



INSTALLATION AND OPERATION MANUAL

X-4 LCG RECORDER

LOWRANCE ELECTRONICS, INC.
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TABLE OF CONTENTS

Introduction	2
Installation	2
Power Connections	3
Noise	4
Keyboard Basics	5
Operation	7
On	7
Off	7
2nd	7
Clear	8
Auto	8
Sensitivity	8
Automatic Sensitivity Advanced	10
Chart Speed	10
Range	11
Lower Limit	12
Upper Limit	13
Scale	14
Auto Range with Zoom Bottom Track	15
Digital	15
10th	17
Alarms	17
Zone Alarm	18
Note Key	20
Clearing Zone Alarm	20
Depth Alarm	20
Discrimination	22
Light	23
Surface Clarity Control (SCC)	23
Feet-Fathoms-Meters	24
Transducers and Cone Angles	25
Signal Interpretation	26
Fish Signals	27
Water Temperature and Thermoclines	29
Bait Fish	30
Surveying a Lake	30
How to Obtain Service	31
How to Obtain a Schematic	31
Specifications	32

COMMAND SUMMARY

1. DIGITAL ON/OFF	DIGITAL
2. DIGITAL NUMBERS SIZE	2nd, 7
3. DIGITAL—TENTHS	2nd, DIGITAL
4. AUTOMATIC FUNCTIONS ON/OFF	AUTO
5. SCC	0-10, SCC
6. VIEW SCC WITHOUT CHANGING	SCC
7. CLEAR ENTRY	CLEAR
8. FREEZE CHART	STOP/RESUME
9. RESTART CHART	STOP/RESUME
10. DISCRIMINATION	0-5, DISC
11. AUTO RANGING WITH ZOOM BOTTOM TRACK	WINDOW SIZE, 2nd, 8
12. INCREASE SENSITIVITY	PRESS > KEY
13. DECREASE SENSITIVITY	PRESS < KEY
14. INCREASE CHART SPEED	PRESS FAST KEY
15. DECREASE CHART SPEED	PRESS SLOW KEY
16. VIEW CHART SPEED WITHOUT CHANGING	2nd, SLOW or FAST
17. TURN LIGHTS ON or OFF	2nd, AUTO
18. FEET-FATHOMS-METERS	2nd, 9
19. ZONE ALARM SET	SHALLOW SET or DEEP SET, UP ARROW or DOWN ARROW to adjust depth
20. DEPTH ALARM SET	SHALLOW ALARM, depth DEEP ALARM, depth
21. CLEAR ZONE ALARM	CLEAR, SHALLOW SET or DEEP SET
22. CLEAR DEPTH ALARM	CLEAR, SHALLOW ALARM CLEAR, DEEP ALARM
23. TURN ALARM TONE ON/OFF	NOTE KEY

INTRODUCTION

Welcome to the world of sportfishing sonar. Your Lowrance X-4 is a high quality sonar designed for both professional and novice users. The X-4 automatically finds and displays the bottom depth, fish, and structure by just turning it on. As you grow familiar with your X-4, you can try some of its remarkable features and "fine tune" the unit to the surrounding conditions.

You can program the X-4 to display the bottom depth in tenths of a foot, sound alarms when the boat goes shallower or deeper than a preset depth, or when a fish enters an alarm zone ... plus much more.

To get started with your X-4, 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 X-4, read the rest of this manual in detail. The more you know when you get to the water, the more your X-4 will do for you. Take this manual, or at least the User's Card, when you head to the lake.

INSTALLATION

Mounting

The X-4 can be installed 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. The bracket can be attached to aluminum panels with sheet metal screws. However, we suggest placing 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.

A 7/8" hole in the base of the gimbal bracket allows the power and transducer cables to be routed straight down through the mounting surface. The smallest hole that will pass one connector through is 3/4". This will allow the transducer connector and cable to be passed up through the hole and gimbal bracket, then the power cable wire can be pushed down through the bracket and dash. After the cables have been routed, the hole may be filled with silicone rubber adhesive (RTV), or the bracket can be offset so that the majority of the hole is covered.

Power Connections

The X-4 operates from a 12 volt battery system. The power cable can be attached to an accessory or power buss, but if you have problems with electrical interference (random dots or lines that show whenever the boat's engine or an accessory is on), then attach the cable directly to the battery.

The power cable has two wires, red is the positive lead and black is negative or ground. An in-line fuse holder containing a 3 amp fuse is supplied with the X-4. This attaches 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 X-4 in the event of a short. The X-4 is protected from accidental polarity reversals and will not be harmed if the wires are reversed. (However, the unit will not work until the correct polarity is applied.)

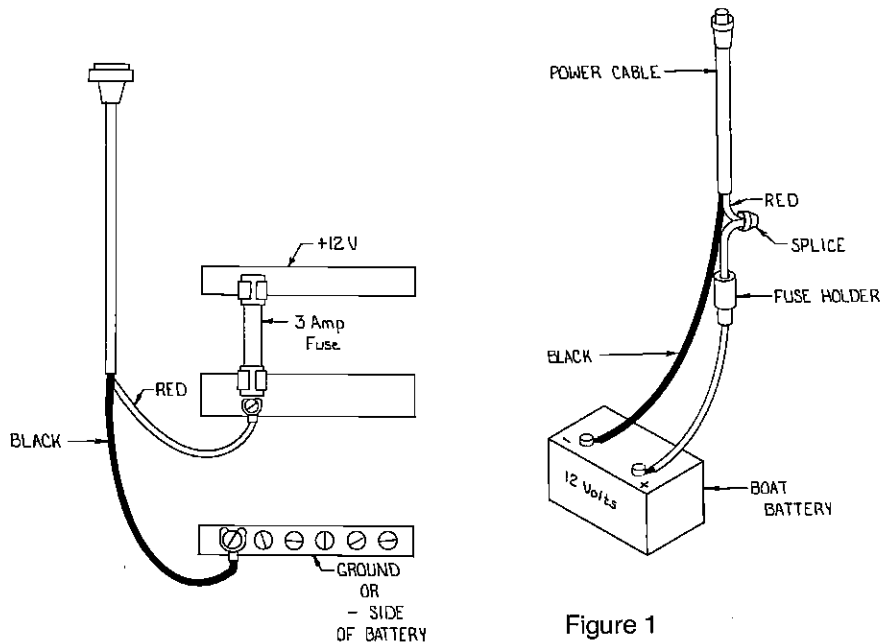


Figure 1

SPECIFICATIONS

Dimensions	6 $\frac{7}{8}$ "H x 8 $\frac{1}{2}$ "W x 3 $\frac{3}{4}$ "D
Weight	2.5 pounds
Transmitter	192 kHz
Output Power	600 watts peak to peak typical 75 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 2624 Total
Depth Capability	300'-500' typical (with 20 degree transducer) 500'-700' typical (with 8 degree transducer)
Display Scroll Speed	.5" per minute (minimum) 32" per minute (maximum)

As you go about your survey, your X-4 will tell you the depth and kind 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 Lowrance Fish-N-Floats in the boat, ready to toss overboard. When the X-4 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 school of fish when you're over it, you may not be able to find it again.

HOW TO OBTAIN SERVICE

If you have a problem with your sonar unit, please give us a chance to help before sending it in for repair. Assistance can often be extended by telephone or letter. Write or call one of our Authorized Service Centers or the Lowrance Customer Service Department in Tulsa, OK.

If you live out of the state of Oklahoma, call 1-800-331-3889, free. If you live in the state of Oklahoma, call collect 918-437-6881.

Please detail the problem you are experiencing. Our Service Department may be able to save you the inconvenience of returning your unit.

