X-70A 3D

INSTALLATION AND OPERATION INSTRUCTIONS

LOWRANCE
ELECTRONICS, INC.

TABLE OF CONTENTS

All features and specifications subject to change without notice.
All screens in this manual are simulated.

INTRODUCTION

Thank you for purchasing an X-70A 3D. Its adjustable VariView™ 3D per-spective lets you rotate the underwater picture to accommodate specific viewing needs. In addition to the 3D views, the X-70A 3D also gives you outstanding 2D detail using either the supplied 384 kHz transducer or an optional 192 kHz transducer.

SPECIFICATIONS

Dimensions .... 5 7/8" H x 7 3/4"W x 3 7/8"D
Transmitter Frequency .... 384 kHz and 192 kHz
Transmitter Power .... 3000 watts (peak-to-peak, typical)
    375 watts (RMS, typical)
Display .... Supertwist LCD
    200 vertical x 320 horizontal
    64,000 total pixels

NOTICE!

The storage temperature for your unit is from -4 degrees to +167 degrees Fahrenheit (-20 degrees to +75 degrees Celsius). Extended storage in temperatures higher or lower than specified will damage the liquid crystal display. This type of damage is not covered by the warranty.

INSTALLATION

TOOLS AND HARDWARE YOU WILL NEED

Screwdriver
Four #10 screws with flat washers or up to 1/4" screws (to attach gimbal bracket to dash)
Hand-held drill with a 5/32" drill bit
Marine grade caulking compound

TRANSDUCER INSTALLATION:

The HS-3D4 supplied with your X-70A 3D is a 384 kHz, 4 element, high-speed, transom mount transducer. It can be installed on any outboard or stern-drive (inboard-outboard) powered boat. The built-in "kick-up" bracket helps prevent damage if the transducer strikes an object while the boat is moving. If the transducer does "kick-up", it can be pushed back in place without tools.

Read this section carefully before attempting the installation. Determine the best mounting location for your boat. Remember, the transducer loca-tion is the most critical part of a sonar installation. If it isn't done properly, the sonar can't perform to it's designed potential.

Transducer Location

1. The transducer must be placed in a location that has a smooth flow of water at all times. If the transducer is not placed in a smooth flow of water, interference will show on the sonar's display in the form of random lines or dots whenever the boat is moving and can completely mask the sonar image at high speed.

2. The transducer should be installed with its face pointing straight down, if possible.

3. Make certain the chosen location doesn't interfere with the boat's trailer. Also, don't mount it closer than about one foot from the engine's lower unit. This will prevent cavitation interference with the propeller. Typically, the transducer should be mounted as far down on the transom as possible. This increases the chance that it will remain in the water at high speed or sharp turns, and reduces the possibility of air bubble interference (cavitation).

4. Don't mount the transducer directly behind strakes or ribs on the bottom of the hull. Typically, a good location on aluminum boats is between the ribs closest to the engine. The port (left) side of the transom is preferred for mounting the transducer, however, if this is not possible, the starboard (right) side can be used, usually with good results.

CAUTION!
CLAMP THE TRANSDUCER CABLE TO TRANSOM NEAR THE TRANSDUCER. THIS WILL HELP PREVENT THE TRANSDUCER FROM ENTERING THE BOAT IF IT IS KNOCKED OFF AT HIGH SPEED.

GOOD LOCATION

RIBS ON ALUMINUM BOATS

POOR LOCATION

POOR ANGLE

GOOD LOCATION
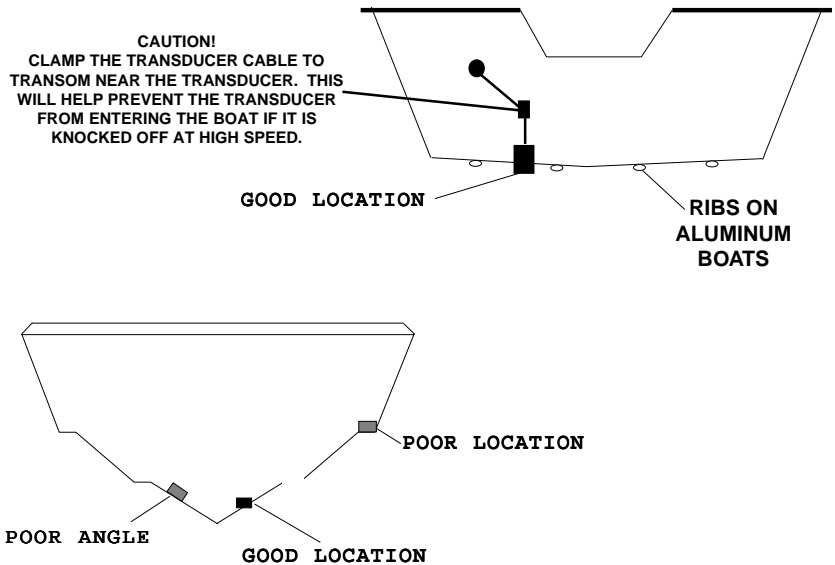
Transducer Assembly and Mounting

The best way to install this transducer is to loosely assemble all of the parts first, place the transducer's bracket against the transom and see if you can move the transducer so that it's parallel with the ground.

1. Press the two small plastic ratchets into the sides of the metal bracket as shown below. Notice there are letters molded into each ratchet. Place each ratchet into the bracket with the letter "A" aligned with the dot stamped into the metal bracket. This position sets the transducer's coarse angle adjustment for a fourteen (14) degree transom. Most outboard and stern-drive transoms have a fourteen degree angle.

DOT
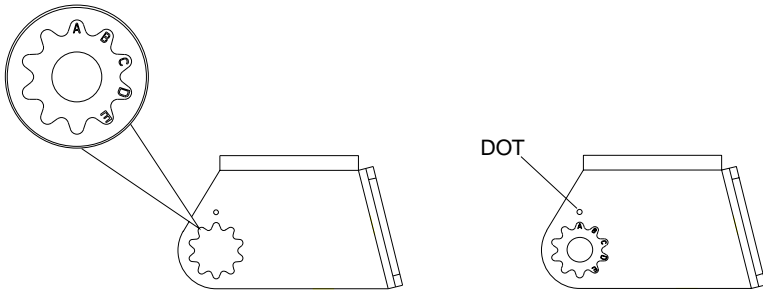
2. Slide the transducer between the two ratchets. Temporally slide the bolt though the transducer assembly and hold it against the transom. Looking at the transducer from the side, check to see if it will adjust so that its face is parallel to the ground. If it does, then the "A" position is correct for your hull. If the transducer's face isn't parallel with the ground, remove the transducer and ratchets from the bracket. Place the ratchets into the holes in the bracket with the letter "B" aligned with the dot stamped in the bracket. Reassemble the transducer and bracket and place them against the transom. Again, check to see if you can move the transducer so it's parallel with the ground. If it does, then go to step 3. If it doesn't, repeat step 2, but use a different letter until you can place the transducer on the transom correctly.

NUT
METAL WASHER
RUBBER WASHERS
METAL WASHER
BOLT
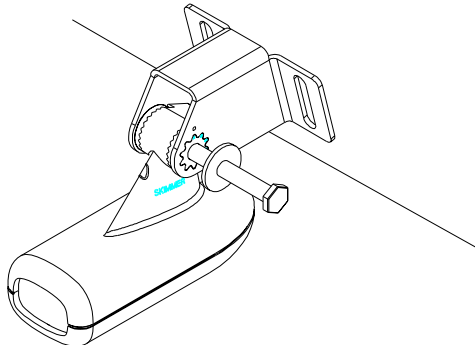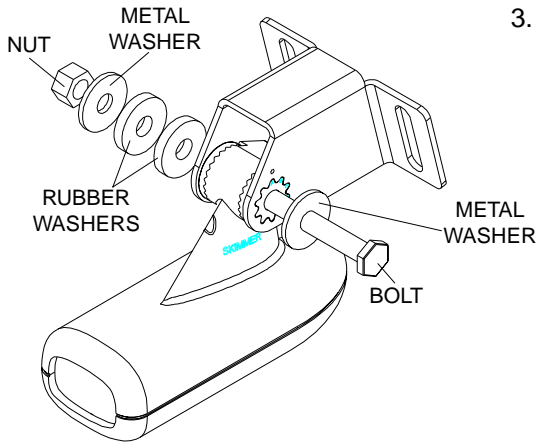
3. Once you determine the correct position for the ratchets, assemble the transducer as shown at left. Do not tighten the lock nut at this time.

4. Hold the transducer and bracket assembly against the transom. The transducer should be roughly parallel to the ground. The bottom of the transducer bracket should be in line with the bottom of the hull. *Don't let the bracket extend below the hull!* Mark the center of the slots for the mounting holes. Drill two 5/32" holes in the marked locations for the #10 screws supplied with the transducer.

TRANSOM

SIDE VIEW
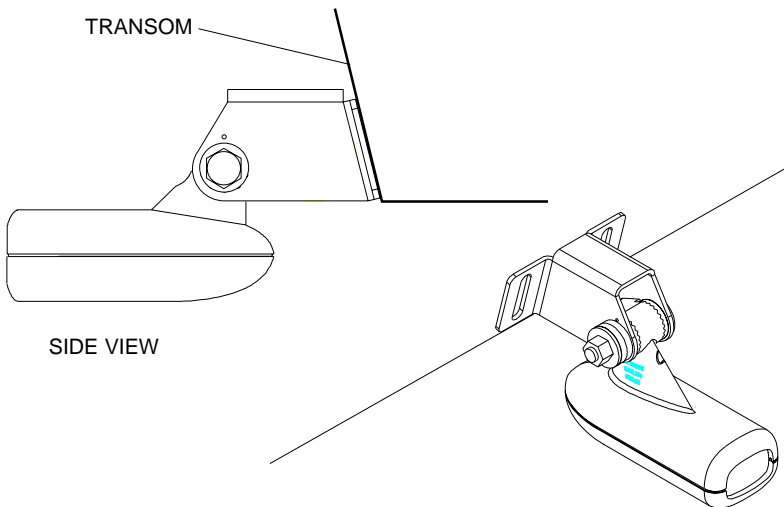
5. Attach the transducer to the transom. Slide the transducer up or down until it's aligned properly on the transom as shown above. Tighten the bracket's mounting screws. Adjust the transducer so that it's parallel to the ground and tighten the lock nut until it touches the flat washer, then add 1/4 turn. *Don't over tighten the lock nut!* If you do, the transducer won't "kick-up" if it strikes an object in the water.

4

6. Route the transducer cable to the sonar unit. If possible, route the transducer cable away from other wiring on the boat. Electrical noise from the engine's wiring, bilge pumps, VHF radio wires and cables, and aerators can be picked up by the sonar. Use caution when routing the transducer cable around these wires.

IMPORTANT!

Clamp the transducer cable to the transom close to the transducer. This can prevent the transducer from entering the boat if it is knocked off at high speed.

7. Make a test run to determine the results. If the bottom is lost at high speed, or if noise appears on the display, try sliding the transducer bracket down. This puts the transducer deeper into the water, hopefully below the turbulence causing the noise. Do not allow the transducer bracket to go below the bottom of the hull!

