

SIGNAL INTERPRETATION

Since your 3D-100 is both extremely sensitive and powerful, it gives an accurate picture of the bottom that your boat is passing. A bottom of firm sand, gravel, shell, or hard clay returns a fairly wide signal. If the automatic sensitivity is off and the signal narrows down, it means that you have moved over a mud bottom. Mud absorbs the sound wave and returns a weak signal. Turn up the sensitivity. If you have the automatic sensitivity turned on, watch the sensitivity bar. As the boat passes over the mud bottom, the 3D-100 will automatically increase the sensitivity to maintain a good bottom signal. The sensitivity bar will help you in determining if the bottom is soft or hard. If it increases while in the same depth of water, then the boat has moved over a soft bottom. If it decreases, then it is over a hard bottom. Of course, as the water depth increases or decreases, the sensitivity will also change.

Big rocks or stumps on a smooth bottom send back signals above the bottom level signal. The height of the signal depends on the target's height. As you pass over a post, it will be clearly visible as a short line extending above the bottom signal.

A steep slope returns a wide signal, the steeper the wider. Signals returned from a high underwater cliff are usually the widest of all.

play. This gives you an effective cone angle of 60 degrees.

For best results, read the Operation section of this manual. It explains in detail all of the functions that are in this section, plus other features not discussed here.

OPERATION

When the 3D-100 is first turned on, it automatically finds and displays the bottom depth, and adjusts the sensitivity to the proper level. It also sets the scales to a range that will keep the bottom signal on the display, plus much more. Using the 3D-100 in this mode is simple and allows you to concentrate on fishing. However, virtually every function of the unit is manually adjustable so it can be "fine tuned" to the surrounding conditions. Take this manual with you on the boat as a reference guide.

ON

The ON key is located in the lower right corner of the keyboard. It's easily found in this location - even at night. To turn the 3D-100 on, press the ON key. The chart lights flash, then stop after six seconds. The chart will begin scrolling across the display and the number "0" will flash. This number is the digital bottom depth display. After the unit finds the bottom, it displays the digital depth.

OFF

To turn the 3D-100 off, press the OFF key.
POSITION (3-D)

The 3-D 100's most intriguing feature is its ability to display information from three dimensions: depth, distance, and direction. This is accomplished by taking advantage of its special transducer. Inside this transducer are three elements - three transducer crystals. Each one can be turned on or off by the user or automatically by the 3D-100. This gives you a 20 degree cone aimed to the right, left, and center (straight down). They can also be used simultaneously for an effective cone angle of 60 degrees. This advantage is especially useful in shallow water use. The ultra-wide cone allows you to see much more of the underwater world than ever before. Switching to the left, center, or right elements lets you pinpoint a target's location.

NOTE: Turning on Fast Scroll turns the digital, automatic, and fish I.D. off. The 3D-100 can only be used in the manual mode when Fast Scroll is in use. When Fast Scroll is turned off, the 3D-100 is reset to a power-on condition. Automatic and the digital will be turned back on. All other features can be used and will operate normally.

MENU #12 - ZONE BAR

Select this menu when you wish to turn the zone alarm bar on permanently. This also turns the zone alarm on if it isn't already. To turn the zone alarm bar on, press the CMN'D FUNCTION key. Then press the up or down arrow keys on the ZONE ALARM section until menu 12 displays. Next press the up or down arrows in the RANGE section of the keyboard to turn the zone alarm bar on continuously. Wait fifteen seconds for the menu to disappear or press the CMN'D FUNCTION key to activate.
MENU #10 - DIGITAL AVERAGING

The digital sonar used in the 3D-100 is a highly sensitive device that gives rapid updates of the water's depth. Under most conditions, the bottom contour changes so quickly that the display appears to "jitter". In other words, the display will change so quickly that it can be difficult to determine the actual bottom depth. To minimize this condition, the 3D-100 averages the bottom readings and displays the result. When the 3D-100 is first turned on, averaging is enabled. To turn it off, select menu #10 by first pressing the CMN'D FUNCTION key. Then press the up or down arrow keys on the ZONE ALARM section until menu 10 displays. Next press the up or down arrows in the RANGE section of the keyboard to turn averaging on or off. Wait fifteen seconds for the menu to disappear or press the CMN'D FUNCTION key to activate.