If it's determined your unit must be returned, we'll provide full shipping instructions.

SCHEMATIC DIAGRAM AND PARTS LIST

Should you desire a schematic and parts list for your Lowrance sonar, send \$1.00 to the address below and the information will be mailed to you promptly. Be sure to include the model and serial number of your Lowrance sonar unit.

Mail to: Lowrance Customer Service
12000 E. Skelly Drive
Tulsa, Oklahoma 74128-2486

TRANSDUCER

Installation instructions for the transducer are supplied with the transducer in a separate package. Please read the instructions carefully before you start installing the transducer.

NOISE

Electrical noise picked up by the power cable can be minimized by routing it 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 X-4'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 very important to keep the X-4's power and transducer cables as far away as possible from a VHF radio antenna cable.

If there is no noise—interference—on the unit when the boat is sitting still with the engine running in neutral, but 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. Usually, acoustic noise is created by air bubbles passing over the face of the transducer. The faster a boat travels, the more air bubbles increase and generate noise on the display. To eliminate this problem, read the transducer owner's manual for proper mounting techniques.



KEYBOARD BASICS

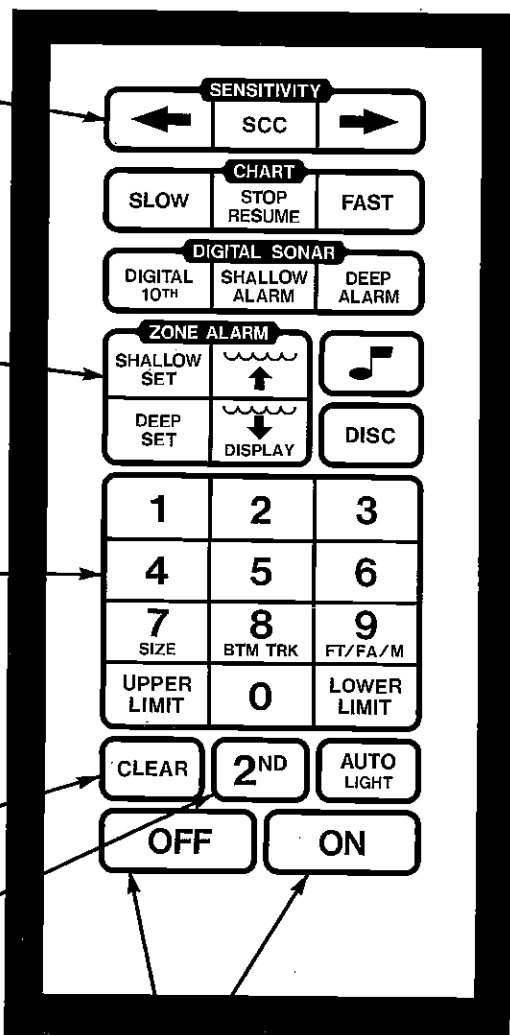
SENSITIVITY These keys control the graph's sensitivity. (The digital's sensitivity is automatically adjusted.) The receiver sensitivity has 32 speeds which allows adjustment over a wide range of conditions. The left arrow key decreases the sensitivity, the right arrow key increases it.

ZONE ALARM KEYS This group of keys controls the X-4's zone alarm. It can be used as a "fish alarm" with upper and lower limits set so that a target (such as a fish or school of fish) will set off the alarm if the target enters the alarm zone.

0-9 These keys allow the entry of numbers 0 through 9. Some of these keys have more than one function and can be accessed by using the 2nd function key. When a numeric key is pressed, the number will be displayed in a window near the top center of the display.

CLEAR The CLEAR key erases the last entry. It can also erase other features, as you will see later.

2nd 2nd allows some of the keys to have more than one function. Notice that some of the keys have a small word printed in white below the key's primary function label. For example, the AUTO key also has the word "LIGHT" printed on it. "LIGHT" is the AUTO key's second function. The "2nd Function" keys are activated by first pressing the "2nd key" and then the appropriate key which has the second function printed in white.



OFF ON These keys turn the X-4 on and off. To turn it on, simply press the ON key. To turn it off, press and HOLD the OFF key. You must hold the OFF key down for a few seconds in order for the X-4 to turn off.

You'll notice a beep every time a key is pressed. This is the X-4'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 LDT-3000 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 in which, we assume, they are the most comfortable.

BAIT FISH

The importance of bait fish to successful fishing can't be over-emphasized. 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 are concentrated 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 X-4 to find the bait fish first. A school of bait fish will look like a "cloud" on the X-4's display. Usually, game fish will be nearby, often directly beneath the school of bait fish.

SURVEYING A LAKE

The most successful anglers on any lake or reservoir are those who fish it day after day and year after year until they learn the hot spots that produce fish consistently. They discover through experience where, and at what depth, they can expect to find the kind of 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 aid of the X-4, 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 X-4. Start out with a map of the lake, if possible, and indicate the promising spots in relation to landmarks on shore.

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 so that they need about a fourth as much food as they consume in the summer.

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 called 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.

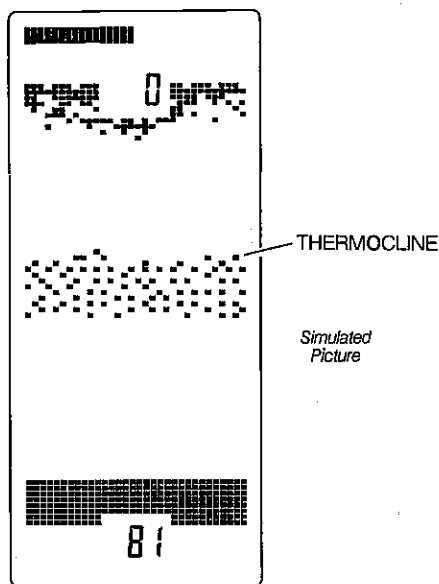
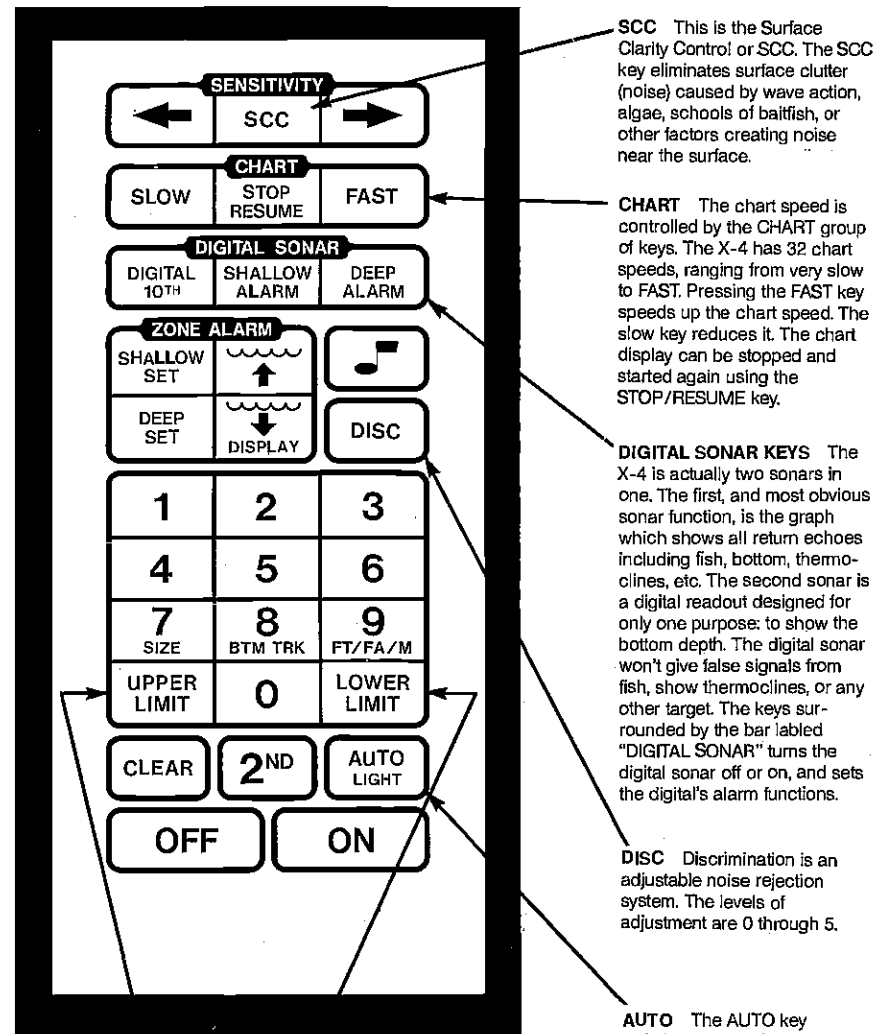


