

**INTERPHASE**  
*Forward Looking Technology*

# Color Twinscope™



## Operation Manual

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**To Our Customer:**

Thank you for choosing the **Interphase Color Twinscope Dual-Axis Forward Scanning Sonar**. Throughout the development of this product, we have tried to make sure that we included all of the suggestions made by owners of our earlier sonar models. Selection of features, ease of use, superior performance and outstanding reliability were the benchmarks upon which all important design decisions were made. We feel proud of the **Color Twinscope** and your satisfaction is very important to us. To this end, we welcome any comments or suggestions that you might have in regard to this equipment.

It is very important that you complete and return the **WARRANTY REGISTRATION CARD** within 15 days of purchase so that we have a record of your purchase, both to protect your warranty and to allow us a method to contact you about future enhancements, etc.

Sincerely,

**INTERPHASE TECHNOLOGIES, INC.**

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## WARNING

Navigation based solely on one method or one instrument should never be practiced. While the **Color Twinscope** can be quite useful in showing underwater structure and changing bottom conditions both below and in front of your vessel, there are many situations and conditions which can cause erroneous or distorted readings.

In addition, there are many situations that can cause "blind spots" in the **Color Twinscope's** field of view including the presence of temperature inversion layers (thermoclines), water turbulence, and high concentrations of suspended particles in the water.

While the **Color Twinscope** can be considered as a useful aid to navigation, it should never be the **only** means of navigation.

## General Information

Thank you for your selection of the **Interphase Color Twinscope** Forward Scanning Sonar. The **Color Twinscope's** ruggedly built, compact design makes it ideal for installation on nearly any boat. It will display water depth, bottom conditions and submerged objects such as fish, or objects in your path, on its high resolution display. The **Color Twinscope** is available with either a thru-hull or two transom-mount scanning sonar depth transducers.

To ensure that you receive the maximum benefits available from the outstanding features of the **Interphase Color Twinscope**, please carefully follow the steps outlined in this manual. An instructive demonstration simulator has been designed into the **Color Twinscope** and we highly recommend that you spend some time using the demo mode prior to actual use of the unit. We also recommend that you read this entire manual before attempting to either install or operate your **Color Twinscope**.

## Warranty Information

**Interphase** provides a limited warranty on the **Color Twinscope** Forward Scanning Sonar which is printed on the inside rear cover of this manual. We recommend that you save all packing materials so that if you should need to send the unit in for repair, it can be fully protected. Should you experience a problem with your **Color Twinscope**, first refer to the **Troubleshooting** section (Page 38) of this manual. Most common problems and their solutions are described here. If problems persist, call **Interphase Product Support** at (831) 477-4944. We will be happy to try to assist you, and if required, we will give you instructions on how to quickly get your set repaired.

The enclosed warranty registration card must be completed and returned to **Interphase** within 15 days of purchase so that your unit may be protected under the warranty. Failure to return the warranty card may cause unnecessary delays in processing your unit for warranty repair. (See warranty, page 43).

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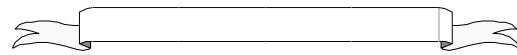
## *Principle of Operation*

The **Color Twinscope Forward Scanning Sonar** uses a proprietary and patented phased array acoustic technology first developed for marine use by **Interphase Technologies**. Known as “phased array ultrasound technology”, its capabilities have been proven in the military and medical industries for many years. The amazing video images provided by medical ultrasound equipment are familiar to most people and clearly demonstrate the technology’s ability to show highly defined images in a “real time” or “live action” mode.

Interphase’s phased array is a group of piezoelectric ceramic elements that are precisely sized and spaced. Each element can send and receive acoustic pulses. When all elements in the array are sending or receiving acoustic energy at the same time, the entire array behaves like a single larger element with one important difference: the ability of the array to concentrate its acoustic energy in different directions, depending on the different “phasing” of the signals applied or received by each element. Depending on the signal phasing of the array, acoustic beams can be directed in an almost unlimited number of directions. For example, using an 8 element phased array transducer, the **COLOR TWINSOPE** is capable of steering the acoustic beam in any of 60 different directions.

Since the acoustic beam in the phased array is steered electronically, requiring no moving parts, it can be quickly and reliably scanned and re-scanned over a large area. When displayed, the changing information between subsequent scans takes on an almost animated quality - for example, showing movement of underwater targets such as fish or rapidly changing bottom conditions.

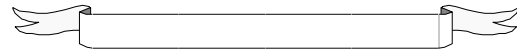
During operation, the **Color Twinscope** converts a small amount of electrical current from your battery into ultrasonic sound pulses, which are then fed to the phased array transducer. These acoustic pulses travel out from the transducer in a cone shaped pattern, called the cone angle. When the sound pulse strikes an underwater object, it is reflected back (echo return), received by the transducer and converted back into small electrical impulses. These impulses are amplified, then displayed as an image on the LCD screen.



### **Award Winning Technology**

For its pioneering work in developing Phased Array Scanning Sonar, **Interphase Technologies** won the prestigious **IMTEC INNOVATION AWARD**.

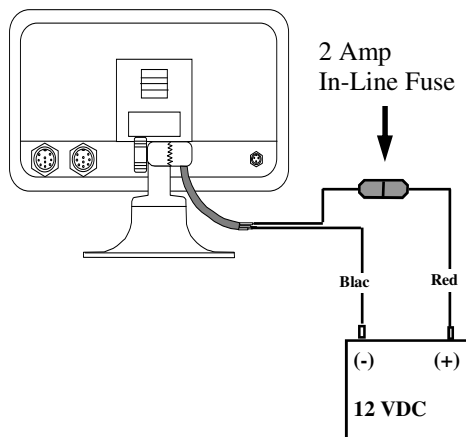
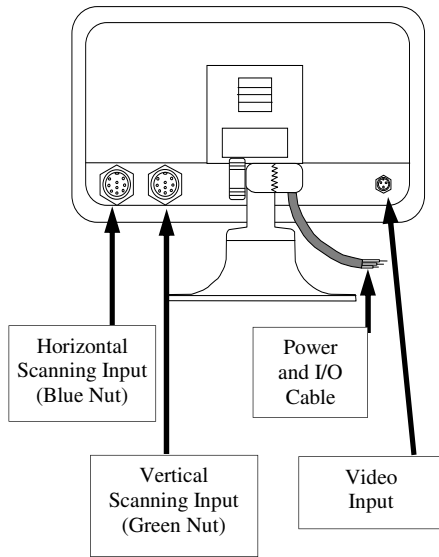
The **Color Twinscope** is based on this same award-winning technology.



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## Installation

### Color Twinscope Rear Panel Connections



### Display Unit

The compact size of the **Color Twinscope** display unit allows for easy installation in almost any vessel. To get maximum performance and life from your unit, the following guidelines should be considered when selecting a mounting location:

- 1) Select a location where the unit is protected from excessive temperatures. Heat is one of the worst enemies of electronic components, and will accelerate component aging, thereby reducing the trouble-free life of your **Color Twinscope**.
- 2) Mount the display in a location where it will be convenient to route the power cord and transducer cable.

### Power connection

The **Color Twinscope's** power leads are the red and black wires inside the cable that connects to the rear mount. These wires must be connected to a source of 12VDC voltage. The red wire should connect to the plus (+) 12 VDC and the black wire should be connected to the minus (-) side of the 12 VDC. To minimize electrical interference, carefully route the power cable so that it does not run parallel or close to the transducer cable, engine, refrigeration, bilge pump or any other critical wiring. An in-line fuse holder is included with your unit and should be placed in the positive lead as shown at left. A 2 Amp fuse is included.

**IMPORTANT:** The **Color Twinscope's** 12 VDC power leads should go directly to the boat's battery, distribution board, or breaker panel. Instability of the display may result if the unit has to share leads with other electrical systems aboard your boat.

### Wiring for Power & Transducer Connectors

The correct pin-out wiring sequences for the transducer connectors are shown at right. **DO NOT SHORTEN THE TRANSDUCER CABLES.** If a transducer cable longer than the 30' length supplied with your unit is needed, please contact your **Interphase** dealer. 30-foot scanning sonar transducer extension cables are available. (P/N 04-0014-008)

**DANGER:** Removal of any connector, disassembly of transducer, shortening of any cable or use of any cable other than that supplied by **Interphase** will void your warranty.

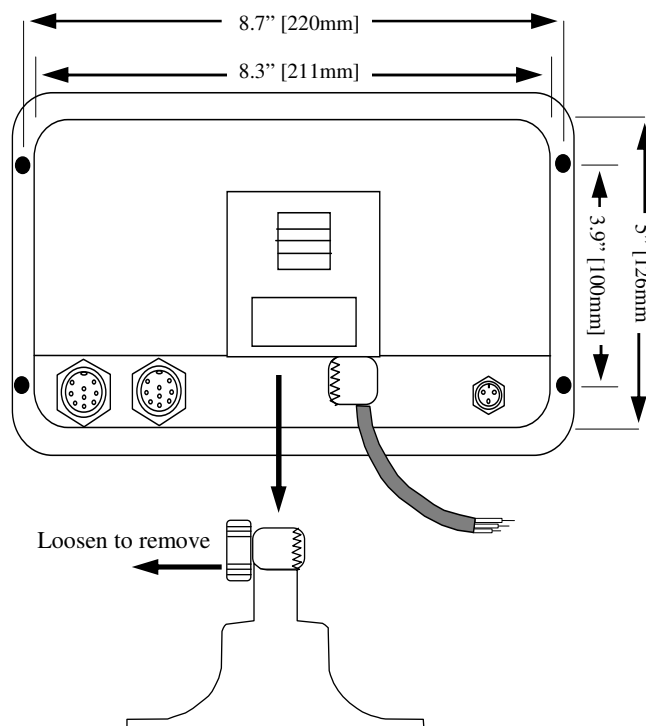
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## *In - Dash Mounting*

The **Color Twinscope** comes with mounting hardware to mount the display in-dash. Four mounting screws and a cutout diagram are included.

For in-dash mounting, the mounting base portion of the Quick Disconnect Mount is removed. To remove the mounting base loosen the thumb screw until it separates from the upper portion of the Quick Disconnect Mount.

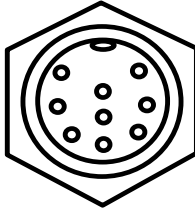
While the cutout is included, dimensions of the cutout and pilot holes has been included in the drawing below.



## Wiring and Cable Connectors

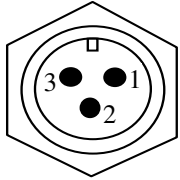
### 9 Pin Transducer Connectors: (view from front of female plug)

- |   |        |               |
|---|--------|---------------|
| 1 | White  | 1st element   |
| 2 | Brown  | 2nd element   |
| 3 | Orange | 3rd element   |
| 4 | Yellow | 4th element   |
| 5 | Green  | 5th element   |
| 6 | Blue   | 6th element   |
| 7 | Violet | 7th element   |
| 8 | Gray   | 8th element   |
| 9 | Shield | Ground/Return |



### 3 Pin Video Input

- |   |               |
|---|---------------|
| 1 | Ground Return |
| 2 | +12 VDC       |
| 3 | Video Signal  |

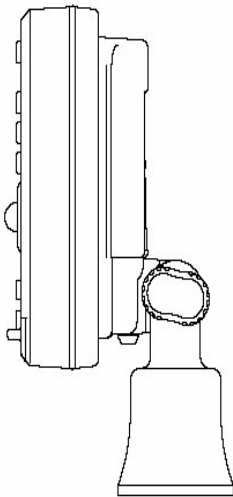


### Transducer Connectors

Color Coded. **Blue = Horizontal** and  
**Green = Vertical** Scanning inputs

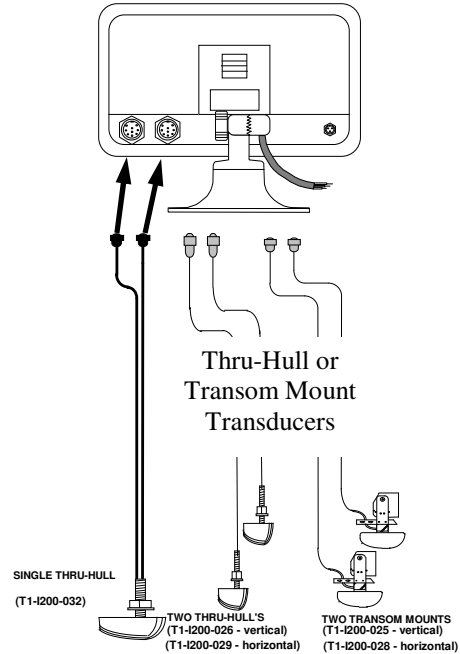
### Main Power-I/O Wiring .

(Cable from Quick Disconnect Bracket)



QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	DESCRIPTION	FUNCTION
BLACK	GND/COMMON	POWER SUPPLY GND (-)
RED	POWER +11-16 VDC	POWER SUPPLY (+)
WHITE	RXA (+)	GPS INPUT PORT
GREEN	RX-TX - GND -	SERIAL PORT(S) RETURN
YELLOW	TXA (+)	NMEA OUT/ MASTER-REMOTE/ SOFTWARE DOWNLOADS
BROWN	RXC (+)	NMEA TEMP INPUT PORT
GRAY	+12 Vdc - OUTPUT	12VDC - FOR ALARM
ORANGE	RXB (+)	MASTER-REMOTE/SOFTWARE DOWNLOADS
PINK	TXB (+)	N/C
BLUE	TXC - OUTPUT 3+	EXTERNAL ALARM SIGNAL

## Transducer Connections





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## ***Selecting the Transducer Configuration for your Boat***

Keep in mind the primary rule for transducer operation. This is: the transducer can function as long as it has an unobstructed forward view and has smooth flowing non-aerated water surrounding it.

The first line of inquiry should be about the boat. Transom mounted transducers are intended for low speed boats with external props. Boats with inboard motors and boats that regularly exceed 40MPH cannot use transom mounted transducers. Inboard motors create aeration and excess turbulence that prevent the transducers from operating properly. I/O motors where the prop is aft of the transom do not create this situation. Be careful that the driveshaft of the I/O does not block the forward horizontal scan. Boats that exceed 40MPH run a risk of having the transom mounted transducers torn free of the transom. The transom mounted transducers are not designed to be used at these speeds.