LEFT - CENTER - RIGHT - ALL

When the 3D-100 is first turned on, the display shows all three elements - left, center, and right at the same time. Each element has a twenty degree cone angle. When the 3D-100 is in the "ALL" mode, the display gives you the equivalent of a sixty degree cone angle. The letter "A" in the lower left portion of the screen signifies that information from all three elements is currently displayed. Press the LEFT key and the "A" changes to an "L". The display also changes, showing a full screen of only the left transducer element. Now you have a twenty degree cone aimed towards the left side of the boat. If you press the CENTER or RIGHT key the display will show only information from the center or right transducer element. Now press the ALL key. The display now shows information from all three elements. In short, the left, left, center, and right keys gives you a 60 degree cone angle, or a twenty degree portion of the left, center, or right side of the 60 degree cone.

MENU #11 - FAST SCROLL

The fast scroll feature causes targets on the display to scroll very fast. Use this feature when you're travelling at high speed. To turn Fast Scroll on, press the CMN'D FUNCTION key. Then press the up or down arrow keys on the ZONE ALARM section until menu #11 displays. Next press the up or down arrows in the RANGE section of the keyboard to turn Fast Scroll on or off. Wait fifteen seconds for the menu to disappear or press the CMN'D FUNCTION key to activate.
NOTE: The 3D-100 can display all three elements at the same time in the split screen mode. In other words, the information from the left element is displayed on the left side of the screen, echoes from the center element are shown on the center portion, and echoes from the right are displayed on the right side of the screen. For more information on this screen mode, see the COMMAND FUNCTION section.

SCAN - LOCK

The 3D-100 can scan between the three transducer elements, or it can lock onto one or all of them. The 3D-100 is in the "lock" mode when it is first turned on. The second letter "L" below the digital display signifies the lock mode. This means the 3D-100 is locked onto the transducer element(s) in use, and it is not scanning.

To scan between the left, center, and right elements, press the SCAN key. The display will automatically show a full screen of each element for a few seconds, then switch to the next automatically. As each screen is switched, the letter "L", "C", or "R" will display corresponding to the element in use. If you see something interesting on the display, for example on the left element, press and hold the LEFT key for as long as you want to view that element. When you release the LEFT key, the 3D-100 will continue to scan to the next element. This will, of course, work on both the CENTER and RIGHT keys as well.

To exit from the scan mode, press the LOCK key to display a full screen from any one of the elements, or press the LOCK key, then the ALL key to display all of the elements on the screen at the same time.

MENU #8 - DIGITAL SIZE

The digital depth display has three size selections: small, medium, and large. When the 3D-100 is first turned on, the depth is displayed with the medium size numbers. To change to a different size, press the CMN'D FUNCTION key. Then press the up or down arrow keys on the ZONE ALARM section until menu 8 displays. Next press the up or down arrows in the RANGE section of the keyboard to select the desired digital number size. Wait fifteen seconds for the menu to disappear or press the CMN'D FUNCTION key to activate.

MENU #9 - TENTHS

The digital sonar displays the bottom depth in whole numbers when the 3D-100 is first turned on. To display the depth in tenths of a foot, select the DIG TENTHS menu. The 3D-100 will display tenths of a foot down to 99.9 feet. Below this the depth display will automatically revert to whole numbers. To select the DIG TENTHS menu, press the CMN'D FUNCTION key. Then press the up or down arrow keys on the ZONE ALARM section until menu #9 displays. Next press the up or down arrows in the RANGE section of the keyboard to turn tenths on or off. Wait fifteen seconds for the menu to disappear or press the CMN'D FUNCTION key to activate.
MENU #6 - UNITS (FEET, FATHOMS, or METERS)

The 3D-100 can display the depth in either feet, fathoms, or meters. At first, the display reads in feet. To change it to fathoms or meters, press the CMN'D FUNCTION key. Then press the arrows in the ZONE ALARM section until the UNITS menu appears. Press the arrow keys in the keyboard's RANGE section until the desired unit of measure (feet, fathoms, or meters) is highlighted, then press the CMN'D FUNCTION key to activate your selection. Turning the unit off reverts the range to feet.

AUTO

When the 3D-100 is turned on, the automatic mode is enabled. To switch to the manual mode, press the AUTO key located above the ON key. Doing this erases the word AUTO at the top of the display. This cancels auto sensitivity and ranging, giving you complete manual control of the unit. Return the 3D-100 to automatic at any time by pressing the AUTO key again.