Figure 23

The X-4 can detect this invisible layer in the water, but the sensitivity will probably have to be turned up to see it.



SCC This is the Surface Clarity Control or SCC. The SCC key eliminates surface clutter (noise) caused by wave action, algae, schools of baitfish, or other factors creating noise near the surface.

CHART The chart speed is controlled by the CHART group of keys. The X-4 has 32 chart speeds, ranging from very slow to FAST. Pressing the FAST key speeds up the chart speed. The slow key reduces it. The chart display can be stopped and started again using the STOP/RESUME key.

DIGITAL SONAR KEYS The X-4 is actually two sonars in one. The first, and most obvious sonar function, is the graph which shows all return echoes including fish, bottom, thermoclines, etc. The second sonar is a digital readout designed for only one purpose: to show the bottom depth. The digital sonar won't give false signals from fish, show thermoclines, or any other target. The keys surrounded by the bar labeled "DIGITAL SONAR" turns the digital sonar off or on, and sets the digital's alarm functions.

DISC Discrimination is an adjustable noise rejection system. The levels of adjustment are 0 through 5.

AUTO The AUTO key switches the X-4 in or out of the automatic mode. When the X-4 is first turned on, it automatically adjusts the sensitivity and range selection, and the word "AUTO" will be displayed near the top of the screen. By pressing the AUTO key, you can take control of the X-4, making manual adjustments as desired. When the X-4 is in the automatic mode, the word "AUTO" will be displayed near the top of the display.

UPPER LOWER LIMIT LIMIT The Upper and Lower Limit keys allow you to select different depth ranges by pressing the desired depth and then pressing the appropriate upper or lower Limit key. The Upper Limit key sets the depth for the top of the display, while the Lower Limit determines the depth displayed at the bottom.

OPERATION

When the X-4 is first turned on, it automatically finds and displays the bottom depth, sets the sensitivity level, and much more. If desired, the X-4 can be left in this automatic mode and used for finding fish and the water and bottom conditions they prefer. However, virtually every function of the X-4 can be manually adjusted so that "fine tuning" of the unit to the surrounding conditions can be made. At first, you should take this manual out on the water as a reference guide. As you become more familiar with your X-4, the handy User's Guide we've enclosed should be adequate reference material.

ON



The ON key is located in the lower right corner of the keyboard. It is placed in this location so that it can be easily found—even at night. To turn the X-4 on, press the ON key. An audible beep will be heard signifying the X-4 knows that a key has been pressed. The chart lights will begin flashing, 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 has found the bottom, the depth will be displayed.

OFF



To turn the X-4 off, press and HOLD the OFF key until the display is erased.

2nd



The X-4 has many different functions, but only a limited amount of space for keys. Therefore, some of the keys have more than one function. Each key's primary function is printed in one color, while its second function is printed in white. The "2nd" key must be pushed to access the second function printed in white on the appropriate key.

For example, the AUTO key is also labeled "LIGHT". If you press the AUTO key by itself, the X-4 will be taken out of the automatic mode. However, if you press the 2nd key, then the AUTO key, the X-4's lights will be turned on. The 2nd key just reassigned the meaning of the AUTO key from AUTO to LIGHT.

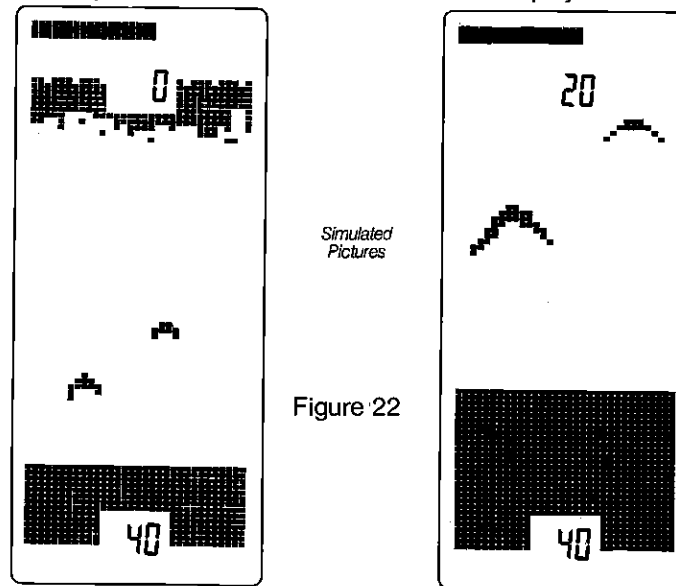
Remember, there must be some movement between the boat and the fish to develop the arch. Usually this means trolling at very slow speeds with the main engine in gear at a minimum throttle setting.

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 X-4 may not arch at all, 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, an X-4 cannot show as fine of detail because the pixels (dots on the screen) are much larger than a paper graph's markings. Therefore, the X-4 cannot show fish arches as well as a graph, and 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, while 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 the sensitivity needs to be turned up in deeper water to see the arch. Because of water conditions, such as heavy surface clutter, thermoclines, etc., the sensitivity sometimes cannot be turned high 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.



FISH SIGNALS

The signals displayed on the X-4 by fish can be 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. Individual fish can, at times, be distinguished 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" Figure 21. When the fish has moved into the center of the cone, the distance to it will be shorter, "B", and as it moves out of the cone, the distance will increase again as shown in "C".

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 pointed straight down. If the transducer is mounted on the transom, adjust it until the fish show the distinctive arch. This may take some trial and error until the correct mounting is achieved.