In addition, the transom mounted transducers are mounted on kick-up brackets. This allows the brackets to kick up at about 35-40MPH. This is intended to allow the transducers to kick-up if they strike an object, or to be pulled up when trailering a boat. Once kicked up, the transducers must be manually reset in order to function.

Thru-hull transducers are for boats that exceed 40MPH and /or have inboard motors. Transducer placement depends on boat size, speed, hull configuration and sonar application. On displacement hulls, the transducer is generally located 1/3 aft of where the bow meets the water line. This is the farthest forward the transducer should ever be mounted. It is important that the transducer be below turbulent aerated water created by the bow.

### **Special Thru-Hull Mounting Considerations**

On sailboats with a fin keel, the transducer is most often placed at the leading edge of the keel and sometimes faired into the keel. As this location may be where the sling rests when hauling the boat, the transducer may be placed on either side of the hull with the foremost face of the transducer even with the

leading edge of the keel. Alternately, the transducer may be placed forward of the keel ahead of the lifting strap location. This should not be ahead of 1/3 aft of where the bow meets the waterline.

On planing hulls the transducer is typically placed near the transom. This is to provide smooth flowing water at the greatest speed. However, most planing hull boats create transducer aeration when on plane regardless of transducer location.

It should be noted that thru-hull transducers can effect boat performance in two important ways. The first concern is cavitation created by the transducer that causes reduced engine performance by disrupting water flow around the propeller. This is smoothed out by the hull in some boats, but on planing hulls with the transducer near the transom, the hull is not able to clear the cavitation. The second concern is uneven drag on high-speed boats. This may occur when the thru-hull transducer is mounted far off of the centerline of the boat. At low speeds and on large boats the effect is negligible. On smaller boats at high speeds the drag can effect the steering. The effect increases as the boat's speed rises. Boats with trim tabs can usually trim this out, but boats without trim tabs may feel a pulling sensation toward the transducer side of the boat.

A less intuitive mounting location for the single thru-hull transducer on a planing hull is on the centerline just forward of midship. The goal in this mounting is to place the transducer so that it is out of the water at planing speed. As most transducers are aerated at planing speeds, this removes the transducer from the water flow preventing cavitation and steering problems. Most applications for forward scanning sonar occur when the boat is at low non-planing speeds including fishing and navigating hazardous waters. Under these speed conditions the transducer is in the water.

On trailered boats, be certain that the mounting is such that the boat does not rest on the transducers. This could result in damage to the transducer and/or boat hull. Explore possible mounting locations while the boat is on the trailer.

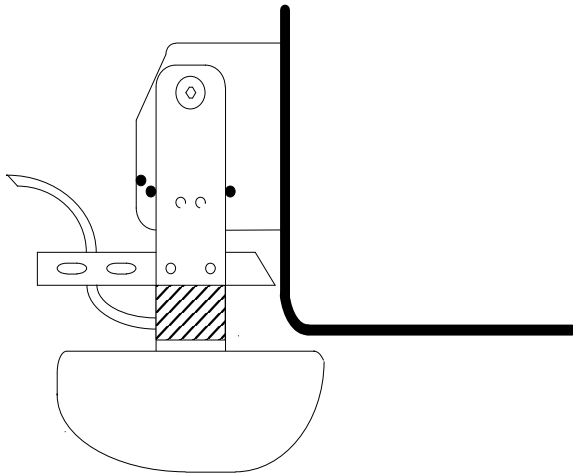
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### *Special Note on the Color Twinscope Transducers*

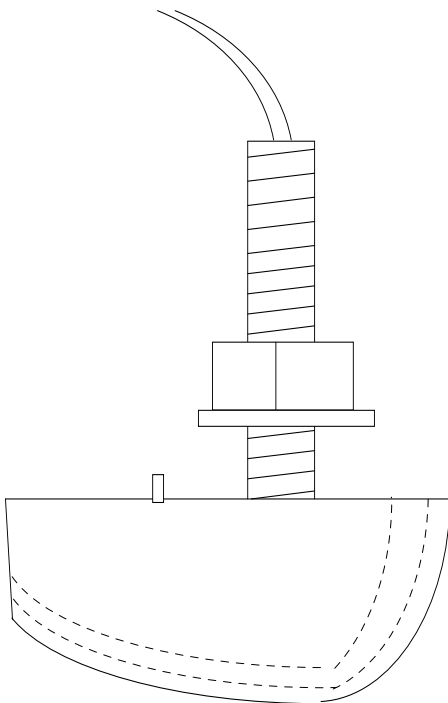
**Q:** There are 2 types of thru-hull transducers for the **Color Twinscope**, 1 with a single transducer and 1 with dual transducers. What are the dual transducers for? Do they provide an extra function for the display or is it to offset a larger keel? Does a large keel affect the horizontal sweep of the sonar (single or dual)?

**A:** **Interphase** offers the twin thru-hull transducers for small high speed boats. The single thru-hull transducer is nearly twice as wide as each of the dual thru-hulls. If the boat does not allow an installation on or close to the center line, then the transducer is sometimes placed 2-3 feet away from the center line. On a high speed boat (40+MPH) the drag can be felt in the steering. If the boat does not have trim tabs to trim this out, then the boat can 'pull' to one side at high speeds. The dual transducer configuration allows for a transducer on each side of the hull which evens out the water flow across the hull.

This does not account for the forward horizontal sweep being blocked by a keel, or deep V hull. In order for the forward horizontal scan to pass beneath the hull, the angle between the transducer and lowest point on the hull must be less than 10 degrees. If the keel or hull of the boat will block the forward horizontal scan, then the **Interphase iScan 180** should be considered.



**The Transom Mounted Transducer is designed for boats with a top speed below 40MPH.**



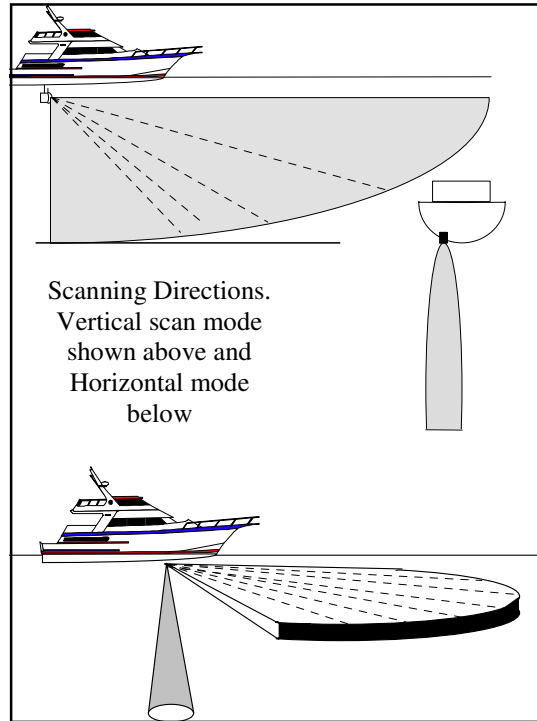
**The Thru-hull Transducer is for boats that EXCEED 40MPH and /or have inboard motors.**

## Transducer Installation

The **Color Twinscope** comes standard with either a single or twin thru-hull or with two transom mount forward scanning transducers.

The **Color Twinscope** uses two phased arrays. In the single thru-hull model both arrays are enclosed in a single transducer. For transom mount applications two transducers are required, each containing a phased array. One of the phased arrays is positioned to scan vertically from straight ahead to directly below the boat, while the other array is positioned to scan forward horizontally from side to side. It is important to position the transducer so that it has as clear a view as possible of the water directly below and ahead of your boat, as indicated at left.

The scanning transducer(s) must be positioned properly so that it scans in the proper direction (i.e. from in front of the boat to the bottom below). The sketch at left shows the proper orientation for both the transom mount or the thru-hull transducer(s). **NOTE THAT ON THE TRANSDUCER MOUNT TRANSDUCERS, THE ROUNDED SIDE MUST POINT FORWARD, AND ON THE THRU-HULL TRANSDUCER, THE MORE BLUNT AREA MUST POINT FORWARD.**

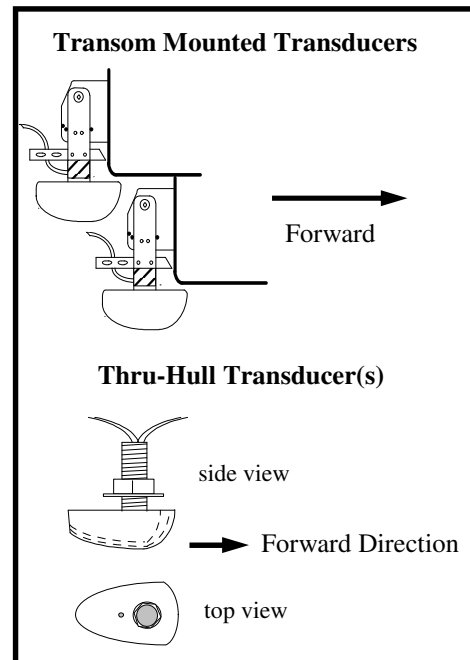


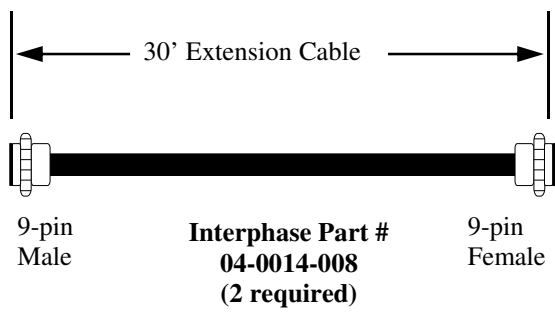
### General Considerations

**DO NOT CUT OR SPLICE YOUR PHASED ARRAY TRANSDUCER CABLE OR REMOVE THE 9-PIN CONNECTOR BECAUSE THE SYSTEM PERFORMANCE MAY BE SERIOUSLY DEGRADED. THIS ACTION WILL VOID YOUR WARRANTY.**

If you need a longer length cable than comes with the transducer (30'), then purchase the optional 30' extension cables, **Interphase** Part # 04-0014-008. It is recommended that only one extension cable length (total of 60') be used as additional extensions will decrease the effective power and depth range. **The Color Twinscope requires two extension cables - one for the vertical scan and one for the horizontal**

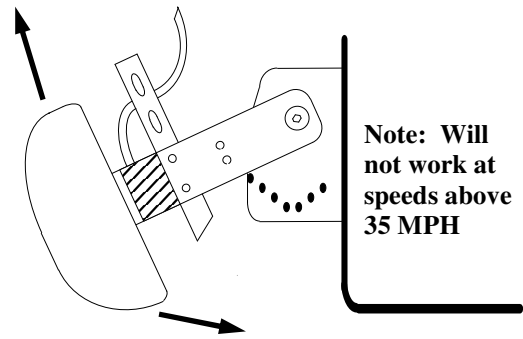
- 1) Choose a location where there is the least amount of acoustic noise, air bubbles or turbulence caused by the boat's movement. The transducer should not be located nearby or especially directly behind the propeller.
- 2) Choose a location where the transducer can be mounted so that it will be level to the water's surface and will not be tilted to either side. Otherwise the transducer will not scan from the surface ahead to directly beneath the boat.





- 3) The transducer must always remain submerged, regardless of the speed of the boat and should not be mounted where it could be damaged by underwater obstacles .
- 4) **DO NOT** locate the transducer in the extreme bow of the boat where it will be subject to intense turbulence as the boat pounds through the water.
- 5) **DO NOT** locate the transducer directly behind any hull protrusion which will cause turbulence at the transducer or which will obstruct the transducer's forward looking view. For displacement-hull power and sail boats, the thru-hull installation is usually required.

**Transom Mount Bracket in Released Position**



**DANGER: DO NOT** allow any solvents, i.e. gasoline, acetone, to come in contact with the transducer or head unit as this may dissolve the plastic material. In addition, **DO NOT** force the cable by pulling on it. This may cause damage to the internal transducer wiring.

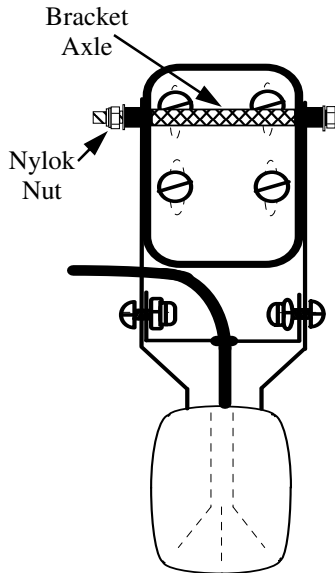
**Transom Transducer Kick-Up Bracket**

The transom transducer is attached to the boat with a heavy-duty stainless steel kick-up bracket to provide protection against impact. When the transducer strikes an object, or the water force exceeds the resistance of the bracket, the transducer automatically kicks up and becomes non-operational. The bracket does not automatically reset at lower speeds. The transducer must be manually returned to its operational position.

- Suggested materials required for installation:**
- ◆ Variable speed electric drill with a chuck capacity of 10mm (3/8") or larger.
  - ◆ Hole saw or spade bit 19 mm (7/8") for transom hole to route cable and connector
  - ◆ Chamfer bit or 6 mm (1/4") drill bit
  - ◆ Drill bit No. 28 or 4 mm (9/64")
  - ◆ Drill bit 3 mm (7/64")
  - ◆ Marine bedding/sealing compound

The transducer is designed to kick up at speeds between 35 and 40MPH (30-35 knots). We do not recommend transom mount transducers on boats that regularly exceed 35MPH (30 knots). Boats that exceed 40MPH (35knots) cannot use transom mounted transducers, but instead must use thru-hull transducers.

**Special Note:** The kick-up feature is designed as a safety consideration to prevent the transducer from being removed from the boat due to impact or excessive speed. The kick-up bracket is not designed for repeated kick-up or to be pulled up manually during loading and unloading from boat trailers. Tests have shown that the bracket can kick-up as many as 30 times before there is a negative effect on the bracket. Repeated kick-up will cause the transducer to kick-up at progressively lower speeds. Excessive kick-ups can cause the transducer bracket to fail. Brackets that fail due to repeated kick-up are not covered under the transducer warranty.