MENU #7 - DIGITAL DISPLAY

This menu allows you to turn the digital display on or off. When the 3D-100 is first turned on, the digital is automatically on. To turn it off, press the CMN'D FUNCTION key. Then press the arrows in the ZONE ALARM section of the keyboard until this menu appears. Use the arrow keys in the RANGE section to select ON or OFF. The digital will be turned on or off immediately.

SENSITIVITY

When first turned on, the 3D-100 is in the AUTO SEARCH mode. The micro-computer automatically adjusts the sensitivity and range to find and lock onto the bottom. You can leave the sensitivity in the automatic mode or manually adjust it to suit conditions.

A horizontal bar at the top of the screen displays the sensitivity level. When the sensitivity is at minimum, the bar is very short. Increasing the sensitivity causes the bar to travel to the right, increasing in length correspondingly. Setting the sensitivity to maximum will cause the bar to extend across the top of the display. (There are 32 steps of sensitivity available.)

To place the 3D-100 in manual mode, press the AUTO key once. This turns auto sensitivity off. The word AUTO at the top of the display will disappear, signifying that the 3D-100 is in the manual mode. To increase the sensitivity, press and hold the right arrow key until the sensitivity is at the desired level. The left arrow decreases sensitivity in the same manner. Notice how the sensitivity bar moves as you change settings. When you press the right arrow key, the bar moves to the right, indicating an increase in sensitivity. Pressing the left arrow key moves the bar to the left, showing the sensitivity has decreased accordingly. You'll also see the change on the display.
Below, the chart on the left has too little sensitivity. On the right, the graph has a proper sensitivity setting. Fish, along with higher surface clutter are now visible, and the bottom signal has widened.

When the horizontal bar reaches the far right hand side of the screen, the sensitivity level is at maximum. With high sensitivity settings, a second bottom echo (second echo) may appear. This is normal. It's caused by the returning signal reflecting off the surface of the water. Then it makes a second trip to the bottom and back again.

To turn Auto Sensitivity back on, press the AUTO key. Remember, pressing the AUTO key turns both automatic sensitivity and auto ranging functions on and off at the same time.

AUTO SENSITIVITY ADVANCED OPERATION

When the 3D-100 is in the automatic mode, the receiver's sensitivity automatically adjusts to the surrounding conditions. The microcomputer places it at a level slightly above the minimum required to pick up the bottom signal.

in the RANGE section until the desired level is highlighted. Then press the CMN'D FUNCTION key. There should be an immediate change in the noise displayed on the screen.

MENU #5 - SPEAKER VOLUME

This menu adjusts the volume of the 3D-100's speaker. To adjust the speaker volume, press the CMN'D FUNCTION key, then press the arrow keys in the ZONE ALARM section until menu #5 appears. To increase the speaker volume, press the up arrow in the RANGE section. To decrease the volume, press the down arrow. Wait fifteen seconds or press the CMN'D FUNCTION key to activate your selection.
Surface Clutter and are caused by wave action, boat wakes, bait fish, temperature inversions, and other reasons.

Use Surface Clarity Control (SCC) to reduce or eliminate surface clutter. SCC varies the gain of the receiver between each transmit pulse, while the receiver is “listening” for the return echoes. The gain is the lowest for echoes near the surface. It gradually increases as the depth increases. The maximum depth that SCC will affect is one-half of the selected depth range. For example, with maximum SCC, on a 0 to 60 foot range, SCC would have an effect from the surface to 30 feet.

SCC has three levels of adjustment. Turning the 3D-100 on automatically sets SCC to medium. To change to a different level, press the CMN'D FUNCTION key, then press the arrow keys in the ZONE ALARM section until the SCC menu appears. Then press the arrow keys in the RANGE section for the desired SCC level. Then press the CMN'D FUNCTION key to activate the new SCC level.

Changing the sensitivity level while the 3D-100 is in the automatic mode is possible. (But only if “FISH I.D.” is off.) This may be desirable if the sensitivity level is not enough to show fish or other small detail. The 3D-100 will increase the sensitivity to pick up the bottom signal, then add in the level you programmed. If desired, you can add sensitivity up to the maximum.

To adjust the sensitivity while the 3D-100 is in the automatic mode, simply press either the right arrow key > to increase it. Press the left arrow key < to decrease the sensitivity. If the value goes below the minimum required to keep the bottom signal, the 3D-100’s audible tone will sound an alert. The same is true if you try to go above the maximum level. As you press the arrow key, the sensitivity bar will move right or left, according to the sensitivity level chosen.