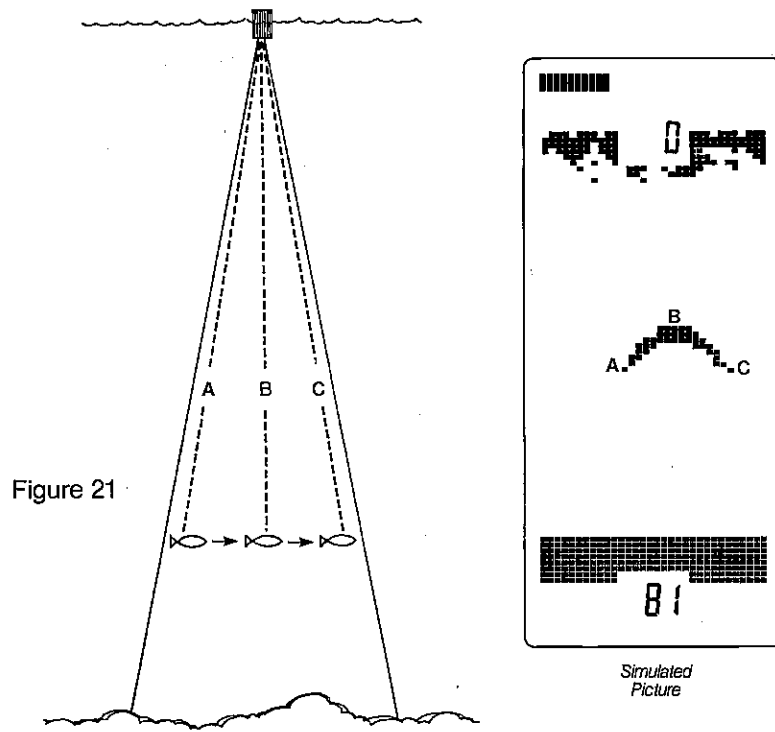


Figure 21

CLEAR

CLEAR

If you make a mistake, and press a key other than what you wanted, wait six seconds and the X-4 will automatically erase the entry. For example, if you wish to turn on the lights, the proper keys to press are 2nd, AUTO. However, if the 0 key was accidentally pressed instead of the 2nd key, you can press the CLEAR key which erases the 0 and allows you to start over.

The CLEAR key also erases or sets to zero other functions of the X-4 including SCC, Discrimination, and Upper Limit. As the other functions are described in this manual, the CLEAR key's operation will be explained in detail.

AUTO

AUTO
LIGHT

When the X-4 is first turned on, the automatic mode is on. To switch it into the manual mode, press the AUTO key which is located above the ON key. The word AUTO at the top of the display will be erased, auto sensitivity and auto ranging will both be cancelled and you will have complete manual control of the X-4. The X-4 can be returned to the automatic mode at any time by simply pressing the AUTO key again.

SENSITIVITY



When first turned on, the X-4 is in the AUTO SEARCH mode. This means the sensitivity and range are automatically adjusted by the micro-computer to find and lock onto the bottom. The sensitivity can be left in the automatic mode or it can be manually adjusted to suit conditions.

The sensitivity level is displayed by a horizontal bar at the top of the display. When the sensitivity is at minimum, the bar is very short. As sensitivity is increased, the bar will travel to the right, increasing in length correspondingly. When the sensitivity is set to maximum, the bar will extend across the top of the display.

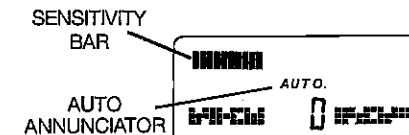
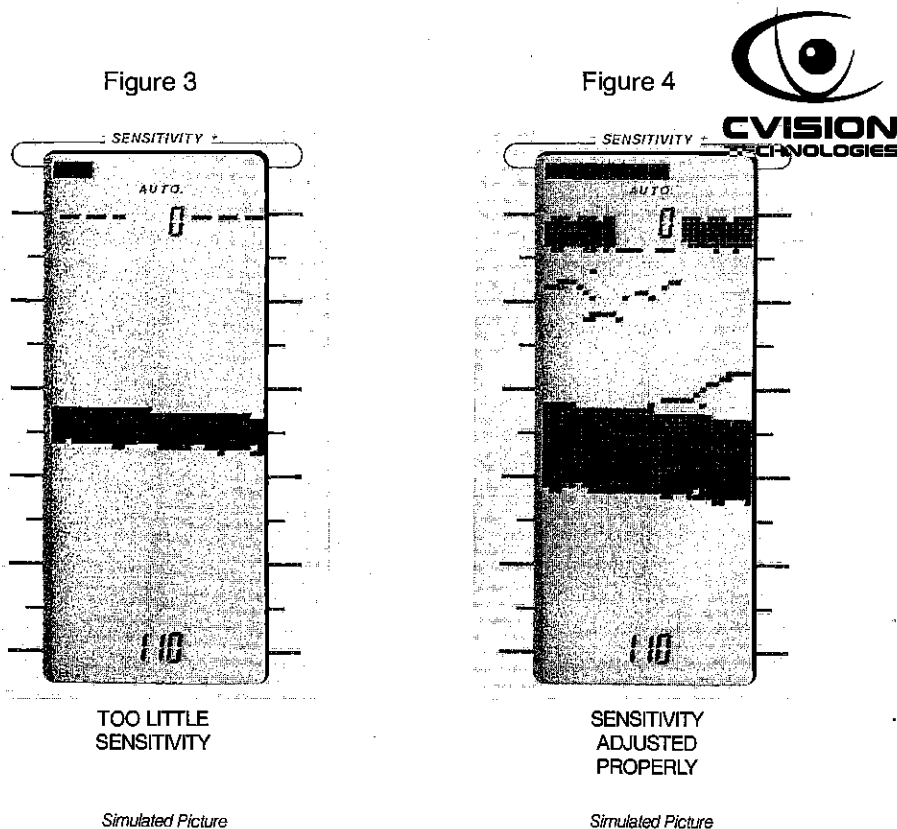


Figure 2

To manually adjust the sensitivity, press the AUTO key once, and auto sensitivity will be turned off. The word AUTO at the top of the display will disappear, signifying that the X-4 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, indicating the sensitivity has decreased accordingly. You'll also see the change on the display.

Figure 3 demonstrates a graph with too little sensitivity, while on the right, the sensitivity is adjusted properly; a fish is now visible, the surface clutter is more pronounced, and the bottom signal has widened.



The 20 degree transducer is almost always the best to use in fresh water, while the 8 degree transducer is used mostly in salt water. In a deep water environment, (300 feet—fresh water, 100 feet—salt water) the narrow cone angle is more desirable because it can penetrate to much deeper depths since the sound energy is concentrated in a smaller area.

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

Transducers on salt water boats need to be painted with a thin coat of anti-foulant paint to prevent organisms from growing. If unchecked, barnacles and other marine growth will cause a decrease in the transducer's sensitivity. Do not use a metal based anti-foulant paint as it will decrease the transducer's sensitivity. There are special anti-foulant paints specifically designed for transducers. They're readily available at most marine dealers.

SIGNAL INTERPRETATION

Because your X-4 is both extremely sensitive and powerful, it can give you an accurate picture of the kind of bottom over which your boat is passing. A bottom of firm sand, gravel, shell, or hard clay returns a fairly wide signal. If the automatic sensitivity is turned off, and the signal narrows down, then it means that you have moved over a mud bottom because 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 X-4 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.

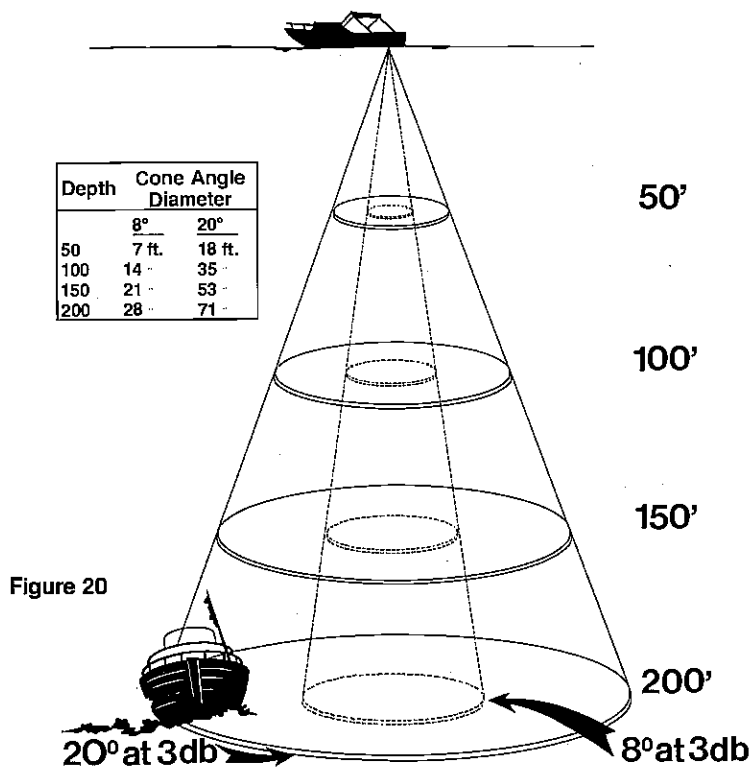
Big rocks or stumps on a smooth bottom send back signals above the bottom level signal. The height of the signal depends on the target's height. If you watch as you approach a post or a tree stump, it will be clearly visible as a short line extending above the bottom signal.