If the transducer must be kicked up for installation, boat service or loading, the nylok nut on the end of the bracket axle can be loosened. Tighten the nut to 50 inch pounds of torque before operating the boat.

### Kick-up Bracket Replacement Parts

If during installation parts are somehow lost or damaged, they can be replaced as follows:

Part# 17-0088-008 - Spray Shield Kit - Includes: Spray Shield, four Mounting Bolts and Nuts, Rubber Grommet and four Large Mounting Screws.

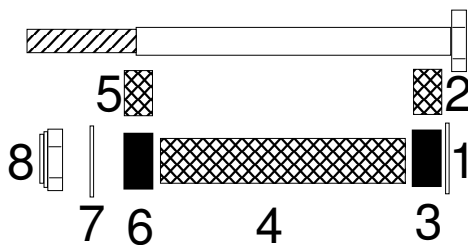
Part# 17-0089-008 - Transom Transducer Hardware Kit - Includes: Complete Bracket Axle Assembly and four Large Mounting Screws.

Part# 17-0056-008 - Kick-Up Bracket Assembly - Includes: Complete Bracket Axle Assembly, four Large Mounting Screws and the Stainless Steel Mounting Bracket.

### Bracket Axle Assembly

On some boats it will be necessary to remove the Bracket Axle during installation. See the diagram to the left and instructions below for details on assembling the axle.

1. Place one stainless steel washer onto the axle against the hex end.
2. Place one small stainless steel spacer against washer.
3. Slide two urethane spacers over the small steel spacer.
4. With the transducer bracket in place, align the long stainless steel spacer with the mounting holes of the mounting bracket and slide the axle in place through the spacer.
5. Place one small stainless steel spacer against the transducer bracket.
6. Slide two urethane spacers over the small steel spacer.
7. Place one stainless steel washer onto the axle against the urethane spacer.
8. Place the nylok nut onto the threaded end of the axle and tighten to 50 inch pounds. If you do not have a torque wrench, tighten until the nut will not turn easily. The stainless steel spacers should prevent over-tightening.

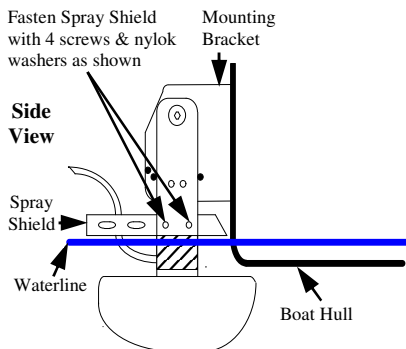
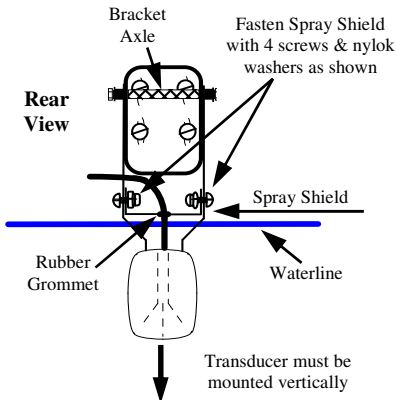
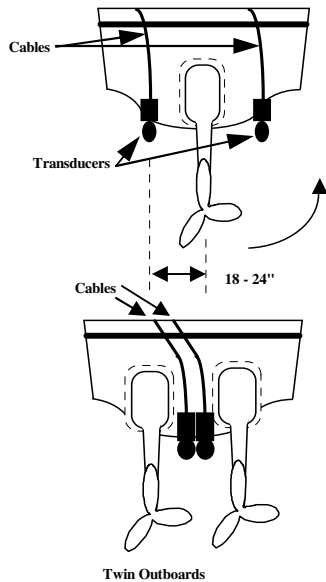


### Transom Mounting Location

The main source of vessel acoustic noise is the propeller. It is very important to position the transducer to minimize noise pickup and provide as clear a view as possible of the water ahead of the boat. Study the hull shape of the vessel carefully to determine the best transducer mounting location. To achieve optimal operation the transducer should be mounted in a spot which:

- \* Minimizes acoustic noise reception.

## Transom Mount Locations



- \* Minimizes the chance that aerated water will flow across the transducer's frontal nose area.
- \* Optimizes the transducer's view of the area ahead and directly below the boat.

**Note:** The Forward Horizontal Transducer must be able to scan beneath the hull. The deadrise angle of the hull must be less than 10 degrees in order for the forward horizontal scan to sweep beneath the hull. Alternately, the transducer can be mounted at or below the lowest point on the hull.

The transducer can be installed on either side of an outboard or inboard/outboard engine, or between twin outboards. For single engine installations, normally 18" to 24" outboard of the propeller center line is acceptable and the down stroke side of the propeller is preferred. Choose a location where water flow is smoothest. For dual engine installation, just off the center line is usually acceptable.

Because the transducer rotates back and upwards when the bracket releases, it must be mounted in a location where there is sufficient clearance and headroom to allow the full release.

### Attach the Transducer & Spray Shield to the Bracket

Locate the Stainless Spray Shield inside the transducer's stainless mounting ears. Make sure the spray shield is orientated as shown in sketch below. Then, assemble the stainless kick-up bracket to the transducers using the 4 screws, washers and lock nuts provided. Place the rubber grommet around the transducer cable and slide it into the slot in the spray shield. The bracket arms must be mounted outside the stainless steel mounting ears of the transducer. Do not fully tighten the lock nuts at this time. Tighten them after the transducer is mounted and the spray shield is positioned.

Position the transducer so that it is perpendicular from side to side and make sure the wider curved end is pointed towards the front of the boat.

### Mounting the Transducer to the Boat

After you have selected the optimum mounting location and have assembled the mounting bracket to the transducer, mount the bracket onto the hull as shown on the right.

Make sure to position the transducer so that it is level in the fore and aft direction and so it will look straight down. Check the location of your boat's waterline and position the flat top surface of the transducer so that it is parallel to the waterline as shown below.

**Note:** If the transducer is not mounted so that its fore and aft direction is parallel to the surface, then the forward looking display will be distorted and flat bottoms will appear to be

slanted upwards or downwards. After mounting the transducer and actually using the **Color Twinscope** on the water, you may need to readjust the transducer's mounting for optimum performance.

### Thru-Hull Transducer Installation

The thru-hull transducer is the recommended choice for larger boats with in-board engines. Thru-hull mounting is usually required on larger power and sail craft in order to find a mounting location free of forward looking hull obstructions. The **Color Twinscope** must have a clear view of the water ahead as it can not see through obstructions such as the vessel's hull. Please read the following carefully before starting the thru-hull installation.

Normally, thru-hull installations are performed by a professional in a boat haul-out facility. We suggest you seek professional assistance before attempting to mount this transducer.

### Selecting the Best Location

The best location to mount the thru-hull transducer will vary with the type of boat. Try to find a location with the smallest dead rise angle to make installation easiest.

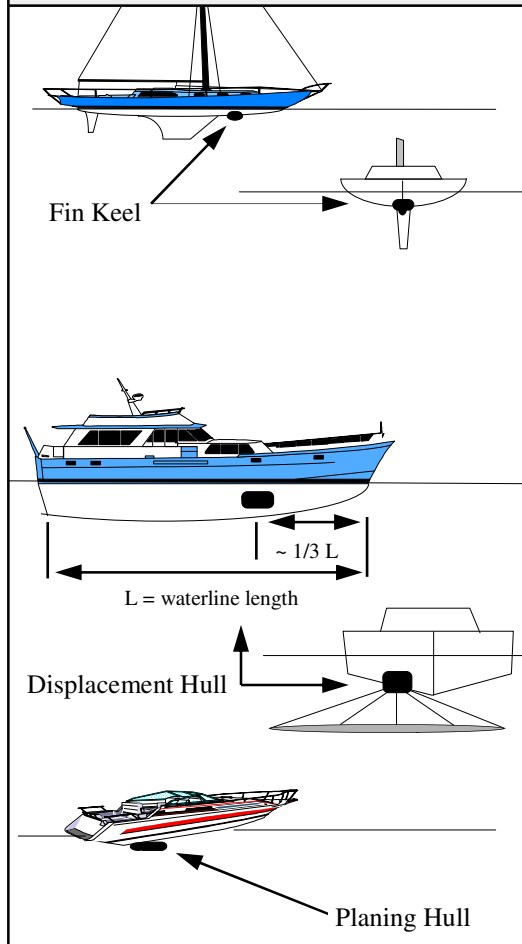
a. On **displacement hulls** (sailboats, trawlers, etc.) locate the transducer about 1/3 aft along the waterline. Generally this provides the best compromise between obtaining aeration-free water and minimizing propeller noise. The **Color Twinscope's** transducer can not see through aerated water and water near the bow and near the keel can be quite aerated. Aeration of the transducer can be minimized by keeping the transducer mounted away from the keel and by not mounting too far forward. Because the **Color Twinscope** scans horizontally from side to side, it is also important to find a location where the beam will not be shaded by the keel. This can often be accomplished by use of a fairing block to place the transducer below the keel, or by mounting the transducer forward or beside but at some distance from the keel.

b. On **sailboats**, the transducer should be mounted where the acoustic beam will not be shaded by the keel. A spot forward of a fin keel is usually best. Try to find an accessible spot with a minimum dead rise angle.

c. On **planing powerboat** hulls, the transducer should be mounted well aft and close to the keel to insure that the transducer is in contact with the water at higher boat speeds.

On I/O's, transducer mounting close to the engine usually yields good results.

### Suggested Thru-Hull Transducer Locations



### MOLDED FAIRING BLOCK

If your installation requires a fairing block, you may either have one made locally, or purchase a molded plastic unit from Interphase or your Interphase distributor.

For the T1-I200-032 Thru-Hull transducer, the molded Fairing Block Part Number is:

**42-2005-000**

On inboards always mount the transducer well ahead of the propeller(s). Turbulence from props can seriously degrade performance. (Thru-hull installation is recommended.)

d. Mount the transducer on the side of the hull where the propeller is moving downwards. The upward motion of the propeller generates pressure waves and pushes bubbles up against the hull.

**DO NOT** install a bronze transducer housing directly into an aluminum or steel hull because electrolytic corrosion will occur. Consult your boat-yard for more information on how to properly install transducers into these types of hulls.

**IMPORTANT:**

- 1) Make sure the water flow across the thru-hull transducer is bubble and turbulence free at all speeds if good performance is to be achieved.
- 2) Make sure the transducer has an unobstructed view of the water ahead and below the boat.
- 3) On displacement-hull power boats, the transducer should be mounted relatively close to the center line of the hull.
- 4) Mount the transducer in a place which has reasonable access from inside the vessel since the transducer's bronze nut will require tightening from inside the hull.

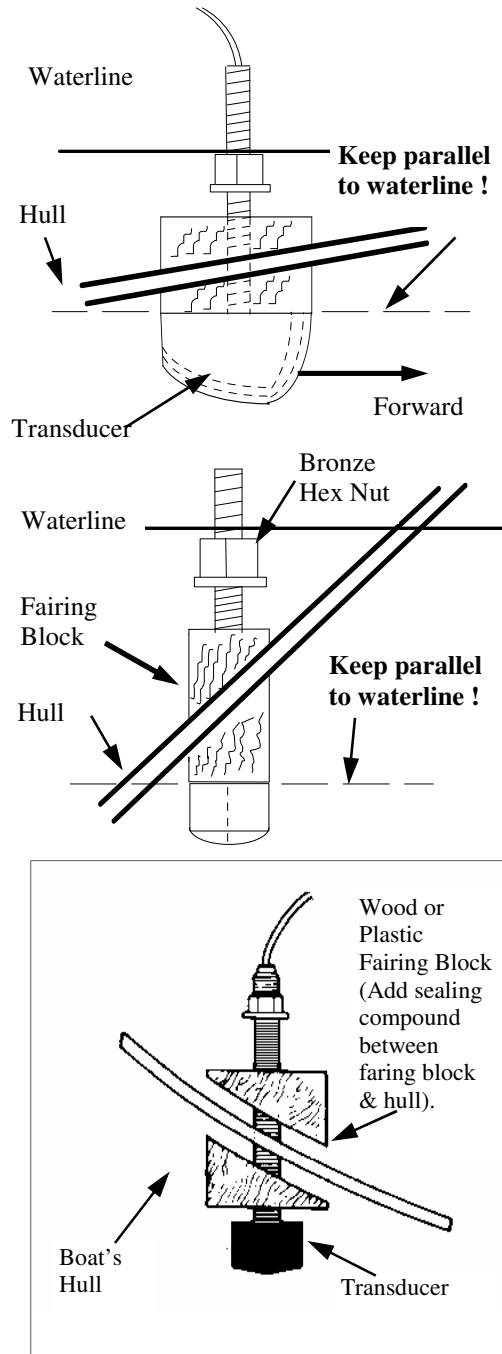
Because the **Color Twinscope** scans a 12 degree beam from the surface ahead to directly below the boat, it is important to make sure that the transducer is installed so that it will scan in a vertical direction and not off to either side. The transducer must be mounted so that its bronze stem is as perpendicular to the water line as possible. If necessary, use a fairing block to properly position the transducer.

**Use of a Thru-hull Fairing Block**

Nearly all vessels have some dead rise angle at the transducer mounting location. If the thru-hull transducer were mounted directly to the hull, the sound beam would be tilted off the vertical at the same angle as the dead-rise. Most thru-hull installations will require a fairing block to insure the transducer is mounted properly.

A fairing block is typically made of teak, mahogany, or plastic and should be glued between the transducer and hull (both inside and outside) to insure that the transducer's mounting shaft is perpendicular to the water's surface. Make the fairing block as smooth as possible, and not bigger than the transducer's face, to minimize possible turbulence.

**Mount Transducer so bronze stem is Vertical**





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After cutting the fairing block, trial fit the block to the hull. It is very important that the flat top surface of the transducer be parallel to the water. Because of the skill required, we suggest that your professional boatyard provide the fairing block.