![Chart Speed Control](chart-speed-control.png)

**Chart Speed**

At power on, the chart speed scrolls at a pre-determined speed. For a higher speed, press and hold the right arrow key in the CHART section of the keyboard. When the scroll speed reaches the desired speed, release the right arrow key. To slow the display, press and hold the left arrow key. Pressing either of these keys causes the sensitivity bar at the top of the display to change to a dashed line. The letters “CHT” will appear in a window near the top of the display. This bar represents the chart speed. If you press and hold the left arrow key for example, the bar will start moving to the left. This signifies that the chart speed is decreasing. There are 32 steps of chart speed. By holding either arrow key, the display can be speeded up or slowed down. When the horizontal bar reaches the far right side of the screen, the chart speed is at its maximum value. The 3D-100 will sound a tone indicating maximum chart speed.

The automatic mode or digital function limits the maximum chart speed. (The chart bar will stop one step from the far right and the audible tone will sound.) Turning both the digital and the automatic mode off will allow the maximum chart speed to be attained.

At times it is desirable to stop or “freeze” the display to examine an echo before it scrolls off the screen. Press both arrow keys in the CHART section at the same time to freeze the display. Now the top line...
on the display will flash on and off signifying the unit is in the freeze mode. Pressing both arrow keys at the same time again will start the display moving at the last chart speed setting. If the digital sonar is on, the bottom depth will be displayed. The digital does not stop when the chart is in the “freeze” mode.

SCALE

There are ten scale markers printed on both sides of the display. This helps to determine the depth of a target. For example, if the range is 0 to 60 feet, then each mark is equal to six feet. If a target (such as a fish) is next to the 5th line, then it is 30 feet deep. (5 lines times 6 feet = 30 feet.)

To make it easier to use the depth scale, use ranges in multiples of ten, i.e., 10, 20, 30, etc.

RANGE

When the 3D-100 is in automatic, the ranges change to keep the bottom signal on the display as the bottom depth varies. At times, however, it may be desirable to expand the range or zoom in on a target. Pressing the ZOOM key doubles the size of targets on the screen.

LOWER LIMIT

To change the lower limit, first make certain the word “AUTO” is off at the top of the screen. This indicates that the automatic mode is off. (Note: This also disables the automatic sensitivity function.) If the automatic mode is on, press the AUTO key once to disable it. Next, press one of the arrow keys in the RANGE section until the desired lower limit

MENU #2 - FISH SIZE

This menu adjusts the size of fish that fish alert will alarm or flash on. When the 3D-100 is first turned on, it automatically flashes on medium and large fish. You can adjust it to flash on small, medium, and large fish, medium and large fish, or large fish only.

Notice when the 3D-100 is in the automatic mode, only medium and large fish will flash. The fish size feature is not adjustable when the 3D-100 is in automatic. The menu appears with only medium on the screen. If you try to adjust it, the 3D-100 will sound an tone.

To adjust the fish size, first make certain the 3D-100 is not in automatic. Next, press the CMN'D FUNCTION key. Next, press the up or down arrow keys in the ZONE ALARM section until menu #2 - FISH SIZE appears. Medium fish size is highlighted. To change to small, press the down arrow key in the RANGE section. To change to large, press the up arrow key in the RANGE section. Wait fifteen seconds and the menu will disappear, or press the CMN'D FUNCTION key. The selection you just made will now be activated.

MENU #3 - SCC (SURFACE CLARITY CONTROL)

The markings --or noise--at the top of the display can at times extend many feet below the surface. This can interfere with fish signals or other targets. These markings are
appears. The display will immediately change to the new depth range and display the new lower limit at the bottom of the screen.

NOTE: The maximum lower limit the 3D-100 can display is 600 feet. However, the actual depth that it can reach is dependent on water and bottom conditions, plus the quality of the transducer installation.

Changing the lower limit is possible, even if the Automatic function is on. However, the 3D-100 won't accept a lower limit less than the depth of the bottom while it's in the Automatic mode. For example, the 3D-100 is in Automatic, and the range is 0 to 60 feet, with a bottom signal at 50 feet. Selecting a lower limit of 40 feet causes the 3D-100 to sound an alert. The lower limit stays at 60 feet.