TRANSDUCERS AND CONE ANGLES

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

Lowrance offers a choice of transducers with either an 8 or 20 degree cone angle that will interchange with any of the 192 kHz sonar products. In other words, any Lowrance sonar instrument can be used with any Lowrance transducer of the same frequency with no loss of performance. However, the use of any other manufacturers' transducer will result in a loss of performance.

Generally, wide cone angle transducers (20 degrees) are ideally suited for operating in shallow to medium water depths. The 20 degree cone angle allows you to see more of the underwater world. In 15 feet of water the 20 degree cone covers an area about six feet across. The 8 degree transducer covers only about a two foot circle.



When the horizontal bar reaches the far right hand side of the screen, the sensitivity level is at maximum. If high sensitivity settings are used, a second bottom echo may appear. This is normal and is caused by the returning signal reflecting off the surface of the water, making a second trip to the bottom and back again. This is called "second echo".

To turn Auto Sensitivity back on, press the AUTO key. Remember, both automatic sensitivity control and auto ranging functions are turned off and on at any time by pressing the AUTO key. The two controls cannot be turned off or on separately by pressing the AUTO key.

AUTO SENSITIVITY ADVANCED OPERATION

When the X-4 is in the automatic mode, the sensitivity of the receiver will be adjusted to ten steps above the minimum required to pick up the bottom signal. (There are 32 steps of sensitivity available.)

The sensitivity level can be changed while the X-4 is in the automatic mode. This may be desirable if the level of sensitivity chosen by the X-4 is not enough to show fish or other small detail. Once the sensitivity has been changed, the X-4 will increase the sensitivity enough to pick up the bottom signal, then add in the level you programmed. If desired, any amount of sensitivity up to the maximum may be added.

To adjust the sensitivity while the X-4 is in the automatic mode, simply press either the right arrow key > to increase the sensitivity or the left arrow key < to decrease it. If the sensitivity is decreased to minimum, the X-4's audible tone will "flutter". 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 amount of sensitivity chosen.

CHART SPEED



When the X-4 is turned on for the first time, the chart speed scrolls at a pre-determined speed. If a higher speed is desired, press and hold the FAST key in the CHART section of the keyboard until it runs at the desired speed. To slow the display, press and hold the SLOW key. Whenever either of these keys are pressed, the sensitivity bar at the top of the display will change to a dashed line and 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 FAST key for example, the bar will start moving to the right, signifying that the chart speed is increasing.

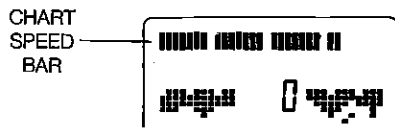


Figure 5

There are 32 steps of chart speed. By holding either the FAST or SLOW keys, 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 X-4 will “flutter” signifying the maximum chart speed has been reached.

If the automatic mode or digital function is on, the maximum chart speed cannot be reached. (The chart bar will stop one step from the far right and the audible tone will “flutter”.) Turning both the digital and the automatic mode off will allow the maximum chart speed to be attained.

To view the chart speed without changing it, press 2nd, FAST or 2nd, SLOW. The sensitivity bar will disappear and the chart speed bar will replace it for a few seconds.

At times it is desirable to stop or “freeze” the display to examine an echo before it scrolls off the screen. Pressing the STOP/RESUME key once will freeze the display. While the display is stopped, the top line on the display will flash on and off to signify that the unit is in the freeze mode. Pressing STOP/RESUME again will start the display moving at the last chart speed setting. If the digital sonar is on, the bottom depth will continue to be displayed on the screen. The digital does not stop when the chart is in the “freeze” mode.

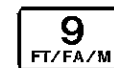
RANGE

When the X-4 is in the automatic mode, the ranges will automatically change to keep the bottom signal on the display as the bottom depth changes. At times, however, it may be desirable to expand the range or zoom in on a target. The upper limit can be set from 0 to 989 feet and the lower limit can be set from 10 to 999 feet. Any combination of the two limits may be used, provided that the lower limit is no closer than ten feet to the upper limit. If a segment less than ten feet is entered, the X-4 will “flutter” and the range will remain at the previous setting.

SCC has ten levels of adjustment. When the X-4 is first turned on, the SCC is automatically set to level 2. To change to a different level, simply press a number key from 0 to 10, then press the SCC key.

To view the SCC level, simply press the SCC key.

To turn SCC off, press 0, SCC or CLEAR, SCC.



FEET-FATHOMS-METERS

The X-4 can display the depth in either feet, fathoms, or meters. When it is first turned on, the display reads in feet. To change it to fathoms or meters, press 2nd, 6. The letters “FT” will be displayed on the screen, indicating that the X-4 is in the feet mode. While the letters “FT” are displayed, press the 6 key again. Now the letters “FT” will disappear and the letters “FA” will appear. The range has changed to fathoms. Press the 6 key again and the display will show the letter “M” and change to meters. After six seconds the letters will disappear. To change the range back to feet, press 2nd, 6, 6. To view the range mode the unit is in, press 2nd, 6 and the letters corresponding to the range will appear. When the unit is turned off, the range reverts back to feet.

Simulated
Picture

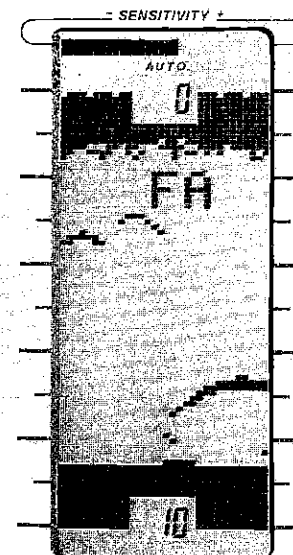


Figure 19

LIGHT

AUTO
LIGHT

A light is provided for operation of the X-4 at night. When the unit is first turned on, the lights will flash for 6 seconds. Press the 2nd, AUTO keys and the lights will stay on. To turn the lights off, press the 2nd, AUTO keys again. The lights will also go out when the X-4 is turned off.

SURFACE CLARITY CONTROL

SCC

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 called Surface Clutter and are caused by wave action, boat wakes, bait fish, temperature inversions, and other reasons.

The surface clutter can be reduced or eliminated by using the Surface Clarity Control or SCC. 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 is gradually increased as the depth increases. The maximum depth that SCC will affect is one-half of the selected depth range. For example, on a 0 to 60 foot range, SCC would have an effect from the surface to 30 feet.