### **Installing the Thru-hull Transducer**

- 1) Drill a 1/8" pilot hole from inside the hull to assure access to tighten the housing nut and clearance for the transducer cables. If there is any hull irregularity near the selected mounting location, it may be desirable to drill from the outside.
- 2) Use a 1-1/16" hole saw and drill the hole from the outside of the hull. Sand or clean the area around the hole, inside and outside to insure that the sealing compound will adhere properly to the hull. Select a marine grade adhesive sealant, such as 3M 5200, and use according to the instructions.
- 3) Remove the bronze hex nut from the housing and cable.
- 4) Uncoil the transducer cable and thread it through the hole into the inside of the hull.

**DANGER: DO NOT** apply tension to the transducer cables as this may sever internal connections.

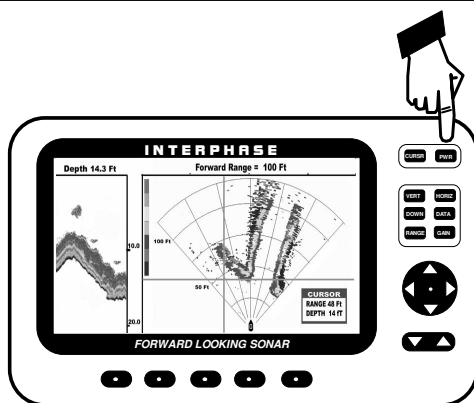
- 5) Apply a 1/8" thick layer of sealant on the upper flat surface of the transducer, bronze alignment pin and fairing block (if used).
- 6) From the outside of the hull, push the housing into the 1" hole. Twist the housing slightly to squeeze out excess sealant. Carefully confirm that the transducer is aligned so that the round front end is pointed directly toward the front of the boat.
- 7) Install and tighten the bronze hex nut (allow for swelling in wooden hulls).
- 8) Remove excess sealant from the outside to assure smooth water flow over the transducer.

**DANGER:** Wood hulls and fairing blocks will expand after the boat is put back into the water, so it is important that the transducer be only hand-tightened until the wood fully expands. Otherwise the wood fairing block may crack.

**DANGER:** Be sure to check for leaks when the boat is placed in the water. Allow at least 24 hours after installation for any leak to appear.

**DANGER:** If the boat is kept in saltwater it is recommended that the transducer be coated with an anti-fouling paint. **USE ONLY WATER BASED ANTI-FOULING PAINT. DO NOT USE KETONE BASED PAINTS.** Ketone based anti-fouling paint will attack the plastic materials used in the transducer. See the maintenance section on page 38 for recommendations.

## Getting Started

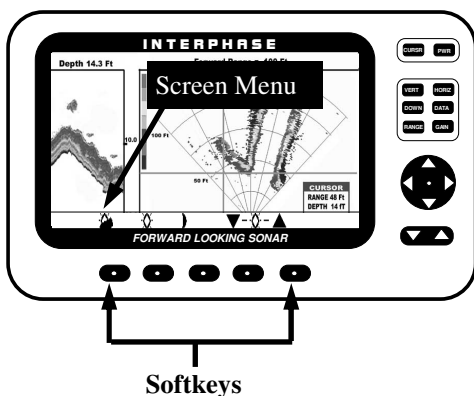


### ON/OFF - PWR Button.


Press the red "PWR" button located at the upper right of the unit to turn the **Color Twinscope** on. The unit will respond with a beep when it turns on. Briefly pressing the **PWR** button again brings up the menu for adjusting the screen brightness and color. To turn the **COLOR TWINSCOPE** off, press and hold down the **PWR** button for longer than 3 seconds.

### Soft Keys and Screen Menus

The five unmarked buttons below the display are called softkeys (because their use is determined by the menu choices and the Color Twinscope's software). Whenever one of the softkey buttons are pressed, or when making adjustments (like changing the color mode, brightness, gain or range) a screen menu will appear at the bottom of the display. For example, the screen menu shown at left is used for selecting the display color mode and adjusting the brightness.



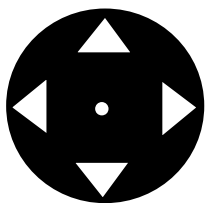
The screen menu provides visual feedback on the adjustment and often allows further choices by pressing one of the 5 softkeys below the menu.

If no button is pressed for several seconds the screen menu will disappear. On some screen menus, the menu will disappear as soon as you make a choice or press the button below the **EXIT** choice. Note: on some menus, the exit symbol  is used instead of the **EXIT** word.

### UP/DOWN (▼▲) and "NAV" Buttons

These buttons are often used to make adjustments to increase or decrease something - like the **GAIN**, **RANGE** and screen **BRIGHTNESS**, etc. In several menus you can also use the softkeys below the ▼▲ symbol that appears in the menu to make the adjustment. The ▼▲ button and the ▼▲ symbols on the NAV button have the same function.

The ◀ ▶ symbols on the NAV button are used to select an item in the menu. For example, when the **GAIN** menu is displayed, the ◀ symbol on the NAV key will select the **DOWN** gain to adjust, while pressing the ▶ symbol will select the **SCAN** gain to adjust. See **RANGE/GAIN** on page 26 for details.



NAV Button



UP/DOWN Button

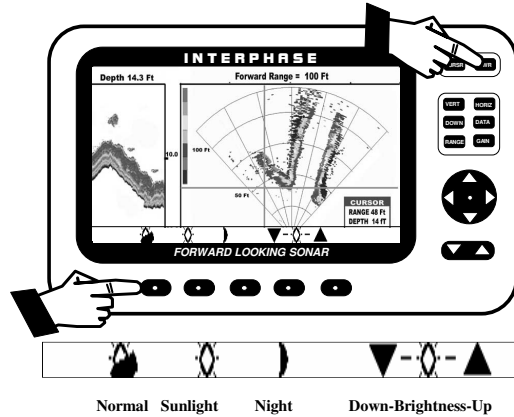
## Adjust Display Color/Brightness

Briefly press the red **PWR** button when the unit is on, and a menu will appear at the bottom of the display which can be used to select the color mode and the screen brightness.

Three display color modes are available: **NORMAL** (normal viewing), **SUNLIGHT** (white background for sunlight viewing) and **NIGHT** (black background for night viewing).

A 3-color palette designates the strength or intensity of the returning signal. **RED** indicates the strongest signal. **YELLOW** indicates a mid-level return, while **BLUE** returns are the weakest.

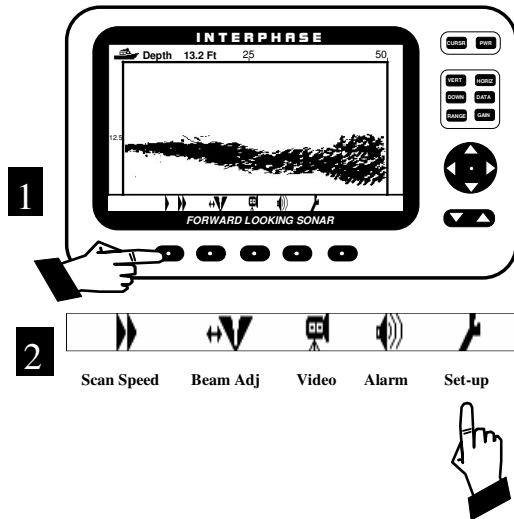
You can also adjust the display brightness from this menu. If no buttons are touched for 6 seconds the screen menu will disappear.



## SET-UP Menu

Press any of the 5 buttons beneath the display to bring up the “softkey” menu at the bottom of the display as shown at right.

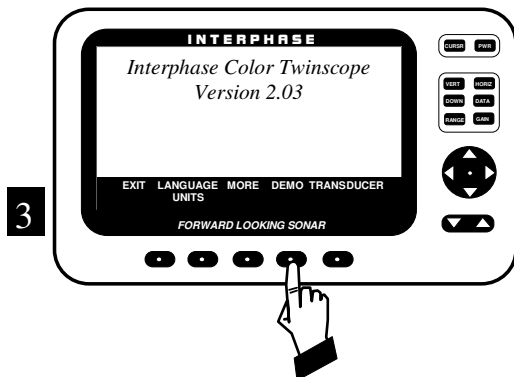
Press the button below the **SETUP** symbol to bring up the **SETUP MENU** where you can select languages, change the display units, select a boat icon, customize the system gain settings, adjust the NMEA baud rate, set a transducer keel offset, add a compensation for the transducer level adjustment and start/stop the demo mode. For more information about using the **SET-UP** Menu, please refer to the **SET-UP** section on page 20-21.

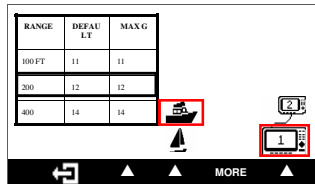
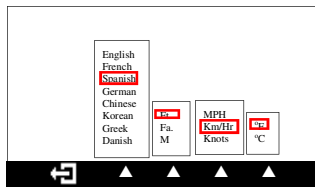
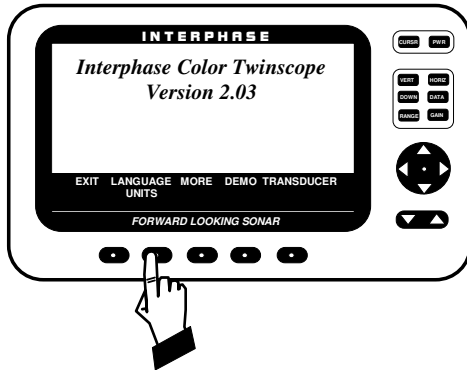


## DEMO

Your **Color Twinscope** includes a built-in **DEMO** simulator program which makes it easy to practice with the unit and to get a feeling for its many features before actually using it in real situations on the water.

To start the **DEMO** mode, Press any of the 5 buttons beneath the display will bring up the “softkey” menu. Then press the softkey beneath **DEMO**.





The Color Twinscope allows you to customize the maximum possible gain for each range. The table below shows a suggested range of Max Gain settings that you can set. Too much gain on the shallow ranges will cause excess noise and false forward targets .

RANGE	SUGGESTED MAX GAIN SETTING
0 - 50 Ft	10
0 - 100 Ft	10
0 - 200 Ft	10
0 - 400 Ft	16
0 - 800 Ft	31
0 - 1,200 Ft	31

## Set-Up

The Color Twinscope's SET-UP menu allows you to make several important initial settings. Typically, most of these settings are only made once and don't have to be changed. The keel offset adjustment is a good example. The SET-UP menu is shown at left and the following paragraphs describe each choice in detail.

### Language/Units

The Color Twinscope allows the choice of several operating languages and conversions for distance, speed and temperature. To select the operating language or choose the unit conversion to use, press the button labeled LANGUAGE/UNITS. A display window as shown at left will pop up on the screen showing the available languages and unit conversions and the ones which are currently selected.

Use the ▲ softkeys to highlight your desired choice for language, units for range, temp and speed. When finished press the EXIT softkey to save your selection and exit this menu.

### More - Max Vert Gain, Remote/Master

Press the softkey below the MORE choice to bring up a menu to set the MAXIMUM VERTICAL GAIN/range, choose the boat icon, configure the display as either a MASTER or REMOTE or press MORE to adjust the STC to minimize the effect of surface clutter.

To choose the boat icon and the MASTER(#1)/REMOTE(#2) setting, use the ▲ softkeys to highlight your choice. To adjust the MAX VERT GAIN\*, use the ▲ softkey to highlight the desired range - then use the NAV or ▼▲ UP/DOWN button to adjust the Max Gain.

When finished with all settings, press the EXIT symbol to save your selections and exit the menu.

\* Note: the Max Vert Gain adjustment applies to the Forward Vertical Scan only.



## STC ADJUSTMENT

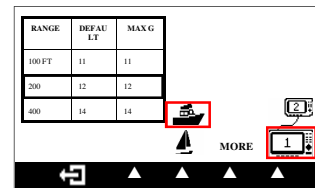
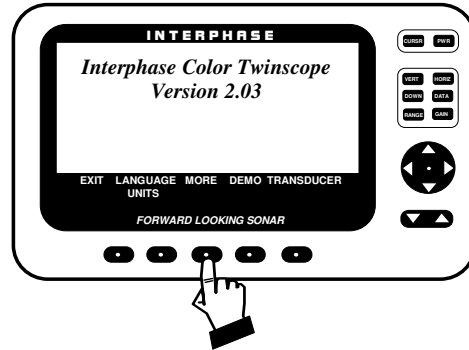
The **STC Adjustment** can be used to help minimize surface clutter problems. Typically, most depth sounders show a band of noise near the surface caused by ringing in the transducer, surface turbulence in the water and other factors. Where there is severe surface clutter, the digital depth display can get confused between showing the true bottom or the surface clutter. In addition, severe surface clutter can cause the alarms to sound.

To minimize these types of problems, the **Color Twinscope** includes an **STC Adjustment**. **STC** stands for Surface Time Constant and you can use it to force the **Color Twinscope** to ignore surface clutter. By default, the **STC** is set to 5 feet - meaning that the digital depth and alarms will ignore anything closer than 5' to the transducer. The clutter will still be displayed, just not used to calculate the digital depth or sound an alarm.

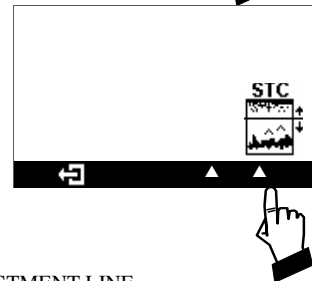
If you are having problems with the digital depth or alarms because of excessive surface clutter, you can increase or decrease the exclusion range as shown at right.

From the **SET-UP** menu, choose **MORE** and from that menu choose **MORE** again. Then press the button below the **STC** Symbol as shown at right. That will bring up a display showing the **STC** adjustment line as shown. Use the **NAV** key to adjust up or down to ignore the clutter area and then press the **EXIT** symbol to save and return to a normal display.

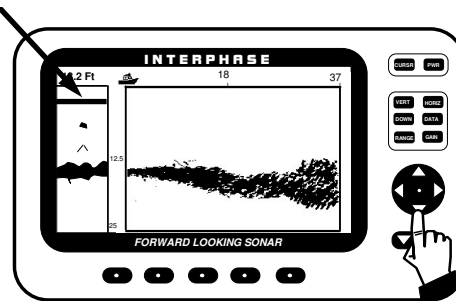
After making this adjustment, the surface clutter will still remain on the display but will be ignored by the alarm and digital depth functions.