SONAR UNIT MOUNTING

Install the X-70A 3D in any convenient location, provided there is clearance behind the unit when it is tilted for the best viewing angle. Holes in the bracket base allow wood screw or through-bolt mounting. Make certain there is enough room behind the unit to attach the power and transducer cables.

Using the bracket as a template, mark the dash for the mounting holes, then make a mark in the center of the bracket location for the cable hole. If you want the smallest possible hole for the power and transducer cables in the dash, install the transducer first, then route the cable to the desired location. The smallest hole that will pass one power or transducer plug is 5/8". After the hole is drilled, pass the transducer connector up through the hole first, then pass the power cable down through it.

After routing the cables, fill the hole with a good marine sealing compound. Place the bracket over the hole and route the cables through the slot in the back of the bracket. Break out one of the other slots for the transducer cable. Screw the bracket to the dash.



FRONT

SLOT   BREAK OUT SLOT
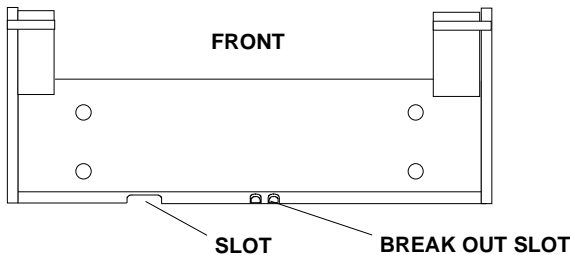
POWER CONNECTIONS

The X-70A 3D works from a twelve-volt battery system. For the best results, attach the power cable directly to the battery. You can attach the power cable to an accessory or power buss, however you may have problems with electrical interference. Therefore, it's safer to go ahead and attach the power cable directly to the battery. If the cable isn't long enough to reach the battery, splice #18 gauge wire onto it. The power cable has two wires, which are red and black. Red is the positive lead, black is negative or ground. Make certain to attach the in-line fuse holder to the red lead as close to the power source as possible. For example, if you have to extend the power cable to the battery or power buss, attach one end of the fuse holder directly to the battery or power buss. This will protect both the unit and the power cable in the event a short occurs.

IMPORTANT!

Do not use this product without a 3-amp fuse wired into the power cable! Failure to use a 3-amp fuse will void your warranty.

If you've purchased the optional ST-T speed/temperature sensor, install it according to the instructions included with the sensor. Route its cable to the X-70A 3D's power cable and plug it into the connector marked "SPEED/ TEMP CABLE".

6
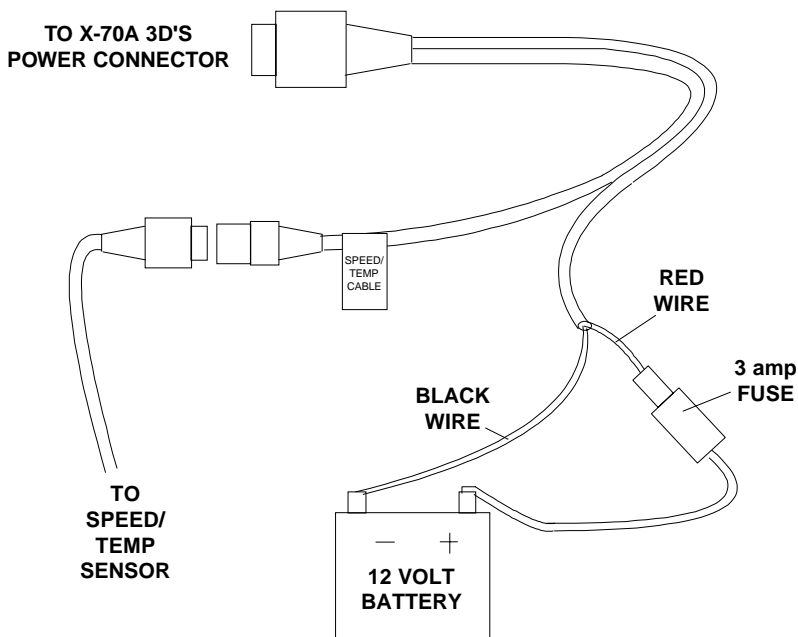
KEYBOARD

The keyboard is arranged for convenient operation. A ten-key keypad on the right side of the screen lets you enter numbers. Arrow keys beneath the keypad are used to adjust features. The keys in the left column are used to select menu features. The keys along the bottom of the screen let you select the basic sonar functions.

SENS Press this key to adjust the unit's sensitivity.

RANGE This key lets you adjust the range shown on the display.

ZOOM This switches the chart between two times and four times zoom.

AUTO This turns the automatic feature off or on.

**WINDOWS** This key lets you select the different display modes.

MENU Press this key to show the menus.

ARROW KEYS These keys are used to make adjustments on menus.

**ON** The "On" key turns the unit on and also turns the backlights on.

OFF Press and HOLD the Off key to turn the X-70A 3D off.

FULL CHART This key switches the digital box between small and large digits when the 2D chart is displayed.
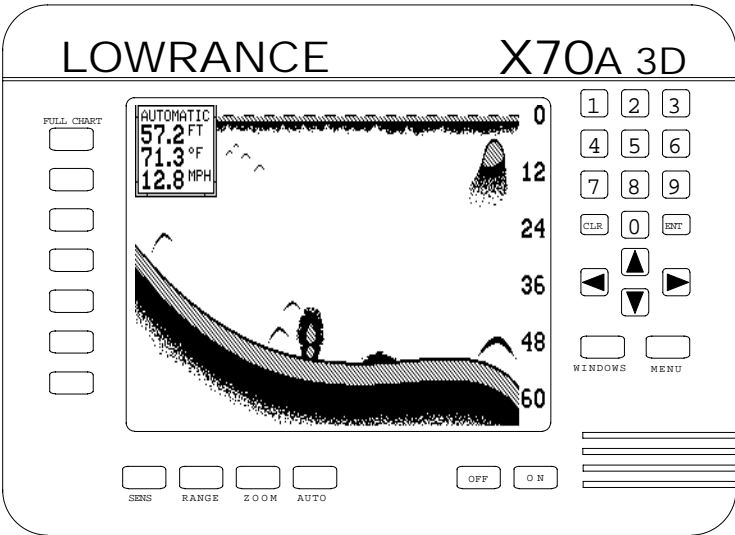
DISPLAY - General
When the X-70A 3D is first turned on, the display looks similar to the one below. The 3D screen scrolls from right to left, with the scale on the right side of the screen. The current depth beneath the transducer shows in the upper right corner of the display. A fish symbol to the left of the depth shows that the Fish ID feature is on. The word "AUTO" signifies that the automatic function is on, keeping the bottom on the display at all times. If the computer identifies targets as fish, one of four fish symbols appear on the screen, depending on the size of the target. Numbers above the fish symbol tell you the depth of the target. This feature is called "FishTrack".
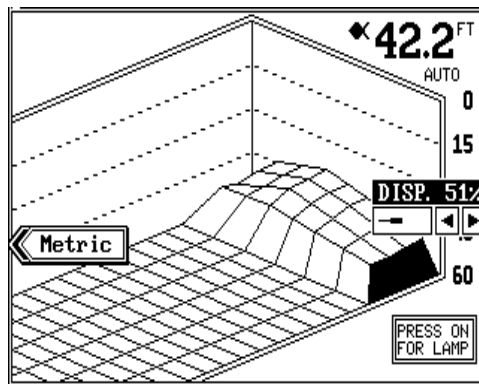
The lights are on for a few seconds when the X-70A 3D is turned on. Menus appear at the same time. To leave the lights on, press the ON key. This key controls the back lights. If you don't want the lights on, wait a few seconds and they will automatically turn themselves off. The menus will also disappear after a few seconds, or you can press the CLEAR key to erase them.

The Metric and Display menu labels work the same way. Press the key adjacent to the Metric label to change the depth from feet to meters. This also changes the temperature display to degrees Celsius, speed to knots, and log to kilometers.

The Display menu on the screen's right side lets you adjust the display's for the best contrast. Press the left arrow key to decrease the contrast, right arrow key to increase it.

The X-70A 3D automatically detects the speed/temperature sensor. If the sensor is attached to the unit, speed, temperature, and distance log automatically appear on the display. Distance markers also appear on the

screen, showing the distance behind the boat. If the speed/temperature sensor is not plugged into the X-70A 3D, then none of these will show.

MODES OF OPERATION
The X-70A 3D shows a sonar picture of the underwater world in 3D, 2D, Bottom Depth View, and FasTrack™ modes. The 2D and Bottom Depth Views can use either the 384 or 192 kHz transducer (if the optional 192 kHz transducer is attached). The 3D mode is always 384 kHz. To switch between the different modes, first press the WINDOWS key. Press a key on the left side of the screen to choose the desired mode. Press the CLR key to exit this menu.
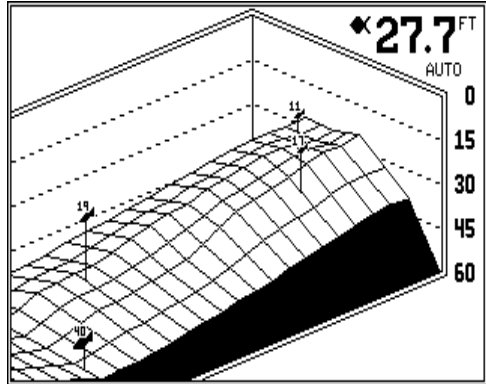
In the 3D mode shown at right, the bottom is represented by a "wire-frame" model. Only the bottom and fish symbols show in this mode. Structure, weeds, thermoclines, etc. will not show.

The X-70A 3D uses a 384 kHz transducer with four elements. The digital depth display shows the bottom depth from the middle transducer elements. If it loses the signal from any element, a box with the word "LOST" appears over the corresponding area on the display. This means the unit cannot receive an echo from that element. This could be due to a large drop-off, noise or other natural phenomenon.

The 2D mode looks like a conventional sonar display as shown below. The bottom echo scrolls from right to left. The range displays on the right side of the screen. The digital bottom depth shows in the upper left corner. When the X-70A 3D is put into the 2D 384 kHz mode, the two center transducer elements are in use. The two outer elements are turned off. You can select the elements from a menu discussed in a later section. The 2D 192 kHz transducer has only one element.


9
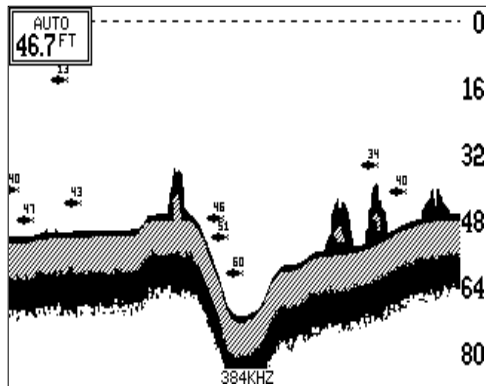
All 2D modes show the bottom signal, structure, thermoclines, fish (both with and without the Fish ID feature), baitfish schools, and more. The 3D view shows a 3D representation of the bottom, with Fish ID symbols only. The 2D mode shows more information, the 3D mode makes it easier to visualize the bottom contour.