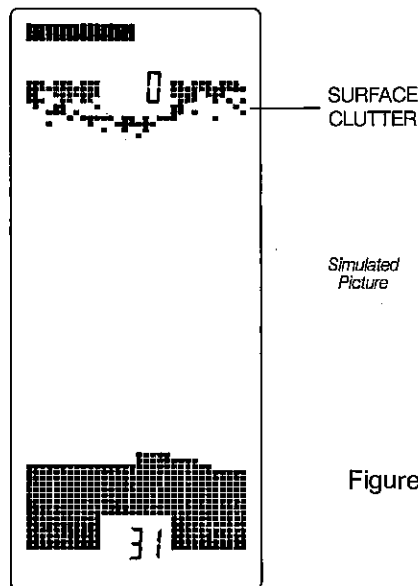


Figure 18

LOWER LIMIT

To change the lower limit, first make certain the word “AUTO” is not displayed at the top of the screen, signifying 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 the lower limit desired from 10 to 999 feet and press the LOWER LIMIT key. The display will immediately change to the new depth range and display the new lower limit at the bottom of the screen.

For example, to set the range from 0 to 70 feet, press 7, 0, LOWER LIMIT.

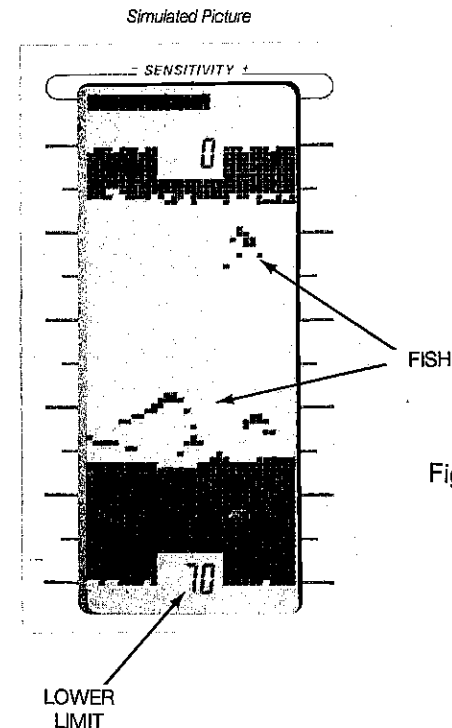


Figure 6

NOTE: Although the maximum lower limit the X-4 can display is 999 feet, the actual depth that the X-4 can reach is dependent on water and bottom conditions, plus the quality of the transducer installation.

The lower limit can be changed even if the Automatic function is on. However, the X-4 won't accept an entry if a lower limit is selected that is less than the depth of the bottom while the X-4 is in the Automatic mode. For example, if the X-4 is in Automatic, and the range is 0 to 75 feet, with a bottom signal at 60 feet, and you select a lower limit of 50 feet, the X-4 will “flutter” and leave the lower limit at 75 feet.

When the X-4 changes ranges while in the automatic mode, the lower limit selected will always be a multiple of ten. In other words the lower limit will be a number that ends in zero such as ten, twenty, forty, one hundred, etc.

UPPER LIMIT

Often it's desirable to expand or "ZOOM" a section of the display to show more detail. You can do this on the X-4 by using the Upper Limit feature. To change the upper limit of the display, simply press the desired depth (any number between 0 and 989 feet) and then the UPPER LIMIT key. The only restriction on the upper limit is that it must not be closer to the lower limit than 10 feet. In other words, if the lower limit is set to 81 feet, the upper limit cannot be set any closer than 71 feet. A ten foot segment or larger is required.

Example: Set the range from 30 to 70 feet.
Press: 3, 0, UPPER LIMIT, 7, 0, LOWER LIMIT.

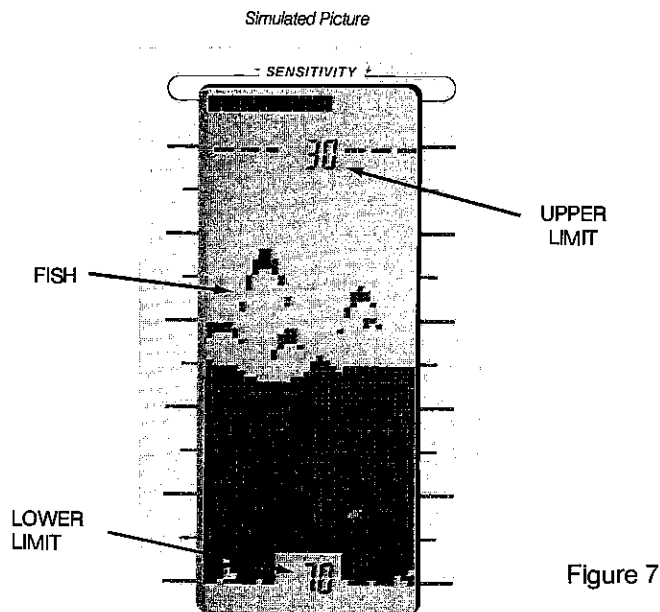


Figure 7

DISCRIMINATION

DISC

Unwanted noise on the display is a fairly common complaint. Noise can be defined as any undesired signal and it can be caused by either an electrical or acoustic source, or a combination of the two. In both cases, the noise can produce unwanted marks on the display.

The X-4 has Discrimination which is effective in combatting noise signals. It processes all incoming echoes from the receiver, determines which ones are noise and eliminates them, displaying only the legitimate echoes. Discrimination has three levels—0 through 5. 0 is off, 5 is the highest level. When the X-4 is turned on, the Discrimination level is automatically set to level 1. If noise is present on the display, press the level of Discrimination desired, (0, 1, 2, 3, 4, or 5) then the DISC key. There should be an immediate change in the amount of noise displayed on the screen.

Discrimination may be turned off by pressing 0, DISC or CLEAR, DISC.

To view the Discrimination setting without changing it, press the DISC key.

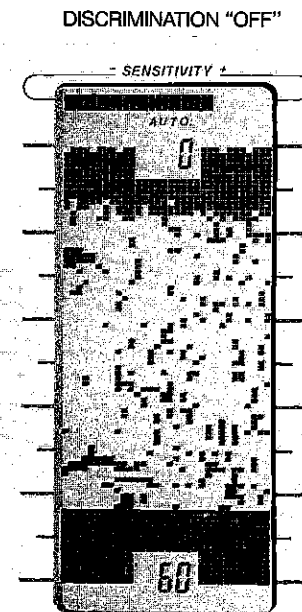


Figure 16

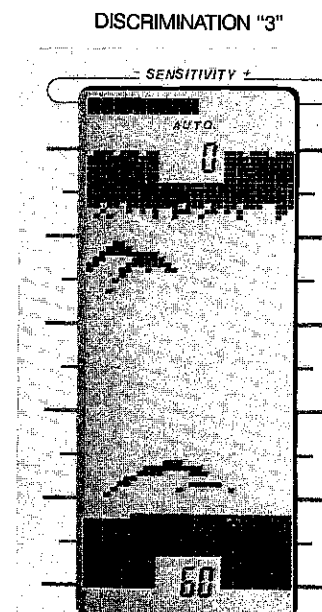
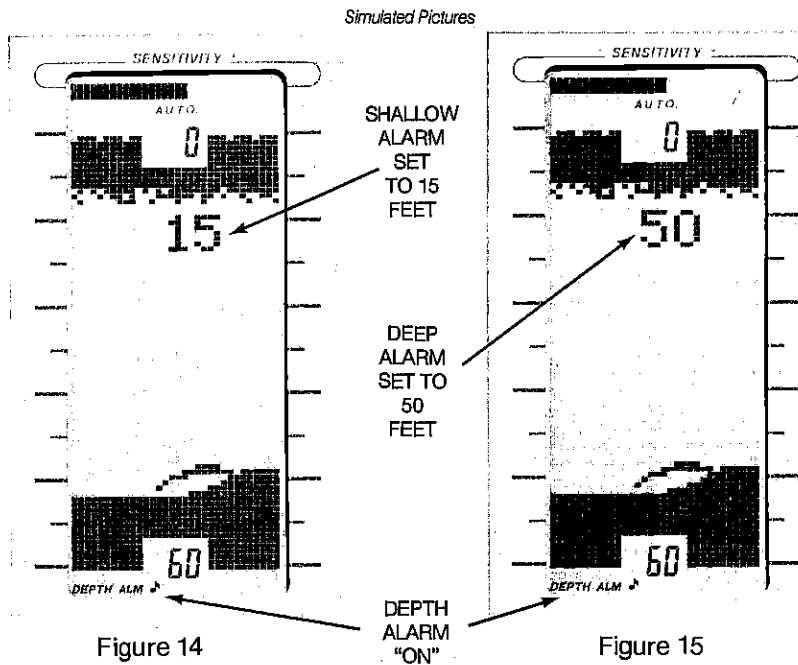