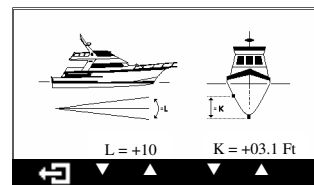
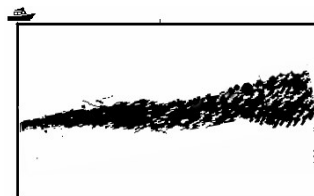
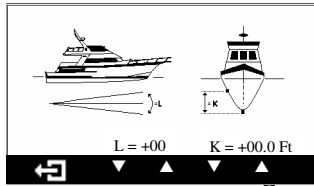


EXIT SYMBOL



STC ADJUSTMENT LINE





## Transducer Level (L) and Keel Offset (K)

If you do not adjust the **KEEL OFFSET**, the **Color Twinscope** will display depth readings below the transducer. Normally the transducer is mounted at some distance above the bottom of the keel and if this distance is entered as the **KEEL OFFSET (K)**, the display will show the depth below the keel.

The **Color Twinscope** also includes an adjustments to compensate for some transducer installation problems, especially thru-hull installations, where the transducer's stem is not perfectly vertical to the water's surface. This problem can be caused by improper installation, or by changes in the boats fore/aft weight.

When the boat is over a known level bottom, the forward vertical (**VERT**) scan display should show a level line. If the bottom display is slanted upward or downward (as in the pictures at left), note the approximate angle of the unwanted upward or downward slope on the display. Then proceed to the **TRANSDUCER** adjustment menu, as above, and press the **▼▲** softkey buttons to adjust the **Level (L)**. It is possible to adjust +/- 15 degrees. Positive numbers will tend to make the bottom slope upwards and negative numbers will make the bottom slope downwards. After making the adjustment, go to the forward vertical display and verify the correction. Once adjusted, the **Color Twinscope's** memory will retain the setting.

## Demo

If the **DEMO** softkey is pressed the **Color Twinscope** will go into a demonstration mode where simulated data is sent to the display. This mode can be a useful tool to help understand the operation of the unit.

To exit the **DEMO** mode, press the **DEMO** softkey again.

## System Reset

The **Color Twinscope** remembers most setting when it is turned off. Normally this is good, however sometimes it can cause problems and you may want to do a reset on the machine to restore it to the factory defaults.

To do this, turn the unit on while simultaneously pressing both the **CURSR** and **PWR** buttons.

## Displays

The **Color Twinscope** has four basic display modes which can be accessed directly by pressing one of the four buttons with the display's name. The following paragraphs give a brief description of each of these display modes. More detailed information on how to interpret and make adjustments in these displays can be found in pages 29 to 33 **Interpreting your Color Twinscope's Display**.

### **VERT** Vertical Scan

Press the button labeled "**VERT**" to view a full screen forward looking vertical scan display. In this mode, the Color Twinscope scans a 90 degree sector from the surface ahead to the bottom directly below. The resulting display shows the bottom and objects directly in front of the vessel.

The display should look similar to the unit shown at right. The boat icon at the top left of the display represents the position of the vessel. The horizontal line with the scale across the top of the display represents the surface of the water and the vertical scale represents the depth below the vessel. The current depth directly below the boat is shown at the top left of the display - just in front of the boat icon.

The current forward range is shown by the digital number at the far top right of the display. This number will change as different ranges are selected. Adjust **RANGE/GAIN** (see page 26) to optimize the picture.

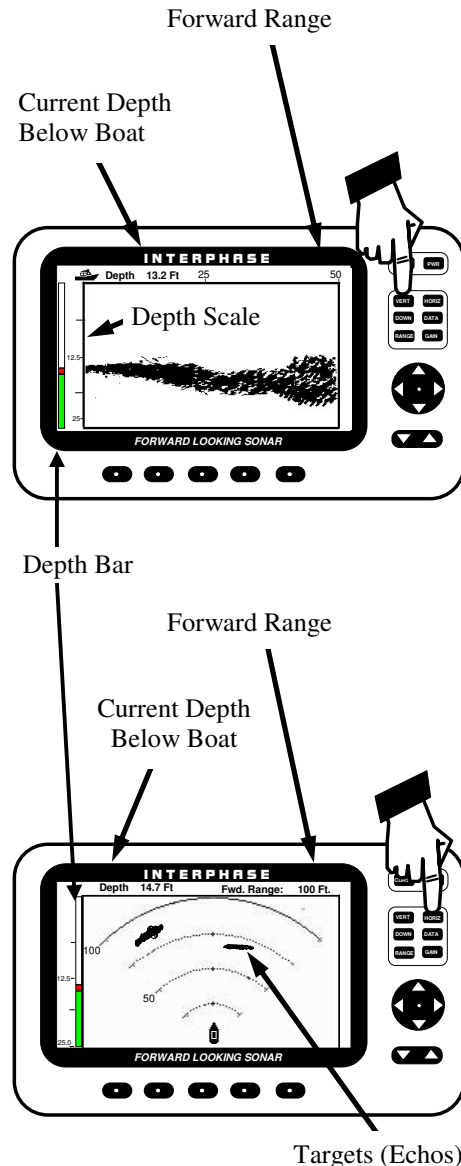
### **HORIZ** Horizontal Scan

Press the button labeled "**HORIZ**" to view a full screen forward looking horizontal scan display.

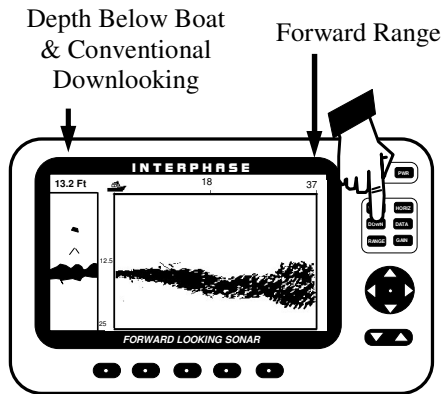
The display should look similar to the unit shown at right. The boat icon at the bottom center of the display represents the position of the vessel. The range rings indicate the forward distance from the vessel. The current depth directly below the boat is shown at the top left of the display .

The current forward ranges is shown by the digital number at the far top right of the display. This number will change as different ranges are selected. Adjust **RANGE/GAIN** (see page 26) to optimize the picture.

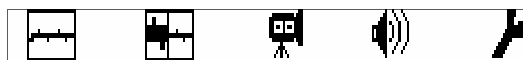
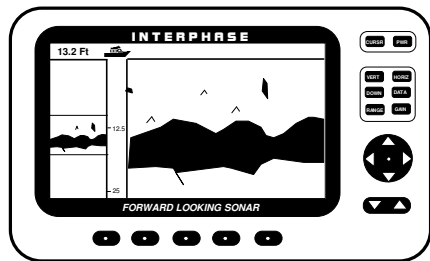
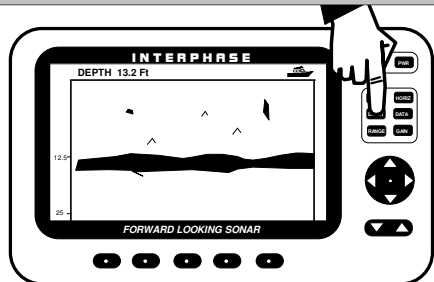
The **Depth Bar** on the left side provides a visual indication of the depth directly beneath the boat. Adjust in **DOWN** Mode.



Press DOWN Once For Split Screen Downlooking AND Forward Scanning Display



Press DOWN Again For Full Screen Downlooking Display



NORMAL ZOOM VIDEO ALARM SET-UP

## DOWN Down Display

(Conventional down looking)

By pressing the **DOWN** button - once, the **Color Twinscope's** display will split and a conventional downlooking display will appear at the left side of the screen as shown on the right. The downlooking split screen mode will work in either the vertical or horizontal display modes.

This down looking display is useful as it shows a history of the bottom depth directly below the boat.

The vertical scale just to the right of the downlooking display can be used to determine the depth below the vessel. The current depth is also shown in the large digits at the top left of the display. Adjust the **RANGE** and **GAIN** for the best picture (see page 26).

To see a full screen downlooking display, press the **DOWN** button a second time. The display should look similar to that shown on the left. This display shows the recent history of the bottom echos. The most current information is at the right of the screen.

## Downlooking Zoom

In the full screen downlooking display, you can **ZOOM** into any 25% portion of the depth being displayed. For example, if the downlooking depth range is 100 feet, then the **ZOOM** function can be used to look at any 25% of the depth - like 10 to 35 feet, 50 to 75 feet, etc.

To turn **ON** the **ZOOM** feature, press any softkey below the display to bring up the menu shown at left. Then press the softkey under the **ZOOM** Symbol to bring up a split screen zoom picture as shown at left. The normal depth display is on the left side, while the larger right portion of the display shows the **ZOOMED** picture. The **NAV** or **UP/Down** button can be used to move the **ZOOMED** area up or down. The **ZOOMED** area is the area between the two horizontal lines on the normal downlooking display on the left.

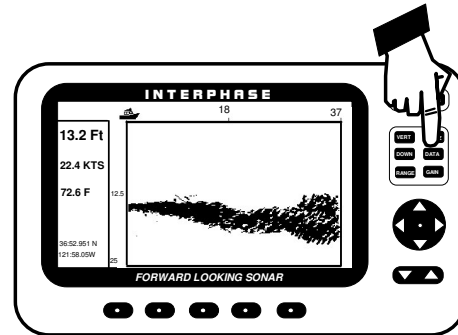


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## **DATA** *Data Display*

Press the button labeled **DATA** and the display will split to show the current depth, speed\*, temperature\* and Lat/Lon coordinates\* in large digits on the left side of the display (see drawing at right).

\*In order for the Color Twinscope to show the speed, temperature and Lat/Lon coordinates, the unit must be connected to an NMEA source of this data - such as an active or “smart” NMEA speed/temp transducer and/or a GPS (for example, the Interphase Chart Master Series) or other acceptable source of NMEA data. Please see **NMEA INPUTS** on page 35 for more details.



## Operating Adjustments

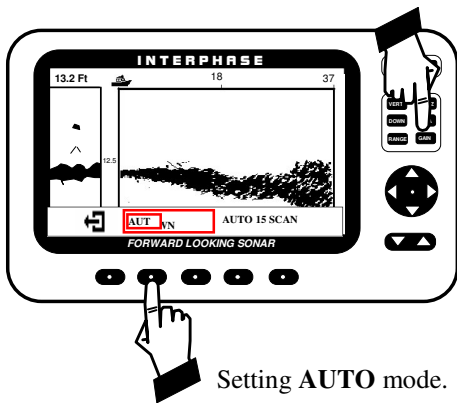
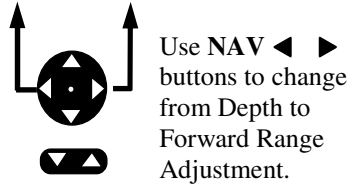
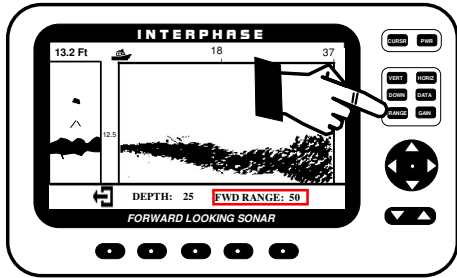
### **RANGE** Range Adjustment

To change the Depth or Forward Range, press the button labeled **RANGE** to bring up the **Range Adjustment** soft key menu. You can use the **NAV** or **UP/DOWN** button to adjust the **RANGE** upwards or downward.

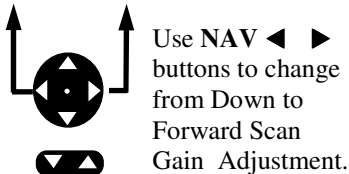
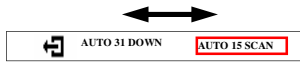
If you are in one of the split screen modes with the **DOWN** looking depth showing on the left, you can adjust the downlooking depth range (Down) **and/or** the forward looking scanning range. To adjust the downlooking depth range, press the left side of the **NAV** button to select the **DOWN** depth adjustment (a red box will indicate it is selected). To adjust the range up or down, use the **NAV** Button or the **UP/DOWN** button.

To adjust the forward looking Range, use the Right side of the **NAV** button to select the **SCAN** range adjustment (a red box will indicate it is selected). To adjust the range up or down, use the **NAV** button or the **UP/DOWN** button.

When finished, press the **EXIT** softkey or allow the menu to time-out after a few seconds.



Setting **AUTO** mode.



### **GAIN** Gain Adjustment (Sensitivity)

Press the button labeled **GAIN** to bring up the choices available for adjusting the **Color Twinscope's** receiver **GAIN**. Press the button below **AUTO** so that the word **AUTO** is shown with a red border if you would like the **Color Twinscope** to automatically adjust its receiver gain for changing conditions. To manually adjust press the **▼▲** on the **NAV** or **UP/DOWN** button to increase or decrease the receiver gain. Note that the **GAIN MENU** shows a number which indicates the relative sensitivity being used (+1 to +32). When you choose to manually adjust the **GAIN**, the **Color Twinscope** turns off the **AUTO** mode and it will remain off until the **AUTO** soft key is again selected. Note: when **AUTO** mode is turned on the word will be displayed with a red border. To exit the **GAIN MENU** and save your adjustments simply press the exit symbol or allow the menu to time-out (approx. 12 seconds)

**Important Note:** One of the biggest problems encountered with adjusting forward scanning sonars is too much gain - especially in the vertical forward view. If there are no targets directly in front of the boat, the natural tendency is to continue to increase the gain. Usually this results in a noisy display and is not necessary. In general, if you can see the bottom between 3 and 4 times the depth forward (for example in 10 feet of water, seeing the bottom forward 30 to 40 feet) the gain is adequate. (On forward ranges below 200 feet, it's recommended to keep the gain below the number 10.)