The Bottom Depth View as shown at right displays the depth at the top of the display in large digits. The graph scrolls at high speed. Note that this graph only shows the bottom signal. No structure, fish signals, or other echoes show on this display. This feature is available using either frequency transducer. (384 Bottom or 192 Bottom)
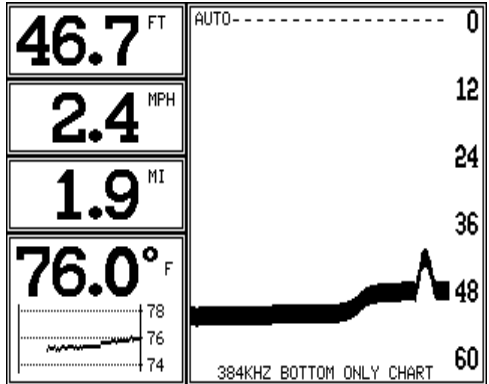
The 3D FasTrak screen converts echoes from all four transducer elements into short horizontal lines. Typically, the thicker the bar, the stronger the echo. This screen is updated rapidly, giving you flasher-like performance. You can view echoes from any or all elements on this screen.
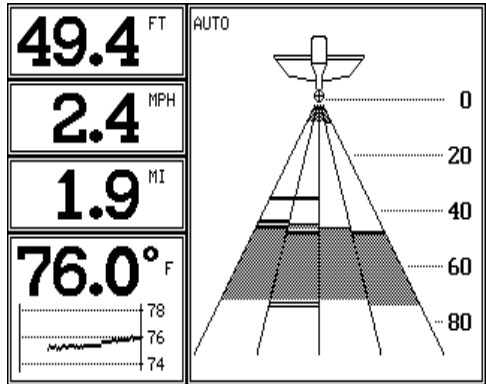
DIGITAL BOX
A box containing the digital displays appears in the upper left corner of the display when a 2D display is enabled. You can switch the size of the display from normal to large by pressing the FULL CHART key or by pressing the up or down arrow keys on the selection menu.
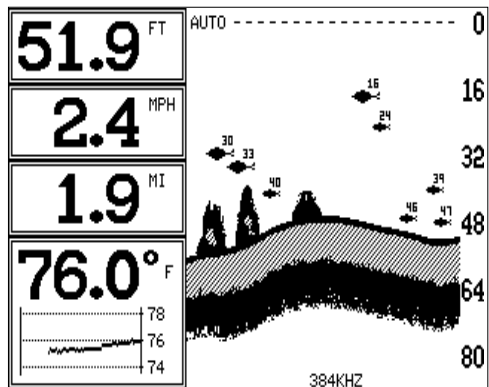
OPERATION

The Automatic and Sensitivity features used on the X-70A 3D are the same for all modes of operation. This section will explain these features. For information on features specific to different modes, see the 2D or 3D operation sections.
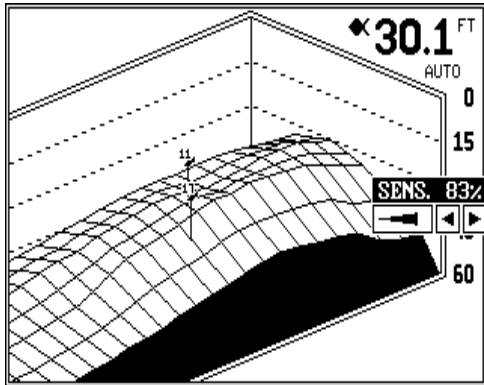
AUTOMATIC

The X-70A 3D adjusts the sensitivity and range to keep a detailed bottom signal on the display when the automatic feature is on. This is enabled when the unit is first turned on. You can turn this feature off to gain greater control over the adjustments and features of this unit.
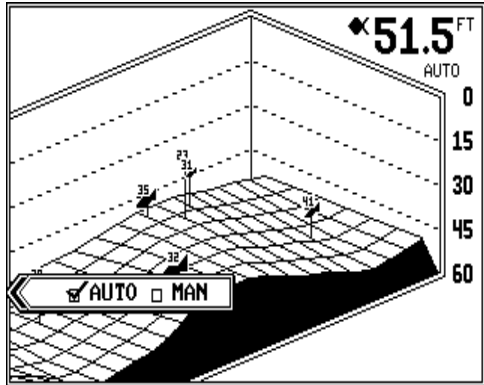
To turn automatic off, press the AUTO key. A screen similar to the one above appears. Now press the AUTO key again. This moves the check mark from the "AUTO" box to "MAN". Press the CLR (clear) key to erase the menu. To switch back to manual, repeat the above steps, but move the check mark to the "AUTO" box using the AUTO key.

SENSITIVITY

The sensitivity control adjusts the receiver's ability to show echoes. If it's adjusted properly, the sonar unit shows not only the bottom, but targets (such as fish) with little or no noise. If the sensitivity is turned too low, no fish signals will show, and you will lose the bottom signal in fairly shallow water.

When the X-70A 3D is in the automatic mode, the computer inside adjusts the sensitivity for the best setting. You can override this setting, adding or subtracting the amount of sensitivity the computer uses. You can also take complete control of the sensitivity level when the unit is in the manual mode.

11

To adjust the sensitivity, press the SENS key. A menu appears on the right side of the screen as shown on the previous page. Press the right arrow key to increase it, the left arrow key to decrease it. When you have it changed to the desired level, press the CLR key to erase the menu or wait a few seconds for it to automatically clear.

3D OPERATION

When the X-70A 3D is in the 3D mode, the Fish ID feature is always on (unless you turn it off). FishTrack (the depth numbers above the fish symbols) shows you the depth of the fish symbol and can be turned off, if desired. See the FishTrack section in this manual for more information.

3D RANGE

The range is set by the unit as long as it's in the auto mode. However, you can adjust the range slightly when automatic is on. The unit won't let you move the bottom off the screen, and it will correct the range once the bottom begins to go off the screen. When the unit is in the manual mode, you can set the range to any that's available.

To change the range on the X-70A 3D, first press the RANGE key. A screen similar to the one at right appears. Simply press the down arrow key to increase the range or the up arrow key to decrease it. When the desired range is chosen, wait a few seconds and the menu will automatically disappear from the screen or press the CLR key to erase it.
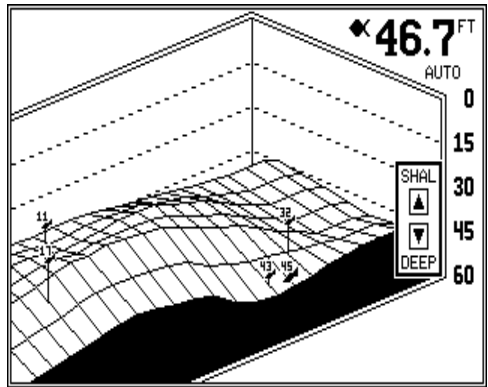
The X-70A 3D uses the following ranges: 0 - 5, 10, 20, 40, 60, 80, 100, 150, 200, 300, 400, 500, 700, and 900 feet.

3D ZOOM

The zoom feature enlarges all echoes on the screen, making them easier to see. This feature works in automatic or the manual mode. (Note: If the unit is in the 3D automatic mode and the zoom feature is turned on, the unit will not change the range to a shallower setting. If the bottom signal goes shallower than the zoom range, the X-70A 3D will simply show a flat bottom signal at the shallowest range shown on the display. For example, if you have a zoom range from 45 to 60 feet, and the bottom rises to 30

feet (shown by the digital depth display), the unit will show a flat bottom at 45 feet.)

To use the zoom feature, first press the ZOOM key, then press the key next to the zoom menu that appears in the lower left corner of the display as shown at right. This switches the unit to the 2X zoom mode. This enlarges all echoes on the screen to twice their nor-

mal size. If you press the key again while the menu is showing, the unit will switch to the 4X zoom mode. This enlarges all echoes four times their normal size.
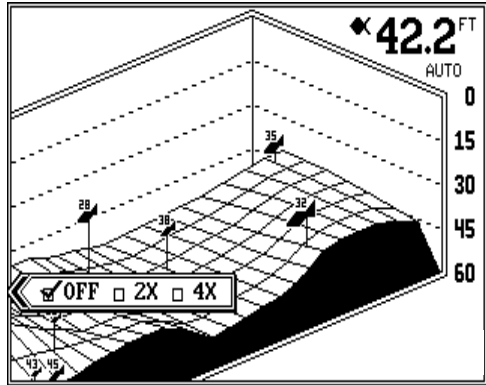
Turn the zoom feature off by repeatedly pressing the key next to the zoom menu until the check mark is on the OFF box. Wait a few seconds for the menu to automatically disappear from the screen or press the CLR key to erase it.

3D VARIVIEW™
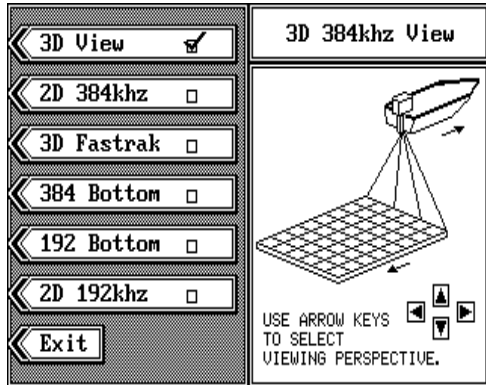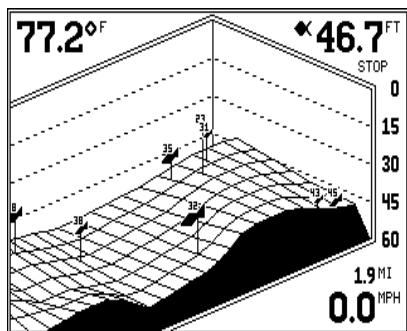When the X-70A 3D is first turned on, the 3D screen scrolls from right to left as shown above. This view shows you the bottom contour as if your boat is travelling from the left side of the screen to the right side. The upper right corner of the screen is the right (starboard) side of your boat's transom. There are occasions when you may wish to change the viewing angle of the bottom. For example, if you're travelling parallel to a drop-off, the far side of the drop-off may not be visible, due to the higher ground obstructing the drop-off. By rotating the 3D view, the opposite side of the drop-off can be seen.
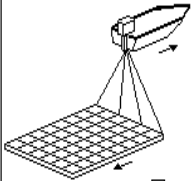
To change the 3D view, first press the WINDOWS key. The screen shown at right appears. There are four views available. Press the arrow keys to rotate the 3D view. When you've rotated the display to the desired view, press the CLR key to return to the 3D screen.
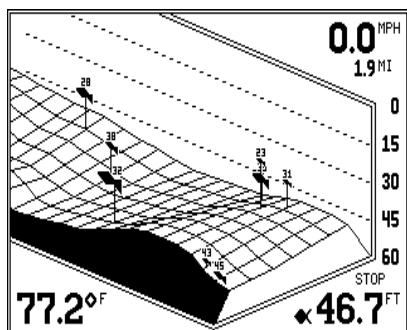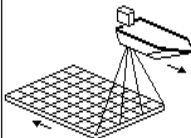

2D OPERATION
2D Transducer Element Se-
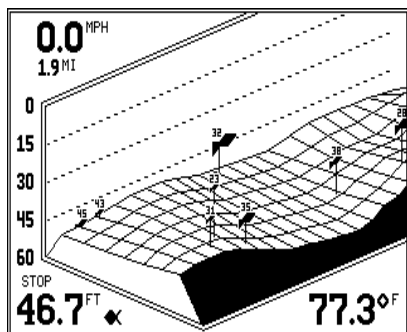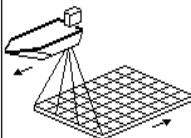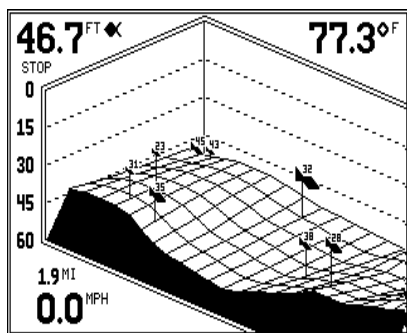
14

lection

This view shows all echoes in the traditional sonar graph display. You can view echoes from any two 384 kHz transducer elements, or the 192 kHz transducer. (Note: 192 kHz operation requires an optional 192 kHz transducer.) To select the transducer element and place the X-70A 3D into the 2D mode, press the WINDOWS key. Next, press the key next to the "2D 384 kHz" label or the "2D 192 kHz" label. The screen shown at right appears.