ZOOM

Often it's desirable to expand or “ZOOM” a section of the display to show more detail. You can do this on the 3D-100 by using the ZOOM feature. If the unit is in the manual mode, press the ZOOM key to double the size of the targets. For example, if the range is 0-60 feet, pressing the ZOOM key changes the range to 30-60 feet. This 30-60 range is called a

To change the All mode, press the CMN'D FUNCTION key. The first menu appears with COMP highlighted. To change to SPLIT or TRACK, press the either the up or down arrow key in the RANGE section. Wait fifteen seconds and the menu will disappear, or press the CMN'D FUNCTION key. The selection you just made will now be activated.
“window”. To change the window size, press the up or down arrows in the RANGE section. For example, if you have a 30 foot window, pressing the up arrow in the RANGE section will change the window to 20 feet. Press the up arrow again and the zoom window will change to 10 feet. This is the smallest zoom window. The largest zoom window is 300 feet.

AUTOMATIC BOTTOM TRACKING

The lower limit will change as the bottom depth changes, if the 3D-100 is in the automatic mode. The 3-D 100 uses depth information from the center transducer element to determine when to auto range to the next range. To zoom in on the bottom and track it as its depth changes, follow the steps below.

To use this feature, first make certain the unit is in the automatic mode. Next, choose a zoom window. For example, let's use a 20 foot zoom window. This means that the 3D-100 will keep the upper limit 20 feet above the lower limit. Automatically placing the bottom signal in this window, the 3D-100 tracks it as it moves shallower or deeper. Press the ZOOM key. If you don't have a 20 foot window, press either the up or down arrows in the RANGE section until the upper limit is 20 feet shallower than the lower limit. The 3D-100 will choose an upper and lower limit that will place the bottom signal in the 20 foot window. The bottom will always be inside this window. If the segment size is 40 feet or greater, the window limits will end in zero (10, 20, 30, etc.). Otherwise the limits are in one foot increments.

To exit from this function, press the ZOOM key.

GRAYLINE

The GRAYLINE functions tells the relative strength of signals displayed on the screen. It also gives clues to the composition of the bottom. In other words, you can tell if the bottom is soft or hard. A hard bottom returns a strong signal causing a wide gray line. A soft, muddy or weedy bottom returns a weaker signal which is emphasized with a narrow 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 is helps distinguish weeds from trees on the bottom, or fish from structure.

this key and the first menu appears for fifteen seconds. As you can see, the first menu is ALL MODE. The number "1" at the bottom of the screen indicates this is menu number one. The numbers at the lower left of the screen are the digital bottom depth display.

To change menus, use the arrow keys in the ZONE ALARM section of the keyboard. To select an item from the menu, use the arrow keys in the RANGE section. Once you make a selection, press the CMN'D FUNCTION key to activate that selection, or press the arrow keys in the ZONE ALARM section to switch to another menu. Once all of the selections are made, press the CMN'D FUNCTION key and all selections on all menus will be activated.

For a detailed description of the menus, see the following.

MENU #1 - ALL MODE

This menu allows you to change the position's "ALL" mode. The selections are: split, composite, and tracking. When the 3D-100 is first turned on, the composite mode (comp) is enabled. This overlays all three elements into one full screen display, giving you the equivalent of a 60 degree cone angle.

The split screen mode (split) divides the screen into three sections. Each section displays echoes from it's respective transducer element. In other words, the left side of the screen shows echoes from the left transducer element, the middle part shows echoes from the center element, and the right side of the display shows information from the right element.

The track mode places the display into the split mode, but changes the return echoes into horizontal bars. This gives a quick, effective means of determining depth information at a glance.
FISH I.D.

The Fish I.D. function is automatically enabled when the 3D-100 is turned on. An "F" displays at the lower left corner of the screen signifying Fish I.D. is on. As signals are scrolled across the display, targets flash that are most likely fish. The "fish flash" can be set for small, medium, and large fish, or only medium and large, or exclusively large fish. This is accomplished with a menu selection. See the COMMAND section for details.

For a distinctive audible alarm when fish are detected by the fish alert feature, press the FISH ALARM key. The word "ALARM" displays at the bottom of the screen, right below the lower limit. Each time a fish is detected by the fish alert feature, the audible alarm will sound.