## **CURSR** Screen Cursor

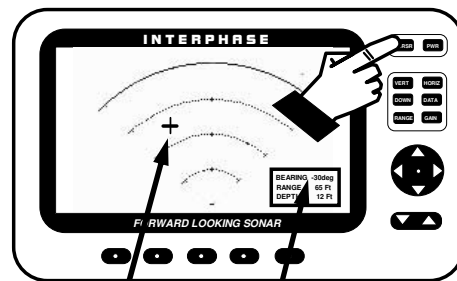
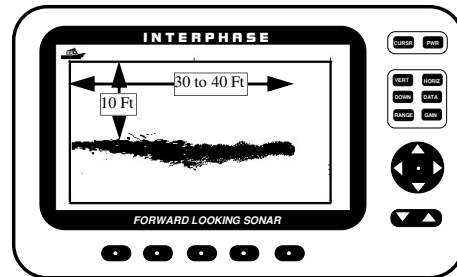
The **Color Twinscope** has a useful screen cursor feature that can show the approximate depth and range from the vessel to any target on a forward scanning display.

Pressing the **CURSR** button will toggle the screen cursor and its **CURSOR DATA BOX** on and off. The drawing at right shows a forward horizontal scan display with the **CURSOR** activated and the **CURSOR DATA BOX** in the lower right corner of the display.

To use the screen **Cursor** feature, press the **CURSR** button to activate and then use the **NAV** button to move the cursor to the desired location on the display. Wherever the cursor is placed, the **CURSOR DATA BOX** will display the approximate **RANGE, DEPTH and BEARING** (if in the horizontal scanning mode) from the vessel to that location.

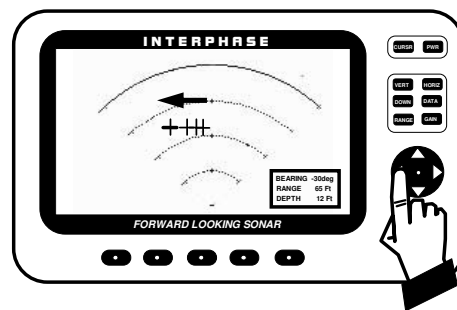
It is important to realize that the depth and bearing information in the **CURSOR DATA BOX** is the result of a calculation based on the angle of the acoustic beam below the surface of the water. Because each transducer installation is unique and the vessel may be moving up and down in the water - the angle of the acoustic beam is only approximately known. Therefore, the calculated depth is also only an approximation and should not be relied upon during critical situations.

It is also important to understand that the calculated depth in the **CURSOR DATA BOX** is the depth at the center of the **Color Twinscope's** 12-degree acoustic beam angle as shown in the diagram at right. Notice that the beam expands as it gets further from the boat. For example, at 1,000 feet the beam angle has a diameter of greater than 100 feet! However, the cursor calculates the depth at the centerline of the beam as shown.

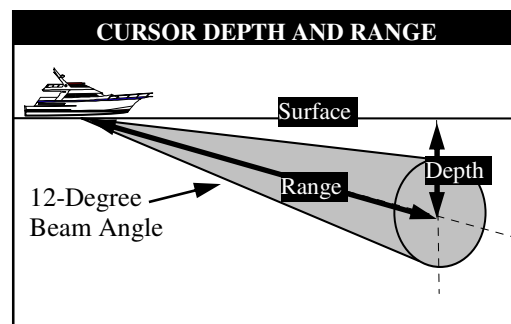


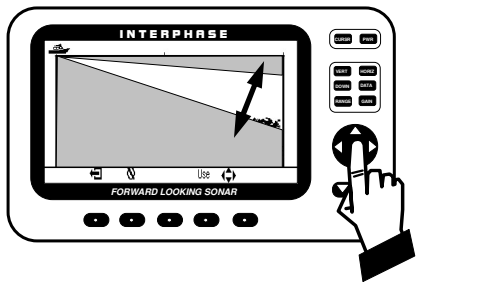
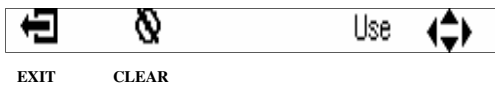
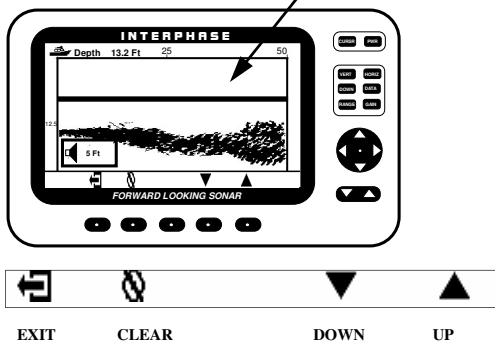
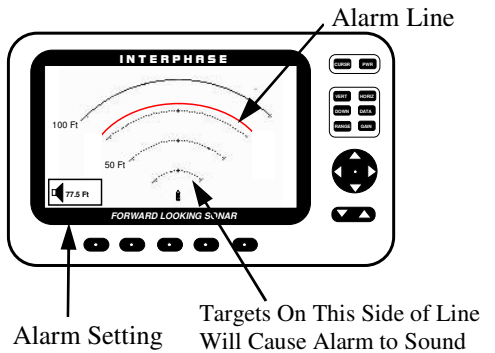
Cursor

Cursor Data Box



Use Nav Key to Move Cursor





Use NAV Button UP/Down ▼▲ to adjust beam sector width

## Scanning Speed

The **Color Twinscope** has two scanning speeds. Fast - indicated with two right facing triangles (▶▶), and slow, indicated with one right facing triangle (▶). In the faster mode, the display resolution is reduced because the number of scanning samples is reduced.

## Alarm Adjustment

A forward looking alarm can be set in the downlookin, the vertical and in the horizontal scan modes. When the alarm is set, a red "alarm" line and an alarm depth box appears on the display to indicate the alarm setting and the fact that it is active.

In the vertical scan mode, the alarm will sound if a target appears above the alarm line. In the horizontal scan mode, the alarm will sound if a target is closer to the boat than the alarm line. See diagrams at left.

To set the alarm, press any of the five unmarked softkeys below the display to bring up the softkey menu. Then, press the softkey beneath the **ALARM** symbol to bring up the **ALARM MENU**.

To adjust the alarm setting, use the buttons below the ▼▲ symbols in the **ALARM MENU**, or the **NAV** or **UP/DOWN** button. Press the softkey button below the **EXIT** symbol to save the setting and exit, or press the button below the **CLEAR** symbol to disable the **ALARM** and exit.

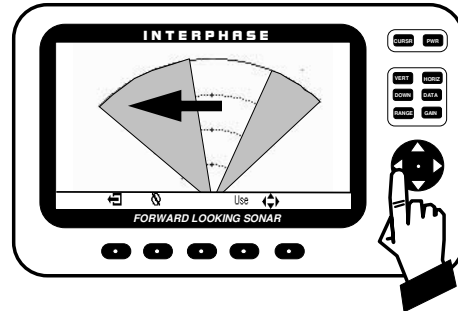
## Beam Adjustment

The **Color Twinscope** can scan a 90 degree arc (segment) in either the vertical or horizontal direction. In some cases you may want to reduce the size of the sector and then steer it in a particular direction. Reducing the sector size is one way to increase the scanning speed, as time isn't wasted by scanning unwated areas. The **BEAM** can be adjusted in both the vertical and horizontal scanning modes.

To adjust the beam, press any of the five unmarked softkeys below the display to bring up the softkey menu and then press the softkey beneath the **BEAM** symbol to bring up the **BEAM MENU**.

Use the **NAV** or **UP/DOWN** ▼▲ buttons to adjust the beam sector size and then use the **NAV** left/right ◀ ▶ buttons to adjust the resulting sector direction. Press the softkey button below the **EXIT** symbol to save the setting and exit, or press the button below the **CLEAR** symbol to disable (reset) the **BEAM** adjustment and exit.

A good example of the use of the beam adjustment is when cruising in deep water where the desired scanning area is close to the surface (looking for obstructions, etc). In this situation you could reduce the size of the scanning sector and then steer it up to the surface. This would result in the desired coverage but with a much faster scanning speed. See diagram at bottom of previous page.



Use NAV ◀ ▶ buttons to steer beam sector

## Video Inputs

The **Color Twinscope** has a 3-pin video input connector on the rear panel. You can connect video cameras, VCR, DVD and other sources of NTSC OR PAL signals to this connector and view them in a full-screen format on the **Color Twinscope's** display. If more than one camera or video input is required, you can use a video switch to choose between several video signals.

Pressing softkey button below the **VIDEO** selection will switch the video signal to the display. When the **VIDEO** selection is **ON**, pressing any of the 5 softkey buttons will turn it **OFF** and the display will return to the sonar mode.



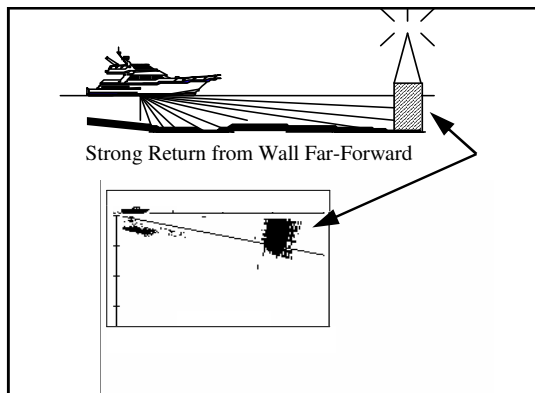
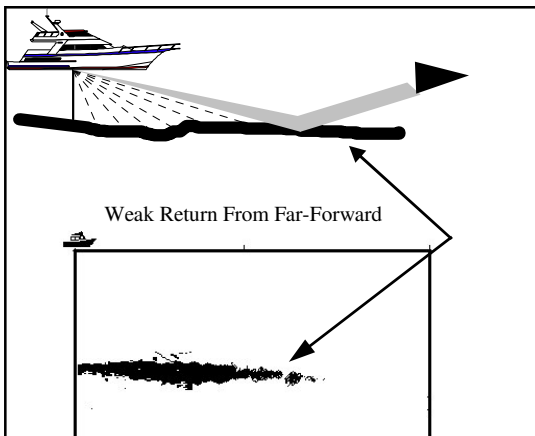
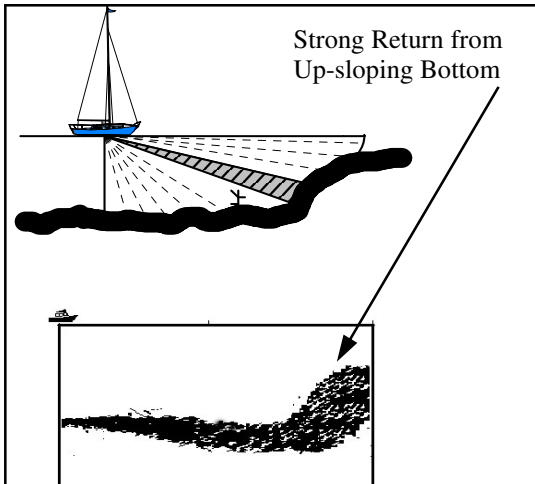
### **Interphase View Cam**

Color CCD camera.  
Water-resistant. Complete with 30' cable.  
(P/N # 84-6100-000)



### **Interphase FishCam**

Color CCD camera.  
Waterproof face. Designed to fit in thru-hull fitting. Complete with 30' cable  
(P/N # 84-6000-000)  
Thur-Hull Housing Kit  
(P/N # 84-6200-000)  
Blanking Plug for above  
(P/N # 17-0061-000)



## Interpreting The Forward Vertical Display

The Interphase **Color Twinscope** provides a display which shows acoustic echo returns from the underwater area beneath and ahead of the vessel. The Phased Array Transducer steers an acoustic beam over an arc which can be adjusted from approximately 12 to 90 degrees. As the **Color Twinscope** steers the beam to different positions, it transmits a pulse of energy and then waits a defined period of time (depending on the range selected) and listens for any return echoes. As the energy from this acoustic beam strikes underwater objects or the bottom, a small portion of the energy is reflected as an echo back to the transducer. When the echo is received at the transducer, it's converted into a small electrical signal, processed and displayed on the **Color Twinscope's** LCD.

The unit knows the direction in which it sent the transmit pulse and the time it took to receive the return echo, so it can determine the location of the object or bottom that created the return echo. As the **Color Twinscope** sequentially steps the acoustic beam from directly forward to the bottom, the LCD display shows a continuously updated display of the return echoes in their approximate position in relation to the vessel.

Because the LCD display is only showing the acoustic echoes that are returned to the transducer, it can not show forward bottom conditions that are hidden from its field of view or are hidden due to obstructions in the acoustic beam's path through the water. In addition, smooth bottom conditions far forward of the vessel are difficult to see as very little of the acoustic energy is reflected back as an echo. See the sketch at left.

Bottoms that are rough and rocky or are sloping upwards will reflect more acoustic energy back to the transducer and will show up better far-forward of the vessel than bottoms that are very smooth or slope downward. However, even though the bottom may be smooth and does not show up far forward, large obstructions (sea wall, large rocks, underwater shelves, etc.) will typically send back strong echoes that can be seen far forward, as the sketch at left indicates.

## Distance Forward

Under typical conditions, the **Color Twinscope** will show level or shallowing bottom contours for a distance forward of between 4X to 6X the depth below the transducer.

Obstructions in the water, such as walls, mud banks, etc. may be seen at much greater distances, subject to the depth below the transducer and the 1,200 ft. maximum forward range.

Besides the bottom conditions, water conditions will also affect the **Color Twinscope's** performance. For example, surface chop, temperature inversion layers (thermoclines) and muddy water may degrade performance.