If you want to use only the center two transducer elements, simply press the CLR key to switch to the 2D chart display.

As shown in the picture at right, the shaded area beneath the boat shows which transducer elements are in use. When this unit is first turned on, only the two center ele-

ments are in use for the 2D mode. To change to other elements, press the left or right arrow keys. As you press the keys, the shaded area on the screen moves also, showing you which transducer elements are in use.
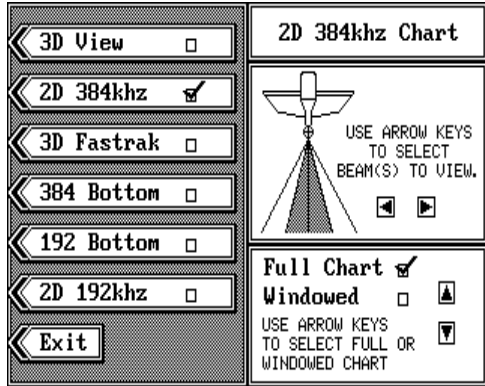
Once you've selected the desired transducer elements, simply press the CLR key to switch to the 2D chart display.

2D RANGE

The range is set by the unit as long as it's in the auto mode. However, you can adjust the range slightly when automatic is on. The unit won't let you move the bottom off the screen, and it will correct the range once the bottom begins to go off the screen. When the unit is in the manual mode, you can set the range to any that's available.

Automatic mode

To change the range, first press the RANGE key. A screen similar to the one at right appears. Now press the down arrow key to increase the range or the up arrow key to decrease it. When the desired range is chosen, wait a
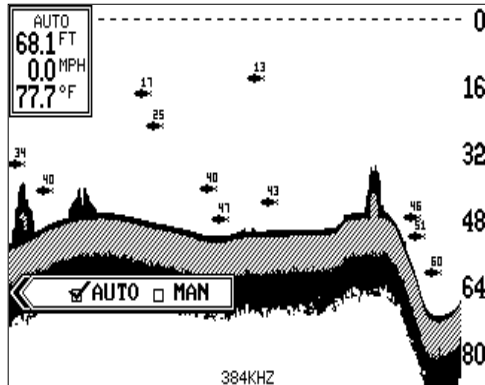
few seconds and the menu will automatically disappear from the screen or press the CLR key to erase it.

Manual mode

When the X-70A 3D is in the manual mode, any range can be selected. The unit will leave the range setting you choose, but it won't keep the bottom on the display. For example, if the range is 0 - 60 feet, and the bottom signal goes from 55 to 70 feet, once the bottom goes deeper than 60 feet, it won't show on the display.

To change the range, first press the RANGE key. A screen similar to the one at right appears. You can simply use the up or down arrow keys to select the range, or you can use the upper and lower limit menus.
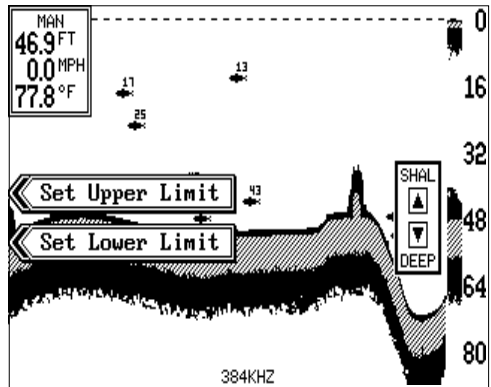
The X-70A 3D uses the following ranges: 0 - 5, 10, 20, 40, 60, 80, 100, 150, 200, 300, 400, 500, 700, and 900 feet.

Upper and Lower Limits

The X-70A 3D gives you added versatility with the upper and lower limits menu. The upper limit is the depth shown at the top of the screen, which is normally zero. The lower limit is the depth shown at the bottom of the screen which is normally a range such as 60 feet. By manually entering the upper and lower limits, you can select any segment of the water using increments as little as one foot! Changing the upper and lower limits in this manner actually gives you a zoom in the manual mode that is much more versatile than the standard zoom.

To change the upper limit, first make certain the unit is in the manual mode, then press the RANGE key. Now press the key next to the "Set Upper Limit" label. A screen similar to the one at the top of the next page appears.

Now enter the upper limit, in any number as long as it's 10 feet or more less than the lower limit. For example, if the range is 0 -60 feet, you can use any number between 0 and 50 feet as an upper limit. After entering the upper limit, press the ENT key. This returns the unit to the range menus

and your new upper limit will be at the top of the screen.

To change the lower limit, use the same steps as above, but press the key next to the "Set Lower Limit" menu.

Press the CLR key to erase these menus or wait a few seconds and they will automatically disappear.
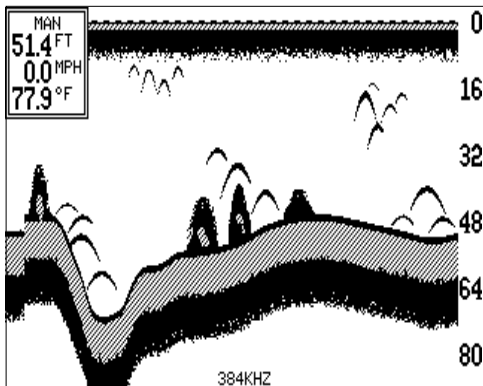
2D ZOOM - Automatic mode

The zoom feature enlarges all echoes on the screen, making them easier to see. This feature works in automatic or the manual mode. The X-70A 3D can show a full 2D zoom screen or a split-screen with the right side normal and the left side enlarged.

To use the zoom feature, first press the ZOOM key. A screen similar to the one at right appears. Now press the key next to the "OFF 2X 4X" menu. This switches the unit to the 2X zoom mode which enlarges all echoes on the screen to twice their normal size. If you press the key again while the menu is showing, the unit will switch to the 4X zoom mode. This enlarges all echoes four times their normal size.
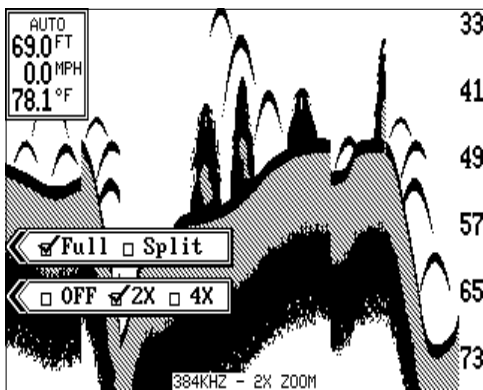
To use the split-screen zoom feature, press the key adjacent to the "FULL SPLIT" label. This instantly divides the screen in half. The left half of the screen is zoomed, the right side is a full-scale, top-to-bottom view of the same area. The echoes that scroll across the screen are the same on both sides of the screen, but they are enlarged and show in greater detail on the left side. To switch back to full screen, press the ZOOM key, then press the key next to the "FULL SPLIT" label.

Turn the zoom feature off by repeatedly pressing the ZOOM key until the check mark is on the OFF box. Wait a few seconds for the menu to auto-

matically disappear from the screen or press the CLR key to erase it.

2D ZOOM - Manual Mode
The zoom feature works the same in manual as it does in automatic with two exceptions. One, since the unit is in manual, the unit won't change the range to keep the bottom signal on the display. Two, you can adjust the zoom "window" to any desired depth.

To zoom the screen in the manual mode, first press the ZOOM key. A screen similar to the one on the previous page appears. You'll notice a new label on the screen: "ADJUST". Press the key next to that label. A screen similar to the one at right appears.

The unit is now in the split-screen zoom mode. A zoom bar is on the far right side of the screen. Use the up and down arrow keys to move this bar up and down the right side of the screen. Everything between the top and bottom of this bar shows on the left side of the screen in either 2X or 4X scale. When you have the zoom bar in the desired loca-

tion, press the CLR key to erase it or wait a few seconds and it will automatically disappear.
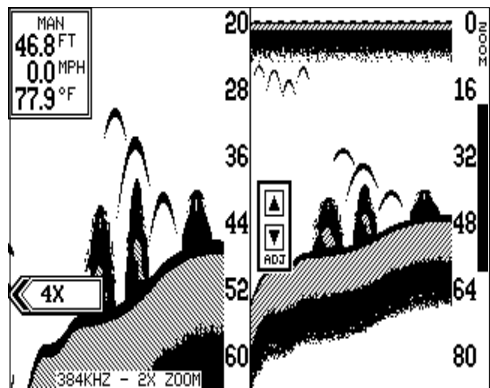
You can have the zoom bar stay on the screen continuously, by using the zoom bar menu. See the 2D Options in the MENUS section for more information.

BOTTOM DEPTH VIEW
To use the Bottom Depth View, first press the WINDOWS key. Now press the key next to the "384 Bottom" or "192 Bottom", depending on the transducer you wish to use or have installed. Finally, press the CLR key. A screen similar to the one at the top of the next page appears.

This view shows the water depth in large digital numbers at the top left corner of the screen. If an optional speed/temperature sensor is installed, the unit can also show boat speed, distance travelled (log), surface water temperature, and a surface water temperature graph in this area.