Figure 17

To use the Shallow Alarm, press the desired depth, then the SHALLOW ALARM key. For example, to set the Shallow Alarm to 15 feet, press 1, 5, SHALLOW SET. The numbers one and five will be displayed on the screen as they are entered, then disappear. Now, if the boat travels into water shallower than fifteen feet, the shallow alarm will sound.



The Deep Alarm can be set in the same manner. Press the desired depth, then the DEEP ALARM key. For example, set the Deep Alarm to 50 feet by pressing 5, 0, DEEP SET. The numbers 5 and 0 will be displayed on the screen as they're entered, then disappear. If the boat moves into water deeper than 50 feet, the alarm will sound.

To view the settings of either the shallow alarm or the deep alarm without changing them, press the SHALLOW ALARM or DEEP ALARM keys.

To clear either the Shallow or Deep Alarm, press 0, SHALLOW ALARM or 0, DEEP ALARM respectively. The words "Depth Alarm" will disappear from the lower left corner of the display, signifying both alarms have been turned off. The CLEAR key can also be used to turn the alarms off. Simply press CLEAR, SHALLOW ALARM or CLEAR, DEEP ALARM to turn the alarms off.

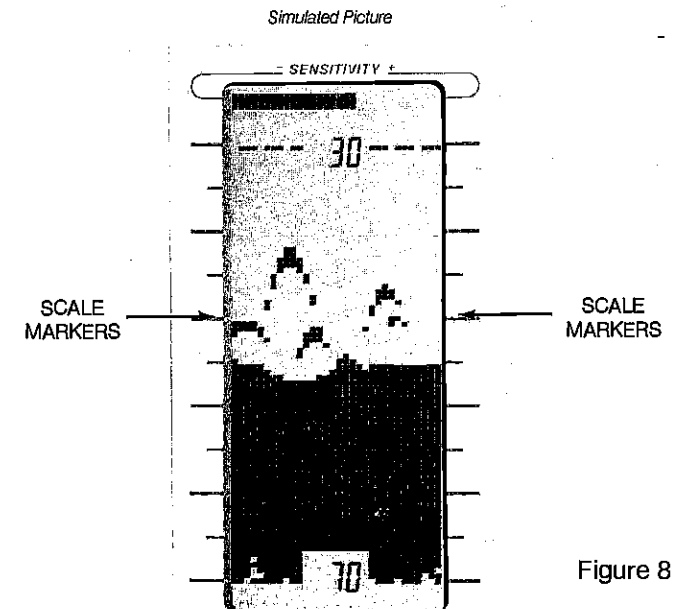
Note: Both Shallow and Deep Alarms must be off for the words "DEPTH ALARM" to go off in the display.

Upper and lower limits may be set in various combinations to show segments from the surface to the bottom and anywhere in between. This permits a scale expansion or "zoom" of a portion of the display. If a ten foot segment is chosen, then the screen resolution is 1½". This means that each dot is equal to 1½ inches when a ten foot segment is chosen.

When changing the upper or lower limits, remember the minimum distance between the two is ten feet. If a distance smaller than ten feet is chosen, the X-4 will change the range to a ten foot separation. For example, if the upper limit is 0, with a lower limit of 10 feet, and you change the lower limit to 9 feet, the X-4 will "flutter" and the previous lower limit of 10 feet will not be changed.

SCALE

There are ten scale markers printed on both sides of the X-4's display to help determine what the depth of a target is. For example, if the depth range is 0 to 60 feet, then each mark is equal to six feet. If the target (such as a fish) was next to the 5th line, then it is 30 feet deep (5 lines times six feet=30 feet). To make it easier to use the depth scale, use ranges in multiples of ten, i.e. 10, 30, 140, etc.



AUTO RANGE WITH ZOOM BOTTOM TRACK

Even though the upper limit can be changed to zoom in on a target, if the X-4 is in the automatic mode the lower limit will change as the bottom depth changes. To make the upper limit track along with the lower limit, couple the Auto Range with Zoom Bottom Track function.

To use this feature, a zoom window must be chosen. For example, lets use a 20 foot zoom window. This means that the X-4 will keep the upper limit setting 20 feet above the lower limit and place the bottom signal in this window, tracking it as it moves shallower or deeper. Press 2, 0, 2nd, 8. The X-4 will choose an upper and lower limit that will place the bottom signal in the 20 foot window. The bottom will be tracked and always kept inside this window. If the segment size is 40 feet or greater, the bottom will be tracked with window limits ending in zero (10, 20, 30, etc.), otherwise the limits will be in one foot increments.

The upper and lower limits can be changed while the Auto Range with Zoom Bottom Track mode is coupled; however the segment size will stay the same internally. When it auto ranges the next time, it will revert back to the original segment size. For example, if a window of 30 feet was chosen and the upper limit picked by the X-4 was 20 feet, with a lower limit of fifty feet, and then you changed the upper limit to 30 feet, when the bottom moves out of the window, the window upper and lower limits will be changed back to a thirty foot window. Use caution when changing the upper and lower limits while the X-4 is in the automatic mode. You can cause it to autorange the bottom signal off the screen.

To exit from this function, press 2nd, 8 or press the AUTO key to turn off the automatic mode.

DIGITAL



A complete digital sonar is built inside the X-4. It automatically discriminates between the valid bottom echoes and false echoes from fish, thermoclines, or other signals. The digital display will show only the bottom depth. It can be used any time, regardless of the mode the X-4 is in.

NOTE KEY



The note key turns the audible tone off and on. When the alarm is first set, the audible tone is on and a "note" at the bottom of the screen is displayed. To turn the audible tone off, press the note key on the keyboard once. To turn it back on, press the note key again.

CLEARING THE ZONE ALARM

To turn the Zone Alarm off, press CLEAR, SHALLOW SET or DEEP SET. All of the Zone Alarm settings will remain in memory until the X-4 is turned off. Pressing either shallow or deep set keys will turn the Zone Alarm back on with the previous settings.

DEPTH ALARM



The Depth Alarm is actually two alarms. The shallow alarm gives a warning when you're in water shallower than the alarm set point. The deep alarm gives a warning in water deeper than the alarm set point. The bottom signal is the only echo that will trigger either the shallow alarm or the deep alarm.

Note: The X-4 must be in either the automatic mode or the digital must be on in order for the Depth Alarm to function.

By setting both the shallow and deep alarms, a window can be positioned between the surface and the bottom. If the boat goes into water that is shallower than the shallow alarm's set point, the alarm will sound. The same will happen if the boat goes into water deeper than the deep alarm set point. This makes a useful anchor watch or when navigating through a channel.