### Noise and Sensitivity Adjustments

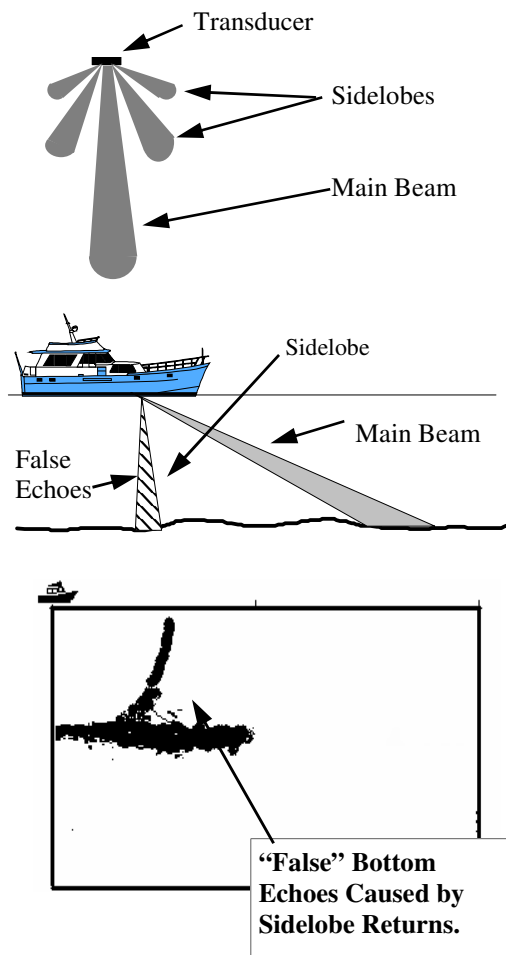
The **Color Twinscope** features an **AUTO** gain feature where it continuously adjusts the gain to achieve the optimum picture quality. The gain can also be adjusted manually to allow for a reduction in gain to minimize the effect of screen noise, or to increase the gain to show weaker targets.

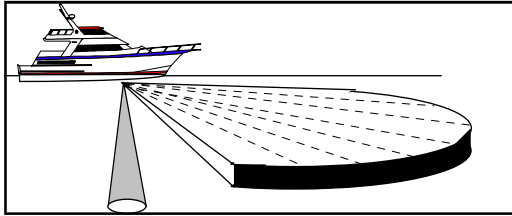
In the forward scanning modes, the gain setting is especially important as too little gain will cause a loss of far forward bottom readings and too much gain will cause an increase in screen noise and a possible display of unwanted transducer sidelobe readings.

### Transducer Sidelobe Effect

The **Color Twinscope's** transducer, like all acoustic transducers, does not form a perfect beam of acoustic energy. Some of the acoustic energy is contained in an area called the sidelobes. In conventional downlooking depthsounders, the sidelobes create little problem except to distort the size of the actual beam angle; however, in scanning sonars they can create echoes that are not placed on the LCD screen in their proper position (also known as false echoes).

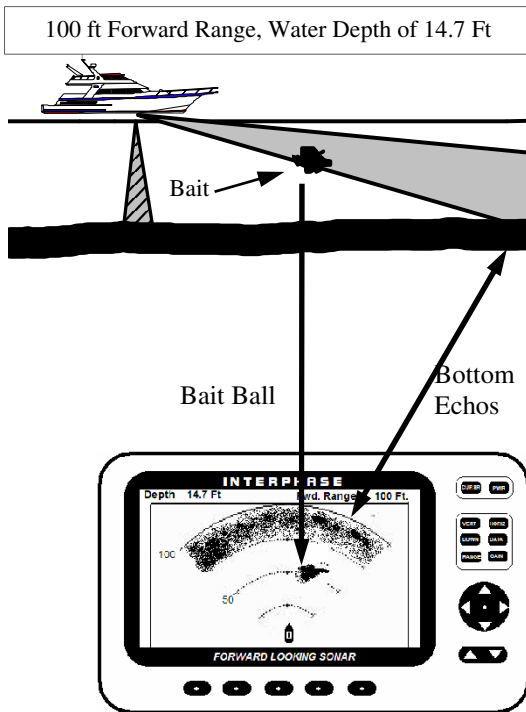
As the **Color Twinscope** sends off its acoustic beam in a specific direction, it assumes that any return echoes are within the main beam. However, if the sidelobe energy (which is not within the main beam) strikes a large object (i.e. the bottom) and creates a strong return echo, the **Color Twinscope** has no way of knowing that this "false" echo was not created by the main beam and will go ahead and show it on the display as if it was located within the main beam. The most typical display of the sidelobe echoes appears as an arc at the same distance as the bottom depth, and in the worst case, from the bottom below to the surface ahead. After using the **Color Twinscope** in different situations, with different gain settings, you should become proficient in identifying the bottom echoes caused by the transducer's sidelobes. To minimize the sidelobe effect, the gain should be reduced.





## Interpreting The Forward Horizontal Display

In the Horizontal display, the **Color Twinscope** scans from left to right across the boat's bow. The forward scanning elements in the transducer are positioned so that the plane of the horizontal scan is angled downward approximately 10 degrees from the water's surface (see sketch at left). This downward angle is designed to help reduce the effects of surface noise clutter when the water is choppy and to allow easier mounting of the transducer to the transom of smaller boats.



As the acoustic sound beam is projected away from the boat, the cross-sectional diameter of the beam increases. At a range of approximately 5 to 6 times the depth of the water the sound beam will begin intersecting the bottom and some of the sound energy that intersects the bottom will be reflected back and will appear on the display as bottom echos.

It is important to understand that when the **Color Twinscope** is in the Horizontal display mode, in shallow water - it will typically show the bottom on the forward display. This display information can be used to help understand the structure of the bottom ahead of the boat, but the bottom echos can also mask or be confused as fish targets.

The top picture and resulting screen display shows a boat in 14.7 feet of water. The **Color Twinscope's** forward range is set to 100 Ft. Notice that the bottom is just starting to show at about 75 forward.. A school of fish or bait is shown about 50 feet to the right and forward of the ship's bow.

On the following page, two bottom situations are shown along with the resulting **Color Twinscope** Display.

## Noise and Sensitivity Adjustments

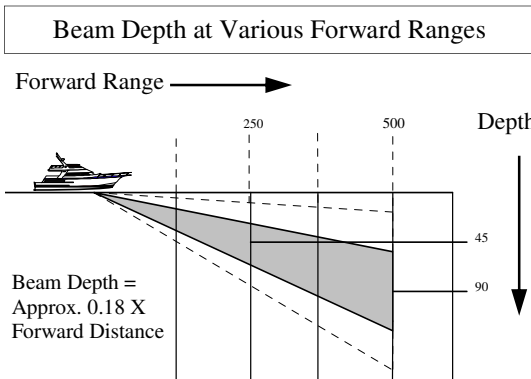
The **Color Twinscope** features an **AUTO** gain feature where it continuously adjusts the gain to achieve the optimum picture quality. The gain can also be adjusted manually to allow for a reduction in gain to minimize the effect of screen noise, or to increase the gain to show weaker targets.

In the forward scanning modes, the gain setting is especially important as too little gain will cause a loss of target detection and too much gain will cause an increase in screen noise. In the **AUTO** mode, the **Color Twinscope** increases the forward gain until there is a certain density of targets on

Plane of Forward Scan is Angled 10 Degrees Downward From Surface. Forward beam will reach bottom at approx. 5 times depth

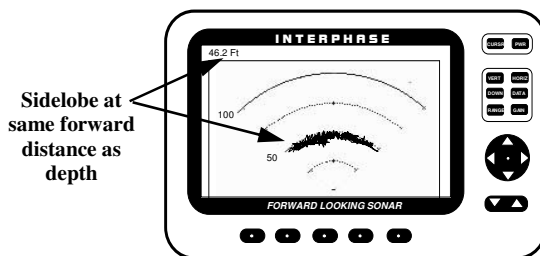


the display. In most situations the **AUTO** gain mode works well, but manual adjustments will often be required to get the optimum picture - especially when looking far ahead in shallow water.

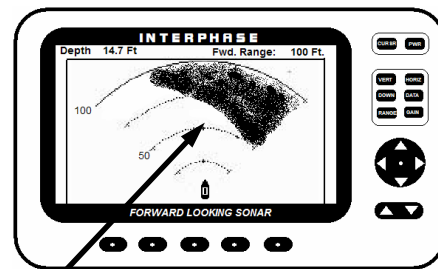
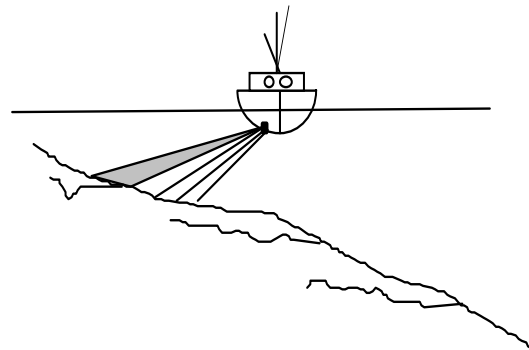


In certain conditions - especially in shallow water - you may see a horizontal display that shows a target ahead that remains on the screen at the same distance - even as the boat moves. This is probably caused by a transducer sidelobe problem and can be reduced or eliminated by decreasing the forward gain.

A sidelobe on the display will show up at a forward distance equal to the depth - as shown below.

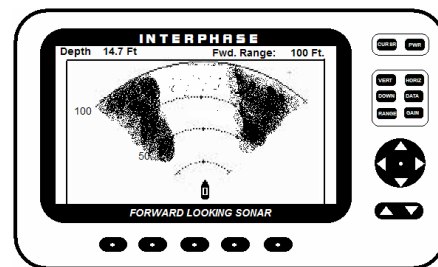
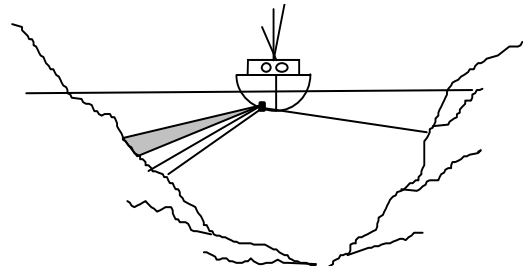


### Following a Shoreline or Bank



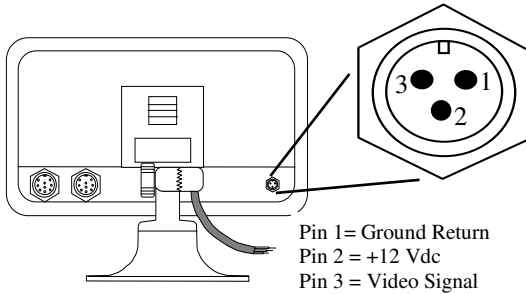
Bottom getting shallow to Starboard

### Following a Channel



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## Inputs and Outputs



### Video Input

A 3-pin connector on the rear of the **Color Twinscope** will accept NTSC or PAL video signals from cameras, VCRs, DVDs and other common video sources. When the Video mode is chosen the **Color Twinscope's** LCD display will show the video input in a full screen format. It is not possible to split the screen in the video mode. The sketch at left shows the wiring of the 3-pin rear panel connector.



View Cam  
# 84-6100-000



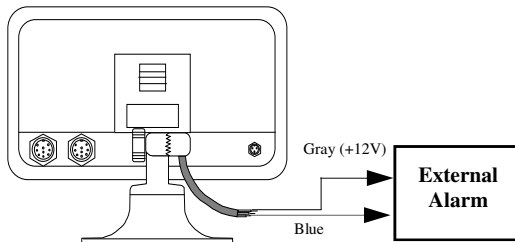
Fish Cam  
# 84-6000-000

The 3-pin connector supplies 12 Vdc at a maximum of 100mA to power an external camera. It's important that the camera not draw more than 100mA or it could cause permanent damage to the **Color Twinscope's** power supply.

Interphase offers two color cameras which can be easily connected to the **Color Twinscope**; the View Cam and the Fish Cam. The View Cam is splash proof and is ideal for mounting in engine rooms, or to monitor deck areas. The View Cam is designed to fit into a plastic thru-hull and has a waterproof face. It's ideal for underwater viewing.

### External Alarm

A loud remote alarm can be connected to the **Color Twinscope** which will sound when the depth or range alarm is triggered. The external beeper alarm can be connected between the **BLUE** and the **GRAY** wires on the main power and I/O cable from the Quick Disconnect. The alarm should be a piezo beeper type and the current consumption should not exceed 20 mA. **Interphase** offers a piezo-beeper alarm which we have found to be loud and reliable. Please call us at (831) 477-4944, ext. 16 for more information.



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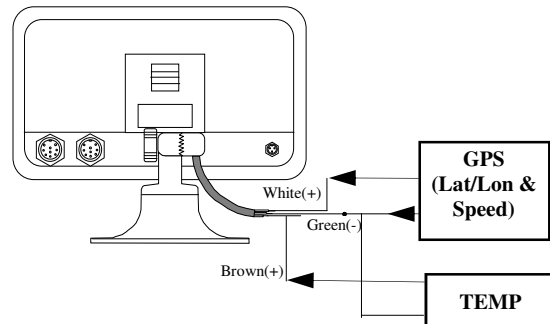
## NMEA Inputs (Position, Speed & Temp)

The **Color Twinscope** has two independent serial NMEA input ports. One can be used to connect to a source of lat/lon position and speed data (i.e., GPS), and the other can be connected to a source of temperature and speed data.

An external GPS should be connected between the **White (+)** and **Green (-)** wires in the power and I/O cable from the Quick Disconnect Mount, and the Temperature and Speed source should be connected between the **Brown (+)** and **Green (-)** wires.

The **Color Twinscope** looks for the following NMEA sentences to get information on position, speed and temperature.