Next to the digital display box is the chart record. This shows depth infor-

mation only. No fish, structure, or any echoes other than the bottom signal appear on this screen. You can adjust the range, however this is the only adjustment you can make on this screen. The X-70A 3D automatically sets the sensitivity level.
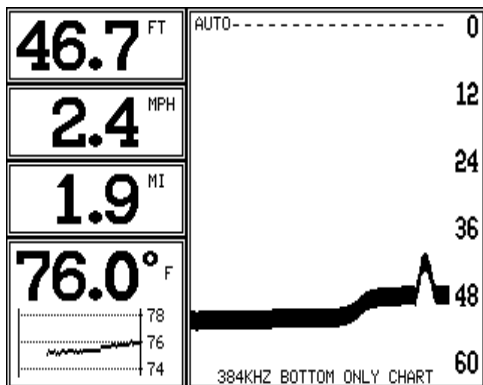
FASTRAK™

The FasTrak™ view converts all echoes to short horizontal lines. Typically, the thicker the line, the stronger the signal. This view gives you an immediate, "real-time" screen display. This high-speed display replicates flasher performance. You can adjust sensitivity, range, and turn automatic on or off in this mode. Zoom is not available.

To use the Fastrak™ mode, first press the WINDOWS key. Now press the key next to the "3D Fastrak" menu. A screen similar to the one at right appears. When the X-70A 3D is first turned on, only the center two transducer elements are in use. By pressing the left or right arrow keys other elements can be selected. When you have the desired elements selected, press the key next to the "Exit" menu. A screen similar to the one below appears.
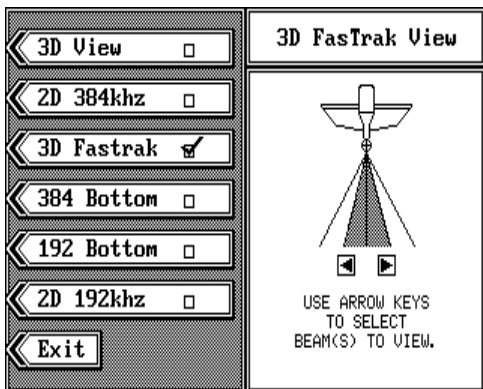
A representation of each of the four transducer elements shows on this screen. The digital displays are on the screen's left side. Range scale numbers are shown on the right side of the transducer cone.
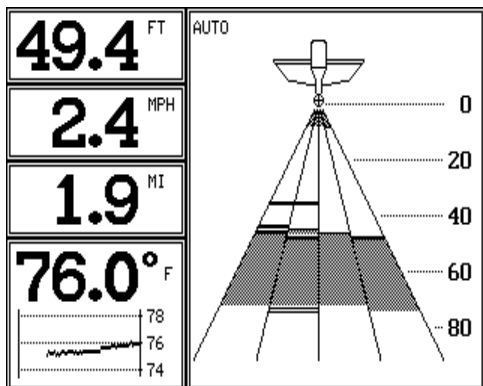
Echoes from each element show in it's respective cone. Fish and other suspended tar-

19

gets appear as short, thin lines; usually for very short periods of time. The bottom echo usually looks like a slice taken from the 2D screen. Surface clutter appears at the top of the screen, near the picture of the boat.

Using the Fastrak screen combines the "instant read" of a flasher with the versatility and convenience of a liquid crystal graph.

MENUS

The X-70A 3D uses menus extensively to guide you through the unit's features. The MENU key accesses most of the these features, letting you customize the unit to your particular water conditions. You can exit from any menu by pressing the CLR key.
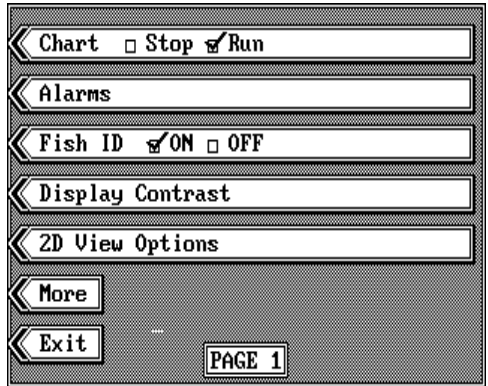
MENU - Page 1
CHART STOP

The X-70A 3D gives you the ability to stop the chart for study. You can stop the chart no matter which mode the unit is in - 3D, 2D, Bottom View, or FasTrack. (Note: Stopping the chart doesn't stop the digital sonar. The digital depth display will continue to operate.)

To stop the chart or start it, press the MENU key, then press the key next to the "Chart Stop Run" menu. Finally, press the key next to the "Exit" label. The unit returns to the last used sonar display.

ALARMS

The X-70A 3D has three different alarms. The first is the Fish Alarm. It sounds when the Fish I.D. feature places a fish symbol on the screen. (This alarm only works in the 2D and 3D modes.) Another alarm is the Zone Alarm which consists of a bar on the right side of the screen. Any echo that appears inside of this bar triggers the alarm. The last alarm is called the Depth Alarm. It actually consists of two alarms - shallow and deep. Only the bottom signal can trigger these alarms. They are useful as an anchor watch, a shallow water alert, or for navigation.

To adjust an alarm, first press the MENU key, then press the key next to the "Alarms" label. The screen shown at the top of the next page appears. Follow the instructions to set each alarm.
DEPTH ALARMS

The depth alarms sound a tone when the bottom signal goes shallower than the shallow alarm's setting or deeper than the deep alarm's setting. For example, if you set the shallow alarm to ten feet, the alarm will sound a tone if the bottom signal is less than ten feet. It will continue to sound until you mute it or the bottom goes deeper than 10 feet. The deep alarm works just opposite. It sounds a warning tone if the bottom depth goes deeper than the alarm's setting. Both depth alarms work only off the digital bottom depth signals. No other targets will trip these alarms. Both can be used at the same time.
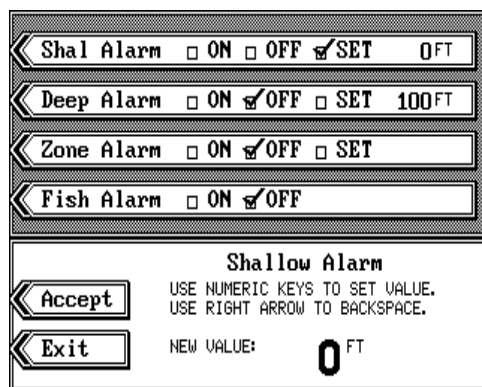
To set the depth alarms, press the key adjacent to the alarm you wish to set. In this example, we will set and turn on the shallow alarm. When the X-70A 3D is turned on, the shallow alarm is set to zero. Pressing the key next to the "Shal Alarm" menu moves the check mark to the "SET" box. This brings up the adjustment menu, as shown above. Using the numbered keys, enter the depth for the shallow alarm. In this example, we used 10 feet. Press the key next to the "Ac-

cept" label. The screen returns to the alarm menu. The number you entered shows on the shallow alarm's menu. You'll also notice that the check mark in the shallow alarm's menu has moved to the "ON" box. Setting an alarm also turns it on. Press the CLR key to return to the sonar display. Using our example, if the bottom signal goes lower than 10 feet, the shal-

low alarm sounds a tone.

To turn the shallow alarm off, press the MENU key, then press the key next to the "Alarms" label. Now press the key next to the "Shal Alarm" menu until the check mark moves to the "OFF" box. Press the CLR key to return to the sonar display.

Remember, the shallow and deep alarms adjust exactly the same. The only difference is the shallow alarm sounds when the bottom signal goes shallower than the shallow alarm's setting. The deep alarm sounds when the bottom signal goes deeper than the deep alarm's setting.

ZONE ALARM

The zone alarm only works on the 2D chart or 2D FasTrak view. Any echo that passes inside the zone alarm's bar sets it off. To adjust the zone alarm, first press the MENU key, then press the key next to the "Alarms" label. Now press the key next to the "Zone Alarm" label. A new menu appears at the bottom of the screen. Finally, press the key next to the "Accept" label. The screen shown above appears.
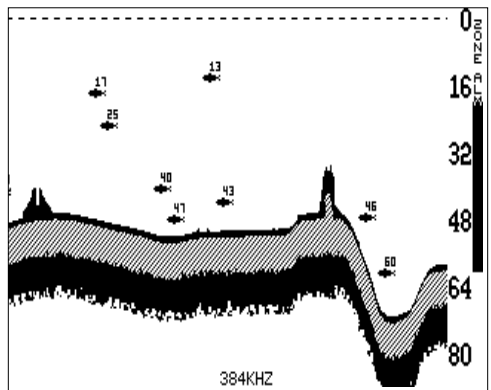
The zone alarm's bar appears on the right side of the screen. Adjustment menus show in the middle of the screen. Press the up or down arrow keys to move the *bottom* of the zone alarm bar up or down. To adjust the top of the zone alarm bar, first press the key adjacent to the "Adjust Upper" label. After setting the zone alarm bar, press the CLR key to erase the menus and bar or wait a few seconds and they will automatically clear. (You can turn the zone alarm's bar on continuously. See the 2D View Options section for more information.)

Setting the zone alarm automatically turns it on. To turn it off, press the ALARM key, then press the key next to the zone alarm's menu. This moves the check mark from "ON" to "OFF". Press the CLR key to exit the alarm menu.

FISH ALARM
The fish alarm sounds a distinctive tone when the X-70A 3D places a fish symbol on the display. A different tone sounds for each of the four fish symbol sizes.

To turn the fish alarm on, first press the MENU key, then press the key next to the "Alarms" label. Finally, press the key next to the "Fish Alarm" label. This moves the check mark from the "OFF" box to the "ON" box. Press the CLR key to return to the sonar display. To turn the fish alarm off, repeat the above steps.

(Note: The automatic and Fish ID features must be on in order to use the fish alarm. If you turn the fish alarm on and these other features are off, the unit will automatically turn them on.)

```
┌─────────────────────────────────────┐
│ ⟨ Shal Alarm   □ ON ☑OFF □ SET   0FT │
│ ⟨ Deep Alarm   □ ON ☑OFF □ SET 100FT │
│ ⟨ Zone Alarm   □ ON ☑OFF □ SET       │
│ ⟨ Fish Alarm   □ ON ☑OFF             │
│                                      │
│                                      │
│ ⟨ Exit                               │
└─────────────────────────────────────┘
```

ALARM MUTE
Whenever a depth alarm sounds, a message appears on the display telling you which alarm is sounding. A "Silence Alarm" menu appears on the display at the same time. Press the key next to this menu to mute or turn the alarm's sound off. This doesn't turn the alarm off, only silences the tone until the alarm is triggered again.

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

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

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

When the X-70A 3D is turned on, the Fish I.D. feature is automatically turned on, also. To turn the Fish I.D. feature off, press the MENU key, then press the key adjacent to the "Fish ID" label. This moves the check mark from the "ON" to the "OFF" box. The unit returns to the sonar display with Fish ID off. To turn the Fish I.D. feature on again, repeat the above steps. The menu immediately disappears and the sonar screen returns. In the 2D mode, echoes will continue to scroll

FISH ID ON

across the screen, however, the surface clutter at the top will no longer be displayed. Any targets the microcomputer determines are fish will be displayed as fish symbols.
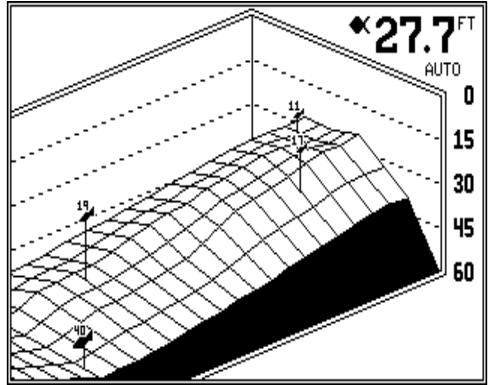
Remember, the Fish I.D. feature can't be used when the X-70A 3D is in the manual mode. If you turn the Fish I.D. feature on when the unit is in manual, the microcomputer will turn the automatic feature on. If you turn automatic off when the Fish I.D. feature is on, the Fish I.D. feature will be turned off also.