To adjust the shallow (top) alarm, press the SHALLOW SET key, then press the up arrow key to move the top of the alarm window up, or the down arrow key to move the top of the zone deeper. The bottom of the zone can be set in the same manner using the DEEP SET key. Press the DEEP SET key, then press either the up arrow key to make the bottom part of the window move shallower, or press the down arrow key to move the bottom of the window deeper. After the keys are released, the bar will remain on the screen for six seconds, and then disappear.

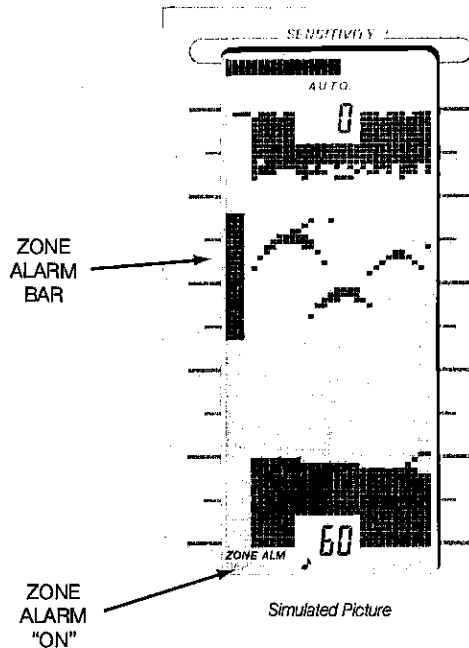


Figure 13

As long as the "ZONE ALARM" signal is displayed, the alarm is engaged. If you wish to view the zone alarm bar, simply press either the SHALLOW SET or DEEP SET keys and the bar will be displayed for six seconds. It can be turned on permanently by pressing 2nd, down arrow. To turn it back off, simply press 2nd, down arrow again.

If the zone alarm is set off by a fish or the bottom, the alarm will sound and the words ZONE ALARM will be seen at the bottom of the display.

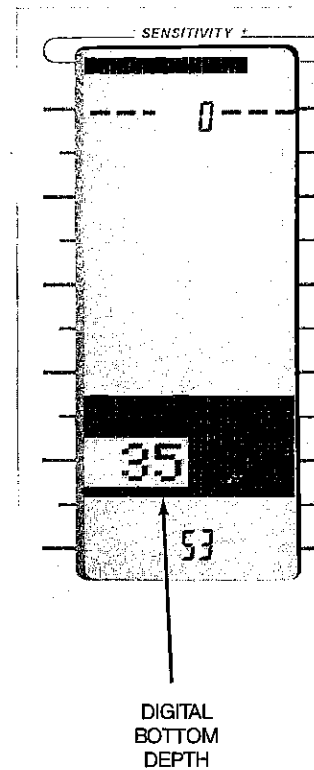
If the range is changed, the zone alarm may need to be changed since it does not track range settings.

NOTE: If the digital is on, the chart bar may interfere with the digital display while the shallow or deep alarms are being adjusted. The digital display will return to normal after the zone alarm adjustments are finished.

When the X-4 is first turned 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.

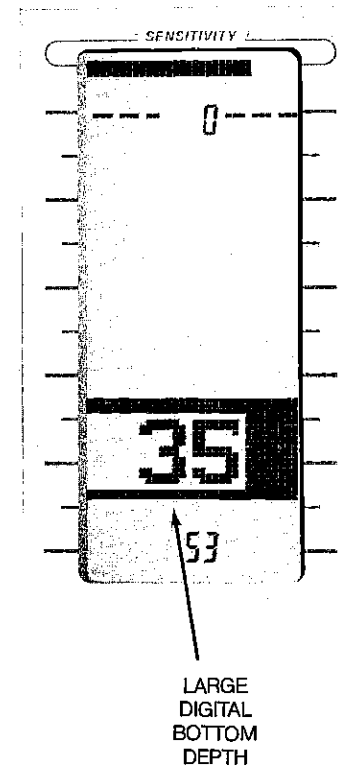
For easier reading, the size of the digital numbers can be enlarged by pressing 2nd, 7. To return to the smaller size, press 2nd, 7 again.

Figure 9



Simulated Pictures

Figure 10



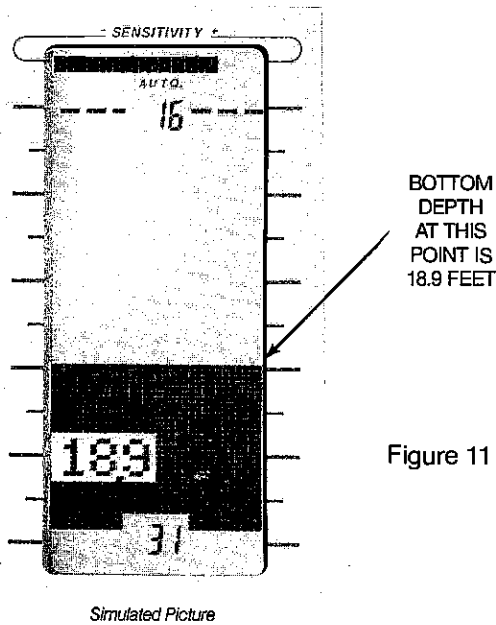
Although it is not necessary in normal use, to get the maximum performance out of your digital sonar, stop the chart by pressing the STOP/RESUME key in the chart section of the keyboard. This turns the X-4 into a digital sonar only and allows it to better track the bottom signal. One reason to use the digital in this manner would be if you are going to travel at high speed from one part of a lake to another and you just want to know the bottom depth. Press STOP/RESUME, then change the size of the digital display by pressing 2nd, 7. This will give both the fastest possible depth updates plus an easy-to-read display.

The digital display can be turned off by pressing the DIGITAL key in the DIGITAL SONAR portion of the keyboard or by pressing CLEAR, DIGITAL.

10th

DIGITAL
10TH

The digital sonar will display the bottom depth in whole numbers. If desired, the bottom depth in water less than 100 feet can be displayed in tenths of a foot by pressing 2nd, DIGITAL. If the bottom depth goes deeper than 99.9 feet, the digital sonar will automatically display in whole numbers again.



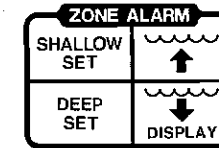
If the chart is in the freeze mode, the digital display will continue to show the bottom depth as it changes. It does not freeze when the chart does.

ALARMS

The X-4 has two different alarms, a zone alarm and a depth alarm. The zone alarm requires both an upper and a lower limit setting. The alarm then "chirps" and the word "ALARM" flashes on the display whenever an echo such as a fish, or school of fish is detected inside the boundaries of the upper and lower limits.

The depth alarm also has upper and lower limits, but they do not have to be used together. The depth alarm sounds with a fast beep whenever the bottom echo is detected shallower than the alarm upper limit, and a slow beep when the bottom is deeper than the alarm's lower limit. The word "ALARM" also flashes on the display whenever the depth alarm is triggered.

ZONE ALARM



The Zone Alarm can also be thought of as a fish alarm. It will sound when an echo is detected inside its window.

To set the Zone Alarm, press the SHALLOW SET key in the ZONE ALARM section of the keyboard. The words ZONE ALARM will be displayed in the lower left corner of the screen. A vertical bar will be displayed on the left side of the screen. This is the Zone Alarm's "window". Any echo that appears between the top and bottom of this bar will sound the alarm. Both the shallow and deep ends of this bar can be adjusted to make a smaller or larger alarm "window".

Simulated Picture