To turn the Fish I.D. function off, press the OFF key in the FISH I.D. section. This also turns the fish alarm off. To keep the fish I.D. on and turn only the fish alarm off, press the FISH ALARM key. To keep the fish alarm on and turn the fish flash off, press the FISH key.

(Note: The sensitivity is not adjustable when the 3D-100 is in automatic and FISH ALERT is on.)

LIGHT

The keyboard and display are backlit which allows operation of the 3D-100 at night. At first, turning the unit on causes the lights to flash for six seconds. Press both SENSITIVITY keys at the same time to turn the lights on. To turn the lights off, press both keys again. The lights will also go out when the 3D-100 is turned off.

DIGITAL

Built inside the 3D-100 is a complete digital sonar. It automatically discriminates between the valid bottom echoes and false echoes from fish, thermoclines, or other signals. (Note: The digital display will show only the bottom depth according to the center transducer element.)

At power on, the digital will flash "0" until it has "locked on" to the bottom signal. Once it has acquired the bottom depth, it will display the depth in the lower left of the display.

The digital can display the bottom depth in tenths of a foot in water shallower than 100 feet. See the COMMAND section for details.

There are three different sizes of the digital depth display. They
can be easily changed with a menu selection. When the 3D-100 is first turned on, the small digital size is enabled. See the COMMAND section for details.

To get the maximum performance out of your digital sonar, stop the chart by pressing both arrow keys at the same time in the keyboard’s chart section. This turns the 3D-100 into a digital sonar only and allows it to better track the bottom signal. A good reason to use the digital is if you are going to travel at high speed and you just want to know the bottom depth. Stop the chart, then change to the large digital number size. This will give both the fastest possible depth updates plus an easy-to-read display.

If you wish to turn the digital display off, see the COMMAND section for details.

**ALARMS**

The 3D-100 has three different alarms, a zone alarm, an alarm that alerts you to shallow water, and a fish I.D. The zone alarm consists of a bar that displays on the left side of the screen. The alarm “chirps” whenever the 3D-100 detects an echo inside the boundaries of the zone bar.

The shallow water alarm, when set, sounds when you enter water at or shallower than a preset depth. This alarm is activated from a menu selection. To use it, read the COMMAND FUNCTION section.

Fish I.D. is an exciting new concept in fish identification. It identifies fish by flashing their signals on the display. This “fish flash” feature adjusts for small, medium, and large fish. Or large fish only, if desired.

With Fish I.D., an audible alarm also sounds only when fish are detected. To separate the alarms, the fish I.D.’s tone sounds different than the zone alarm. Both alarms may be used at the same time.

**ZONE ALARM**

To set the Zone Alarm, press the SHALLOW SET key in the ZONE ALARM section of the keyboard. The words “ZONE ALARM” displays in the lower left corner of the screen. A vertical bar also displays on the left side of the screen for six seconds. This is the Zone Alarm’s “window.”

Any echo that appears between the top and bottom of this bar will sound the alarm. Adjust both the shallow and deep ends of this bar to make a smaller or larger alarm “window.”

To adjust the shallow (top) alarm, press the SHALLOW SET key. The alarm bar displays with a small arrow pointing to the top of the bar. This signifies that the top or shallow portion of the bar is ready for adjustment. Then press the up arrow key to move the top of the alarm window up. Press the down arrow key to move the top of the zone deeper. Six seconds after the adjustments are made, the alarm bar disappears.

Set the bottom of the zone in the same manner using the DEEP SET key. Press the DEEP SET key. The alarm bar displays with the small arrow pointing to the bottom of the bar. Then press the up arrow key to make the bottom part of the window move shallower. Or you can press the down arrow key to move the bottom of the window deeper. Release the keys and the bar will remain on the screen for six seconds, then disappear.

When the “ZONE ALARM” signal is on, the alarm is active. If an echo appears on the left side of the screen inside the area covered by the zone alarm bar, the alarm will sound. If you wish to view the zone alarm bar, simply press either the SHALLOW SET or DEEP SET keys. The bar will be displayed for six seconds. The zone alarm bar can be turned on permanently with a menu. See the COMMAND section for details.

If the range is changed, the zone alarm may need to be changed also since it does not track range settings.

To turn the Zone Alarm off, press both the SHAL SET and DEEP SET keys at the same time. All of the Zone Alarm settings will remain in memory until the 3D-100 is turned off. Pressing either shallow or deep set keys will turn the Zone Alarm back on with the previous settings.