DISPLAY CONTRAST
The unit's display contrast is adjustable to suit different lighting conditions. To adjust it, first press the MENU key. The first menu page appears.

Now press the key next to the "Display Contrast" label. A screen similar to the one at right appears. Now press left arrow key to decrease the contrast. Press the right arrow key to increase it. The percentage of contrast in use changes as the arrow keys are pressed. The bar chart also gives a graphical indication of the contrast level. You can see the
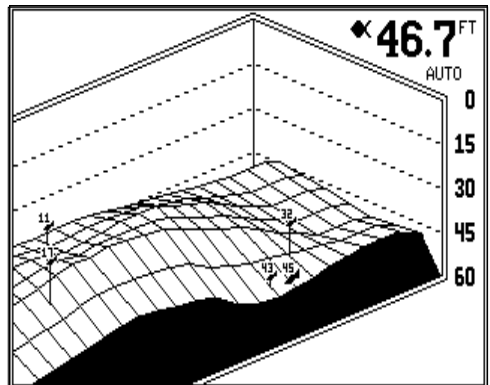
change on the screen as you press the keys. After you've made the adjustment, press the CLEAR key to erase the menu.

2D VIEW OPTIONS

The 2D view has several adjustments that (with some exceptions noted below) affect the 2D view screen only. To use these options, first press the MENU key, then press the key next to the "2D VIEW OPTIONS" label. A menu similar to the one at right appears.

```
《 Digital Box Options
《 Digital Sonar  ☑ON ☐ OFF
《 FasTrak Bar   ☐ ON ☑OFF
《 Zoom Bar    ☐ ON ☑OFF
《 Zone Bar    ☐ ON ☑OFF
《 Chart Cursor   ☐ ON ☑OFF
《 Exit
```
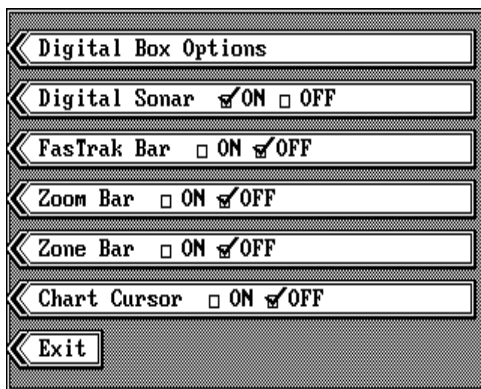
DIGITAL BOX OPTIONS

The X-70A 3D can display the depth, speed, surface water temperature, and distance log on all sonar screens, including the 2D, 3D, Bottom Depth View, and FasTrak. (Speed, temperature, and log displays require an optional speed/temperature sensor.) When the X-70A 3D is first turned on, only the depth is displayed if the sensor is not connected. You can turn each digital display on as desired or turn all of them off, as desired.

To select the digital displays menu, first press the MENU key. Next, press the key adjacent to the "2D View Options" label. Finally, press the key next to the "Digital Box Options" menu. The screen shown below appears.

Now press the key adjacent to the desired display. For example, to turn the temperature display on, press the key adjacent to the "TEMPERATURE" label. Once you do this, the digital display in the corner of the screen will show the temperature in addition to the depth. You can turn each display on or off, individually.

If you wish to turn all of the digital displays off, simply press the key next to the "DIGITAL BOX" label. Press the CLEAR key to exit from this menu.

```
《 Digital Box   ☑ON ☐ OFF
《 Depth      ☑ON ☐ OFF
《 Speed      ☑ON ☐ OFF
《 Distance Log  ☐ ON ☑OFF
《 Temperature   ☑ON ☐ OFF
《 Exit
```

DIGITAL SONAR

When the X-70A 3D's 2D

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

The digital sonar can be turned off, however this also turns all automatic features off also, such as auto sensitivity, auto ranging, and the Fish I.D. feature.
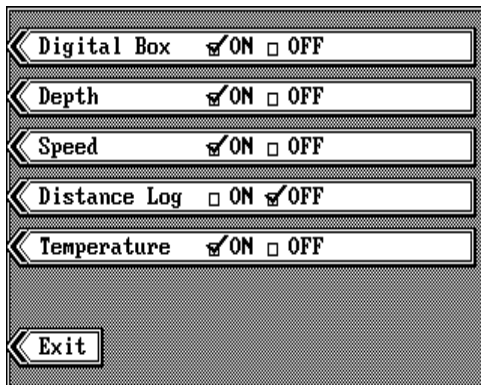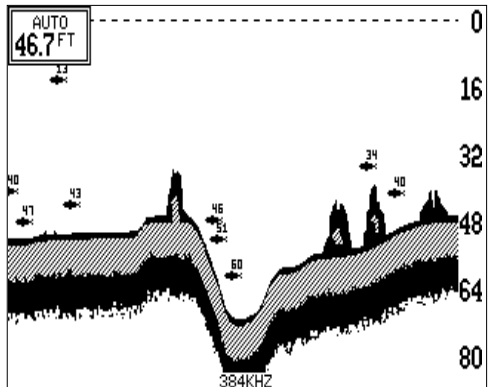
To turn the digital sonar off, first press the MENU key. Next, press the key adjacent to the "2D View Options" label. Finally, press the key next to the "Digital Sonar" menu. To turn it back on, repeat the same steps.

2D FASTRAK BAR
This feature converts all echoes to short horizontal lines on the 2D display's far right side. The graph continues to operate normally. FasTrak™ gives you a rapid update of conditions directly under the boat. This makes it useful for ice fishing, or when you're fishing at anchor. Since the unit is not moving, fish signals are long, drawn out lines on a normal chart display. FasTrak™ converts the graph to a vertical bar graph that, with practice, makes a useful addition to fishing at a stationary location.

To turn FasTrak™ on, first press the MENU key. Next, press the key adjacent to the "2D View Options" label. Finally, press the key next to the "FasTrak Bar" menu. To turn it back on, repeat the same steps.
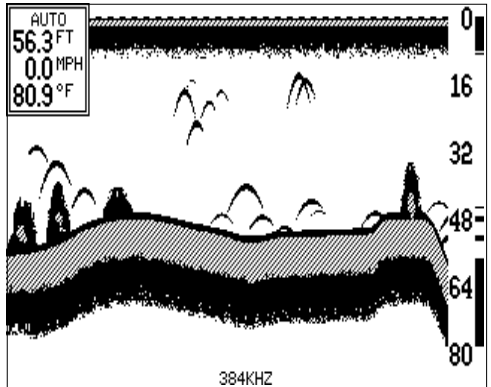
ZOOM BAR

When the unit is in the 2D split-screen zoom mode, the zoom bar doesn't normally show on the screen. The zoom bar shows the section of water on the right side of the screen that the zoom feature displays on the left side. To turn the zoom bar on continuously, first press the MENU key. Next, press the key adjacent to the "2D View Optional" label. Finally, press the key next to the "Zoom Bar"

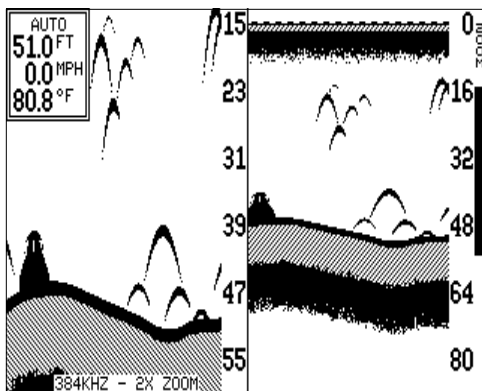menu. Press the CLR key to return to the sonar display. The zoom bar will show on the far right side of the display when it's in the 2D split-screen zoom mode. To turn it off, repeat the same steps.

DISPLAY ZONE ALARM BAR

When the zone alarm is on, the zone bar doesn't normally show on the screen. To turn the zone bar on continuously, first press the MENU key. Next, press the key adjacent to the "2D View Options" label. Finally, press the key next to the "Zone Bar" menu. Press the CLR key to return to the sonar display. The zoom bar will

show on the far right side of the display when it's in the 2D mode. To turn it off, repeat the same steps.
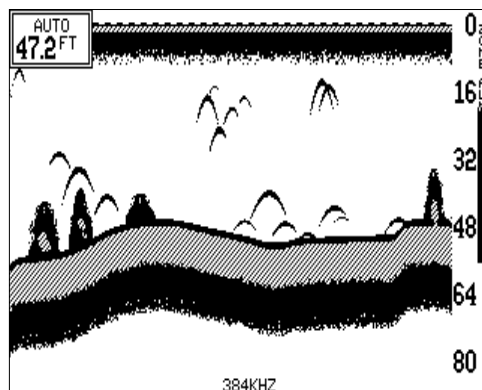
CHART CURSOR

The X-70A 3D has a chart cursor that allows you to pinpoint a target's depth. The cursor is simply a horizontal line that extends across the display from left to right. A depth box at the end of the line on the right side shows the line's depth. In the example at right, the cursor (line) is at 16.4 feet.
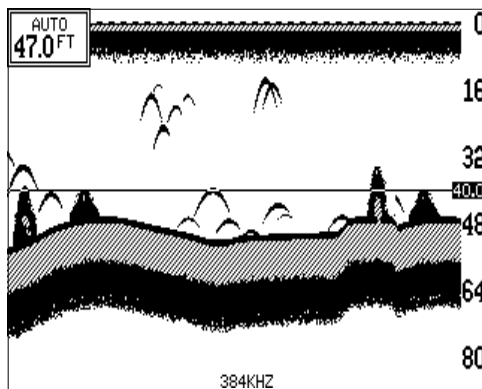
To display the chart cursor, press the MENU key. Next, press the key adjacent to the "2D View Options" label. Finally, press the key next to the "Chart Cursor" menu. Press the CLR key to return to the sonar display.

Use the up or down arrow keys to move the cursor up or down to the desired depth.

To turn the chart cursor off, repeat the above steps. The unit returns to the sonar screen without the chart cursor.

MENU - PAGE 2

GRAYLINE®

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

Adjust Grayline

Adjust Chart Speed

Adjust Back Light Level

Adjust Speaker Volume

Units of Measure

More

Exit

PAGE 2
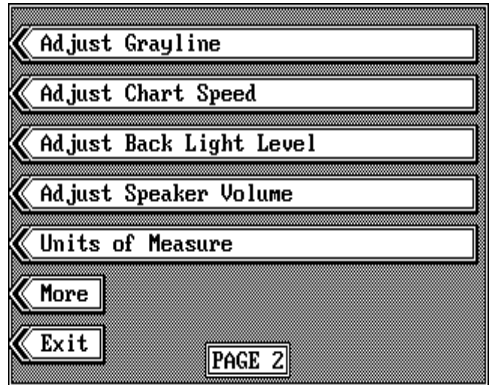
If you have two signals of equal size, one with gray and the other without, then the target with gray is the stronger signal. This helps distinguish weeds from trees on the bottom, or fish from structure.

GRAYLINE® is adjustable. Since GRAYLINE® shows the difference between strong and weak signals, adjusting the sensitivity may require a
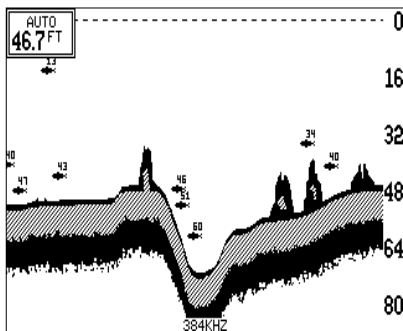
GRAYLINE® ON
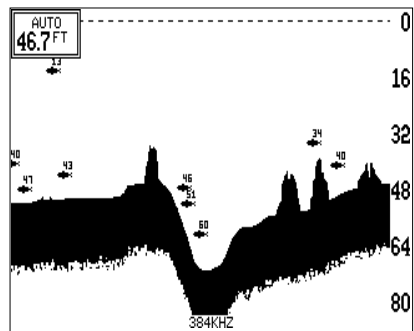
GRAYLINE® OFF

different GRAYLINE® level, also. The level chosen by the X-70A 3D is usually adequate for most conditions. Experiment with your unit to find the GRAYLINE® setting that's best for you.

To adjust GRAYLINE®, press the MENU key twice, then press the key adjacent to the "Adjust Grayline" label. A screen similar to the one at right appears. Now press the left arrow key to decrease the gray level. Press the right arrow key to increase it. The percentage of GRAYLINE® in use changes as the arrow keys are pressed. The bar chart also gives a graphical indication of the GRAYLINE® level. You can see the change on the screen (both on the menu and on the chart record) as you press the keys. After you've made the adjustment, press the CLEAR key to erase the menu.
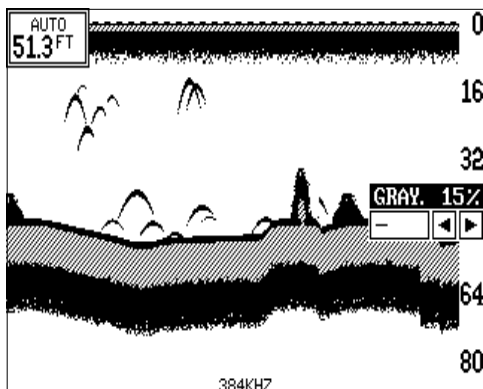
CHART SPEED

The rate echoes scroll across the screen is called the chart speed. It's adjustable by first pressing the MENU key twice, then pressing the key adjacent to the "Adjust Chart Speed" label. The chart speed menu appears on the screen's right side. Increase the chart speed by pressing the right arrow key or decrease it by pressing the left arrow key. The percentage of chart speed in use changes as the arrow keys are pressed. The bar chart also gives a graphical indication of the chart speed. You can see the change on the screen (both on the menu and on the chart record) as you press the keys. After you've made the adjustment, press the CLR key to erase the menu.
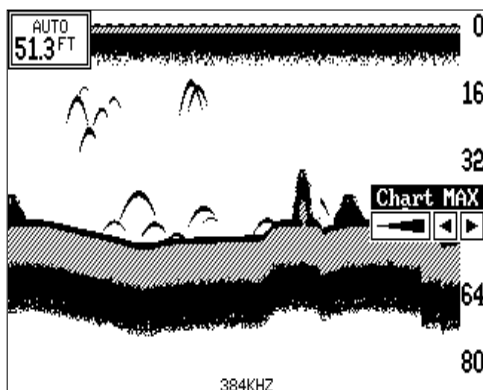
BACK LIGHTS

The X-70A 3D has internal lights for the display and keyboard. To turn the lights on, or off, simply press the "ON" key. To adjust the intensity of the lighting, press the MENU key twice, then press the key adjacent to the

"Adjust Back Light Level" label. The screen shown at right appears. Now press the left arrow key to decrease the light level. Press the right arrow key to increase it. The percentage of back light in use changes as the arrow keys are pressed. The bar chart also gives a graphical indication of the level. After you've made the adjustment, press the CLR key to erase the menu.
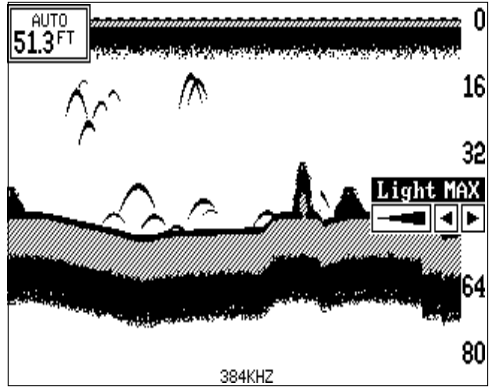

SPEAKER VOLUME

To adjust the X-70A 3D's speaker volume, press the MENU key twice, then press the key next to the "Adjust Speaker Volume" label. Now press the left arrow key to decrease the level, the right arrow key to increase it. The percentage of volume in use changes as the arrow keys are pressed. The bar chart also gives a graphical indication of the level. After you've made the adjustment, press the CLR key to erase the menu.

UNITS OF MEASURE

When the optional speed/temperature sensor is connected, the X-70A 3D can display the water depth in feet, fathoms, or meters, surface water temperature in degrees Fahrenheit or Celsius, speed in statute miles per hour, kilometers per hour, or knots, distance (log) in miles, kilometers, or nautical miles, and the 3D distance markers in feet or meters.

To change the units of measure, first press the menu key two times. Next, press the key adjacent to the "Units of Measure" label. The screen shown below appears. The check mark in the box on each line shows the unit of measure currently in use. In the screen shown below, the units of measure are in feet for the depth, temperature in degrees Fahrenheit, speed is in statute miles per hour, and log is in statute miles.

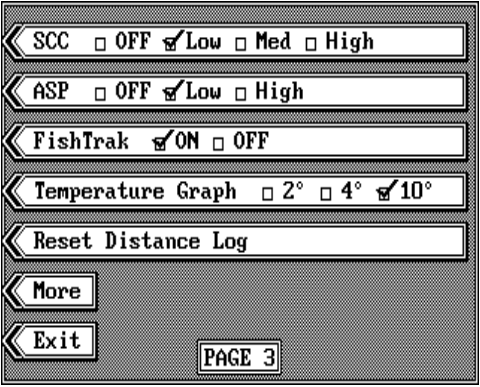Press the key adjacent to the unit that you wish to change.

For example, press the key next to the "Depth" label two times to switch from feet to meters. This moves the check mark two times from the "Ft" to the "M".

After setting the units of measure, press the CLR key.

MENU - PAGE 3

SURFACE CLARITY
The markings extending downward from the zero line on the 2D chart when the manual mode is on are called "surface clutter." These markings are caused by wave action, boat wakes, temperature inversion, and other natural causes.

```
┌─────────────────────────────────────┐
│ ⟨ SCC   □ OFF ☑Low □ Med □ High ⟩   │
│ ⟨ ASP   □ OFF ☑Low □ High ⟩         │
│ ⟨ FishTrak  ☑ON □ OFF ⟩             │
│ ⟨ Temperature Graph  □ 2° □ 4° ☑10° ⟩│
│ ⟨ Reset Distance Log ⟩              │
│ ⟨ More ⟩                            │
│ ⟨ Exit ⟩        │PAGE 3│            │
└─────────────────────────────────────┘
```

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

There are three levels of SCC available on the X-70A 3D: low, medium, and high. When it's turned on for the first time, the SCC level is low. To change it, press the MENU key three times, then press the key adjacent to the "SCC" label until the check mark is on the desired SCC level. Press the CLR key when you're finished.

ASP (Advanced Signal Processing)
The ASP feature is a noise rejection system built into the X-70A 3D that constantly evaluates the effects of boat speed, water conditions, and interference. This automatic feature gives you the best display possible under most conditions.

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

31

The ASP feature has two levels - Low and High. If you have high noise levels, try using the "High" ASP setting. However, if you are having trouble with noise, we suggest that you take steps to find the interference source and fix it, rather than continually using the unit with the high ASP setting. However, there are times when you may want to turn the ASP feature off. This allows

you to view all incoming echoes before they are processed by the ASP feature.
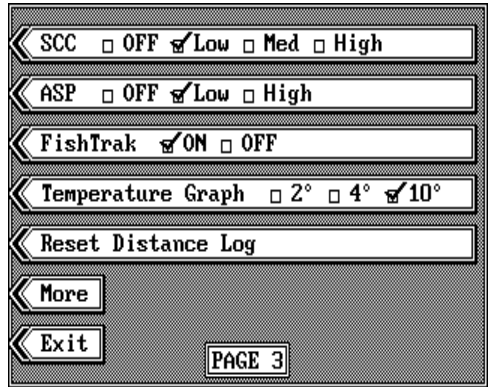
To change the ASP level, press the MENU key three times. Then press the key next to the "ASP" label until the desired level is obtained. Press the CLR key to exit this menu.

FISHTRACK™
When the X-70A 3D is in the 2D or 3D modes and the Fish ID feature is on, the depth of the fish symbols can easily be determined using the FishTrack™ feature. This places the depth above the fish symbol as it appears on the screen. It is normally on when the unit is turned on. To turn the FishTrack™ feature off, press the MENU key two times. Now press the key next

FISHTRACK ON

to the "FishTrack" label. This moves the check mark from the "ON" box to the "OFF" box. To turn it on again, repeat the above steps.
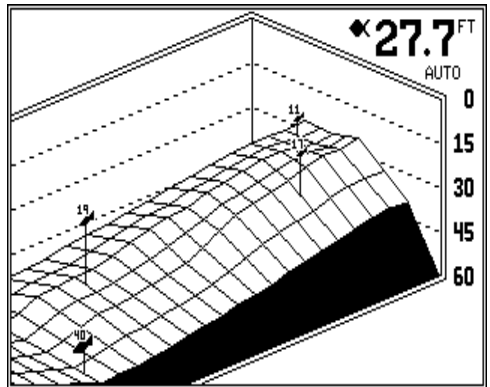
TEMPERATURE GRAPH ADJUSTMENT
The temperature graph that appears beneath the digital surface water temperature display has a range from 5 degrees higher than the current temperature to 5 degrees lower than the current temperature, for a total of ten degrees. This range can be changed from ten to two or four degree. To change the temperature graph range, press the MENU key three times, then press the key next to the "Temperature Graph" label until the check

mark is on the desired range. Press the CLR key to exit the menu.

RESET DISTANCE LOG

The X-70A 3D can display the log (distance travelled) in the digital block if the optional speed/temperature sensor is installed. This feature starts counting distance as soon as the unit is turned on. To reset the distance log to zero, press the MENU key three times, then press the key adjacent to the "Reset Distance Log" label. Press the CLR key to return to the sonar display.

MENU - PAGE 4

3D ENHANCE

Although the X-70A 3D has four transducer elements, the display shows an enhanced grid that adds points to the grid. See the difference between the two screens shown below. To remove the extra lines and view only the depth grid from the four elements, first press the MENU key four times. Now press the key next

to the "3D Enhance" label. The extra lines are erased from the display. To turn the enhanced display on, simply repeat the above steps.
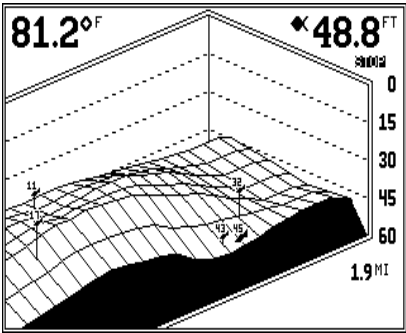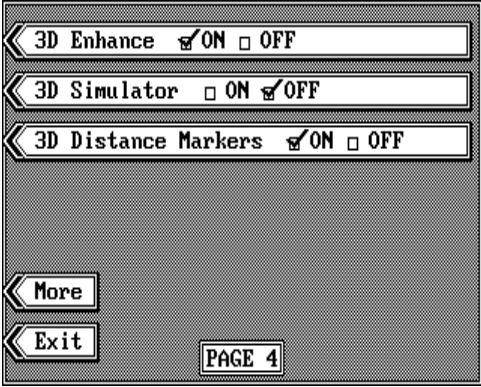
3D SCREEN ENHANCED
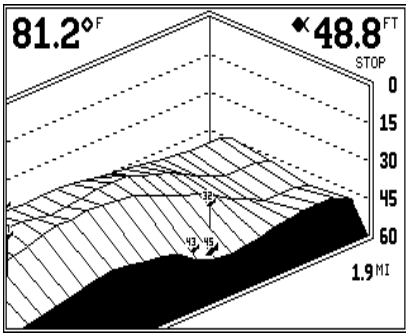
3D SCREEN NOT ENHANCED

3D SIMULATOR

The X-70A 3D has a built-in simulator for the 3D display. When this simulator is turned on, a realistic 3D view scrolls across the screen. The digital depth display shows the simulated bottom depth, and fish symbols appear on the display.

IMPORTANT!
Do not use the simulator when navigating!

To turn the 3D simulator on, press the MENU key four times. Now press the key next to the "3D Simulator" label to move the check mark from the "OFF" box to the "ON" box. If you return to the 3D screen, the simulator will be in operation.

To turn the 3D simulator off, press the MENU key four times. Now press the key next to the "3D Simulator" label to move the check mark from the "ON" box to the "OFF" box. If you return to the 3D screen, the simulator will be off.

3D DISTANCE MARKERS

The X-70A 3D displays markers on the screen, showing the approximate distance echoes are behind the boat. (This requires an optional speed/temperature sensor.) When the unit is turned on, the markers are automatically displayed if the speed/temp sensor is plugged in. If you wish to turn the markers off, press the MENU key four times, then press the key next to the "3D Distance Markers until the check mark moves to the "OFF" box. Press the CLR key to exit.
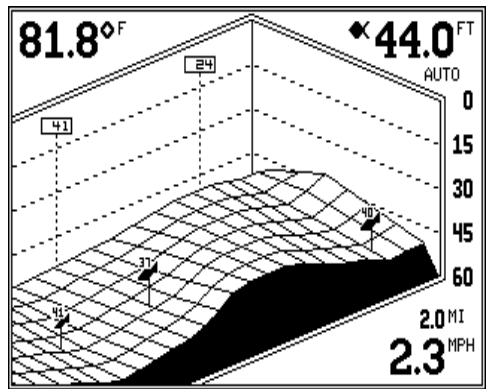
TROUBLESHOOTING

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

Unit won't turn on:

1. Check the power cable's connection at the unit. Also check the wiring.

2. Make certain the power cable is wired properly. The red wire connects to the positive battery terminal, black to negative or ground.

3. Check the fuse.

4. Measure the battery voltage at the unit's power connector. It should be at least 11 volts. If it isn't, the wiring to the unit is defective, the battery terminals or wiring on the terminals are corroded, or the battery needs charging.

Unit freezes, locks up, or operates erratically:

1. Electrical noise from the boat's motor, trolling motor, or an accessory may be interfering with the sonar unit. Rerouting the power and trans- ducer cables away from other electrical wiring on the boat may help. Route the sonar unit's power cable directly to the battery instead of through a fuse block or ignition switch

2. Inspect the transducer cable for breaks, cuts, or pinched wires.

3. Check both the transducer and power connectors. Make certain both are securely plugged in to the unit.

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

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

2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display.

3. The water may be deeper than the sonar's ability to find the bottom. If the sonar can't find the bottom signal while it's in the automatic mode, the digital will flash continuously. It may change the range to limits far greater than the water you are in. If this happens, place the unit in the

manual mode, then change the range to a realistic one, (for example, 0-100 feet) and increase the sensitivity. As you move into shallower water, a bottom signal should appear.

4. Check the battery voltage. If the voltage drops, the unit's transmitter power also drops, reducing its ability to find the bottom or targets.

Bottom echo disappears at high speeds or erratic digital reading or weak bottom echo while boat is moving
1. The transducer may be in turbulent water. It must be mounted in a smooth flow of water in order for the sonar to work at all boat speeds. Air bubbles in the water disrupt the sonar signals, interfering with its ability to find the bottom or other targets. The technical term for this is Cavitation.

2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display. Try using resistor spark plugs or routing the sonar unit's power and transducer cables away from other electrical wiring on the boat.

No fish arches when the Fish ID feature is off:
1. Make certain transducer is pointing straight down. This is the most common problem if a partial arch is displayed.

2. The sensitivity may not be high enough. In order for the unit to display a fish arch, it has to be able to receive the fish's echo from the time it enters the cone until it leaves. If the sensitivity is not high enough, the unit displays the fish only when it is in the center of the cone.

3. Use the Zoom feature. It is much easier to display fish arches when zoomed in on a small range of water than a large one. For example, you will have much better luck seeing fish arches with a 30 to 60 foot range than a 0 to 60 foot range. This enlarges the targets, allowing the display to show much more detail.

4. The boat must be moving at a slow trolling speed to see fish arches. If the boat is motionless, fish stay in the cone, showing on the display as straight horizontal lines.

NOISE

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

To eliminate or minimize the effects of electrical noise, first try to determine the cause. With the boat at rest in the water, the first thing you should do is turn all electrical equipment on the boat off. Make certain the engine is off, also. Turn your X-70A 3D on, then turn off ASP (Advanced Signal Processing). There should be a steady bottom signal on the display. Now turn on each piece of electrical equipment on the boat and view the effect on the sonar's display. For example, turn on the bilge pump and view the sonar display for noise. If no noise is present, turn the pump off, then turn on the VHF radio and transmit. Keep doing this until all electrical equipment has been turned on, their effect on the sonar display noted, then turned off.

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

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

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

LOWRANCE ELECTRONICS
FULL ONE-YEAR WARRANTY

"We", "our", or "us" refers to LOWRANCE ELECTRONICS, INC., the manufacturer of this product. "You" or "your" refers to the first person who purchases this product as a consumer item for personal, family, or household use.

We warrant this product against defects or malfunctions in materials and workmanship, and against failure to conform to this product's written specifications, all for one year (1) from the date of original purchase by you. WE MAKE NO OTHER EXPRESS WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER CONCERNING THIS PRODUCT. Your remedies under this warranty will be available so long as you can show in a reasonable manner that any defect or malfunction in materials or workmanship, or any non-conformity with the product's written specifications, occurred within one year from the date of your original purchase, which must be substantiated by a dated sales receipt or sales slip. Any such defect, malfunction, or non-conformity which occurs within one year from your original purchase date will either be repaired without charge or be replaced with a new product identical or reasonably equivalent to this product, at our option, within a reasonable time after our receipt of the product. If such defect, malfunction, or non-conformity remains after a reasonable number of attempts to repair by us, you may elect to obtain without charge a replacement of the product or a refund for the product. THIS REPAIR, REPLACEMENT, OR REFUND (AS JUST DESCRIBED) IS THE EXCLUSIVE REMEDY AVAILABLE TO YOU AGAINST US FOR ANY DEFECT, MALFUNCTION, OR NON-CONFORMITY CONCERN- ING THE PRODUCT OR FOR ANY LOSS OR DAMAGE RESULTING FROM ANY OTHER CAUSE WHATSOEVER.   WE WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO ANYONE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, OR OTHER INDI- RECT DAMAGE OF ANY KIND.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty does NOT apply in the following circumstances: (1) when the product has been serviced or repaired by anyone other than us,   (2) when the product has been connected, installed, combined, altered, adjusted, or handled in a manner other than according to the instructions furnished with the product, (3) when any serial number has been effaced, altered, or removed, or (4) when any defect, problem, loss, or damage has resulted from any accident, misuse, negligence, or carelessness, or from any failure to provide reasonable and necessary maintenance in accordance with the instructions of the owner's manual for the product.

We reserve the right to make changes or improvements in our products from time to time without incurring the obligation to install such improvements or changes on equipment or items previously manufactured.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

REMINDER: You must retain the sales slip or sales receipt proving the date of your original purchase in case warranty service is ever required.

LOWRANCE ELECTRONICS
12000 E. SKELLY DRIVE TULSA, OK 74128
(800) 324-1356

Lowrance's UPS Return Service

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

1. Call Lowrance at the toll-free number on the front of this flyer for a Return Authorization (RA) number and instructions about what accessories to return. **Do not return a product to the factory without a Return Authorization (RA) Number!**

2. Pack your unit and any accessories in the original shipping container, if possible. **Be sure to include proof of purchase for warranty verification!**

3. Write a brief note detailing the problem you're having with the unit. Please include your name, address, and daytime telephone number.

4. Please include payment for non-warranty repairs. Check, money order, Visa, or MasterCard may be used.

5. Fill in your name, address, zip code, date, and RA number in the blanks provided on the UPS form included with your unit.

6. Attach the label to the shipping box, tear off the tab for your receipt and give the package to any UPS driver or take the package to any UPS Customer Center. You will not be charged for this shipment.

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

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

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

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

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

How to Obtain Service

(Canadian Customers Only)

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

800-347-1014

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

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

We back your investment in quality products with quick, expert service and genuine Lowrance® replacement parts. If you're in the United States and you have questions, please contact the Factory Customer Service Department using our toll-free number listed below. **You must send the unit to the factory for warranty service or repair.** Please call the factory before sending the unit. You will be asked for your unit's serial number (shown above). Use the following toll-free number:

800-324-1356

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

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

Lowrance also gives you free UPS shipping from anywhere in the continental United States both to and from the factory for all warranty repairs. You can also use the enclosed UPS shipping label for non-warranty shipments. See the inside of this flyer for more information.

Remember, non-warranty repairs are subject to Lowrance's published flat-rate charges and 180-day warranty.