**GLL** (Lat/Lon Position)  
**VTG** (Speed over the ground)  
**MTW** (Temperature)

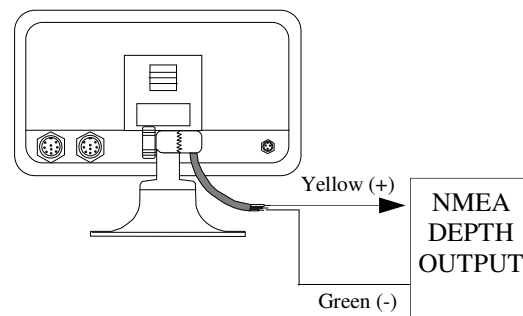


## NMEA Depth Output

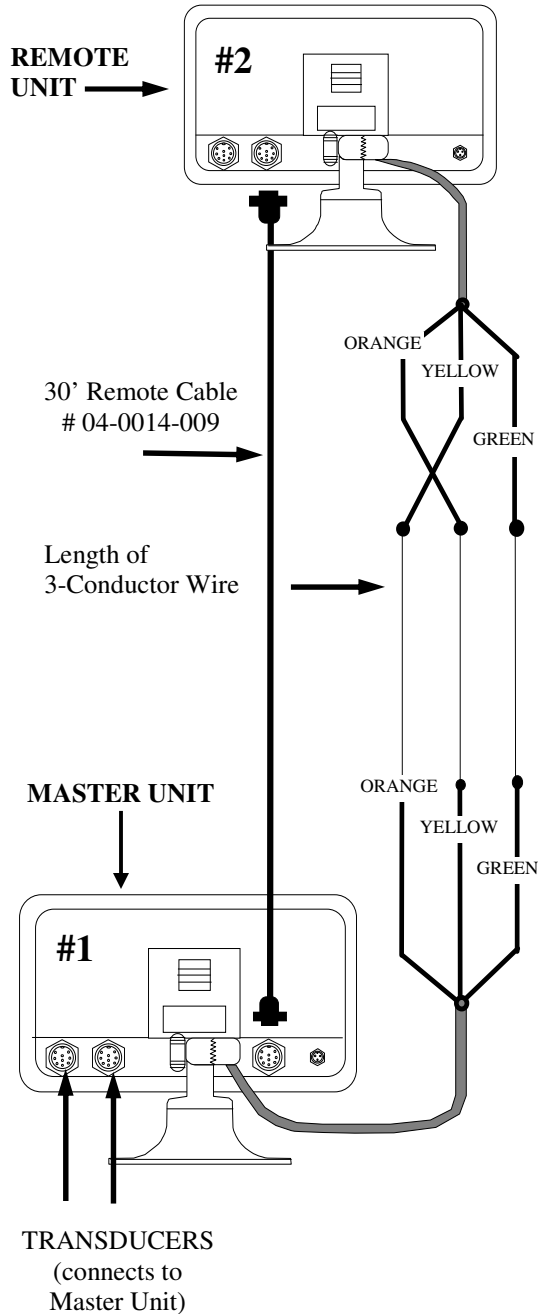
NMEA 0183 depth information is sent out on the **Yellow (+)** and **Green (-)** wires. See the sketch at right showing the wiring for the NMEA output port.

The **Color Twinscope** sends out the following NMEA 0183 sentences with the digital depth data..

**DPT, DBT**



## Remote (2nd Station) Connections



## Remote Display

The **Color Twinscope** can operate with two displays: one being designated as the **Master (#1)** and the other as the **Remote (#2)**. The transducer cables connect to the **Master (#1)** unit and the signal is automatically switched between the **Master (#1)** and the **Remote(#2)** during operation.

The normal **Color Twinscope** will operate as a stand-alone unit or as a **Remote** unit in a two display installation, but can not operate as a **Master** unit.

The **Color Twinscope Remote Kit** includes A 30' **Remote Cable (P/N 04-0014-009)** that carries the sonar information from the transducer between the two displays.

It should be connected between the extra (third) 9-pin connector on the rear of the **Master(#1)** unit and the 9-pin **GREEN** or **Vertical** input connector on the **Remote (#2)** unit. In addition, the two units need to be connected via their serial ports with a three wire cable as shown on the sketch on the left.

Note that the **Orange** wire from the **Master (#1)** connects to the **Yellow** wire from the **Remote (#2)** and the **Yellow** wire from the **Master (#1)** connects to the **Orange** wire from the **Remote (#2)**. The **Green** wires from both units are tied together.

Once connected, you will need to go into the **SETUP** menu of each unit and set the standard unit up as a **REMOTE(#2)** and the other unit unit (the once included with the **REMOTE STATION KIT** with three 9-pin connectors on the rear) as the **MASTER(#1)** unit. See page 16 for details.

In a two-station system, the **Master (#1)** must always be turned on. Then, if the **Remote PWR** button is pressed, the **Master (#1)** display will go into a standby mode while the **Remote (#2)** is being used. To re-activate the **Master (#1)** station, the **Master Display PWR** button needs to be briefly pressed. (pressing for more than a few seconds will turn the Master off).

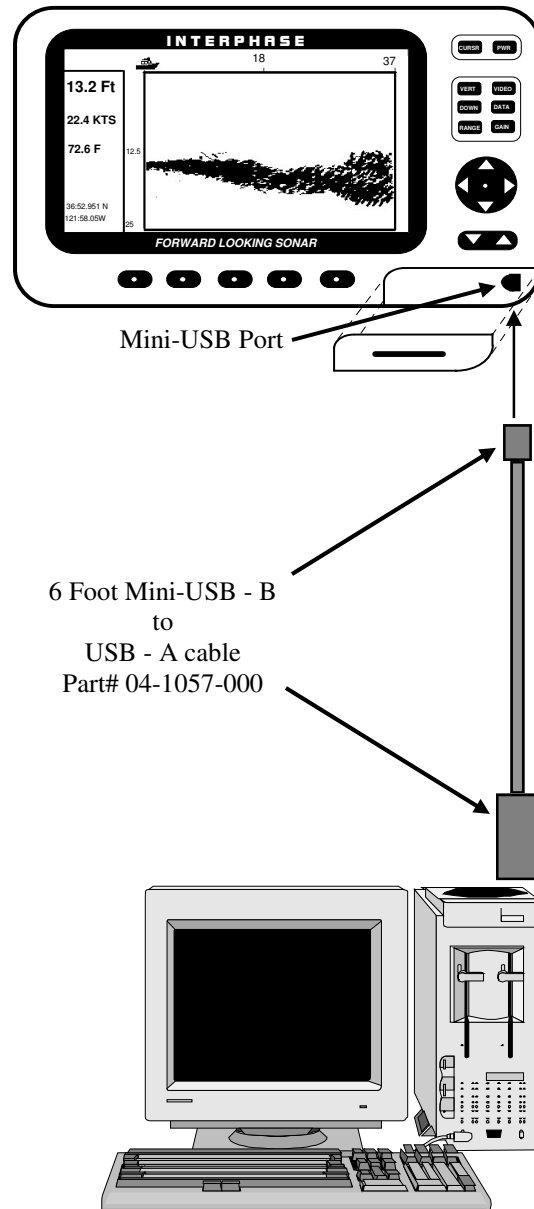
If the **Master (#1)** is turned off, for any reason, both displays will not function.

## Software Upgrades

You can download software updates to your PC from our website at [www.interphase.tech.com](http://www.interphase.tech.com) and then upload the new software to your **Color Twinscope** by using the **PC Software Upgrade Cable (P/N# 04-1057-000)**. Check out the **Interphase** Website for future **Color Twinscope** software upgrades. To get a PC Software Upgrade Cable, please call Interphase at (831) 477-4944, extension 16.

Connect the Mini-USB connector to the port under the rubber protective cover on the front bottom right corner of the **Color Twinscope**. Connect the other end of the cable to the USB port of your PC.

**Note:** Detailed upgrade instructions are available on our website at [www.interphase-tech.com](http://www.interphase-tech.com).



## *Maintenance*

Below are some helpful tips for keeping your **Color Twinscope** in top condition:

- 1) Keep your display clean and dry. Occasionally wipe unit off with a damp cloth, but be careful not to scratch the lens covering the LCD screen. For stubborn dirt, use a mild soap and a damp cloth. **NEVER USE SOLVENTS SUCH AS PAINT THINNER, ACETONE, OR GASOLINE TO CLEAN YOUR UNIT.**
- 2) Occasionally clean the face of the depth transducer (sensing surface) and carefully remove any marine growth. Use a mild detergent, or 220 grit sandpaper, or crocus cloth to remove stubborn growth.
- 3) If the in-line fuse is blown, replace it with a 2 amp fuse. **NEVER REPLACE WITH A HIGHER AMP RATING !** If the fuse continues to blow, check the polarity of your 12 VDC power source. If the polarity is correct, check with the **Technical Service Department** at **(831) 477-4944**.
- 4) In order to protect your transducer from water damage, paint it with one of the following brands: Interlux-UltraCoat, Fiberglass Bottom Coat, Super Bottom Coat; Pettit-UniPoxy; Rule-Super KL, Gloss Dura Poxy. **DO NOT** use a solvent based paint.
- 5) **DO NOT allow any solvents, i.e. gasoline, acetone, to come in contact with the transducer or head unit as these may dissolve the material.**

## *Troubleshooting Tips*

<b>PROBLEM</b>	<b>POSSIBLE SOLUTION</b>
Unit will not turn on, or unit beeps but no picture appears	Check fuse, battery voltage and power connections. Check your connections to the battery.
Unit blows fuses.	Wiring is reversed or there is excessive current from the battery.
Loses picture at speed.	Adjust the transducer angle or placement. Make sure that the transducer is installed in the area which has the least amount of water turbulence.
Screen is full of noise, or has dots running through.	Reduce gain setting. Review the section on interference. Check to see if other 200khz sounders are nearby.
LCD darkens in sunlight after prolonged use.	Overexposed to sunlight - provide shading for display.
Bottom slopes up/down	Adjust the transducer angle or adjust the level setting.
Digital water depth not working.	Increase your gain, and check that you can see the bottom in the DOWN mode.
Controls do not respond. Unit will not change operating modes.	Perform <b>FACTORY RESET</b> : Start with the unit off. Press and hold down the POWER and CURSOR keys. Once the unit powers up, it is reset to the factory settings.

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## ***Interference Problems***

Interference can come from several sources. The most common of these are:

- 1) Other nearby depth sounders operating at the same frequency.
- 2) Radiated interference from the boat's electrical system (alternator, distributor and spark plugs) or from nearby equipment that radiates electrical noise.
- 3) Conducted interference usually occurs when the **Color Twinscope** shares a 12VDC power lead with other noisy equipment (i.e.; bilge pumps, motors, refrigeration systems, autopilots, etc.)

Interference caused by nearby depth sounders operating on or near the same frequency as the **Color Twinscope** will typically appear as "rabbit tracks" that march up and down the screen. Reducing the gain will help minimize this problem.

Radiated interference caused by the boat's engine can usually be identified by observing the **Color Twinscope** with both the engine running and turned off. If the interference disappears when the engine is turned off, it is safe to assume that the engine is the source of the interference.

This type of interference can usually be eliminated by using the same techniques used in the automotive industry to eliminate interference to car radios, CB's, etc. The following actions may be required:

- 1) Reduce the Gain setting to minimize interference.
- 2) Make sure your boat uses resistor type spark plugs and plug wiring.
- 3) Install a suppressor on the center lead of the distributor.
- 4) Install an alternator filter to smooth the alternator's output signal.

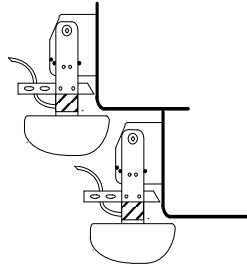
Interference may also be caused by radiation from other nearby equipment and can be detected by turning off all other equipment and observing the **Color Twinscope's** display as each suspected source is turned back on. This type of interference can usually be eliminated by moving the **Color Twinscope** away from the source and checking to ensure that the interfering source is properly grounded.

Interference causing the display to be unstable, to pulsate or periodically change size is usually caused when another piece of equipment shares the same 12 VDC power leads from the battery. This problem is especially severe when equipment requiring large current surges (i.e.; autopilots, refrigerators, or bilge pumps) share the same power leads. Minimize this type of interference by running the **Color Twinscope's** 12VDC power leads, or those of the interfering equipment, directly to the battery.

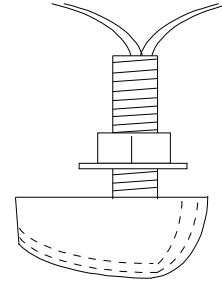
Alternately, you may find it helpful to install a separate dedicated power supply battery that is used only to run your electronic gear (e.g.; fishfinders, VHF radios, radar units, etc.). If your unit shuts off during low voltage situations, such as when cranking your engine starter, you may want to install an isolator switch with an "A/B" type of battery system. An "A/B" system allows you to run your electronic gear on one battery, while the starter and alternator are hooked up to the other battery.

Your authorized marine electronics dealer is familiar with the methods of reducing electrical interference and is qualified to assist you should a problem persist.

## Specifications



Transom Transducers  
Part # T1-I200-025  
& T1-I200-028



Thru-Hull Transducer  
Part # T1-I200-032

<b>Display Type:</b>	480 x 234 pixels, Sunlight Color Active Matrix LCD
<b>Depth Ranges:</b>	Depth ranges, 0 - 25 to 0 - 600feet
<b>Forward Ranges:</b>	Forward ranges, 0 - 50 to 0 - 1,200 feet
<b>Transmit Frequency:</b>	200 kHz
<b>Transmit Power:</b>	Approx. 450 RMS or 3,600 peak-to-peak Watts
<b>Transmit Beam Angle:</b>	Approx. 12 degrees
<b>Pulselength and Sounding Rates:</b>	Automatically optimized for selected range.
<b>Power Requirements:</b>	11 to 16 VDC, less than 1.2Amp.
<b>Operating Temperature:</b>	0 to 50 degrees C (32 to 122 degrees F)
<b>NMEA 0183 Inputs:</b>	GLL, VTG, MTW
<b>NMEA 0183 Output</b>	DBT, DPT
<b>Dimensions:</b>	9.5"W x 5.9"H x 3.25"D
<b>Standard Equipment:</b>	Display with protective cover, Quick Disconnect Mounting Bracket with Power/IO cable, in-line fuse, operation manual and depth transducer (s) with 30' cable.



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## *How to Obtain Service*

If you feel your set is not operating properly, first refer to the sections of this manual on **Troubleshooting** and **Interference Problems**. This information solves the most common problems. If problems persist, please call **Interphase Technical Service** at **(831) 477-4944** or send your unit in with the information below filled out.

If you do need to return your set, send it to the following address:

**Service Department  
Interphase Technologies, Inc.  
2880 Research Park Drive, Suite 140  
Soquel, CA 95073**

In addition, to speed your repair please fill out the following, tear this page out of the manual (or photocopy it), and tape it to your unit for our technicians to review. If possible, also include a copy of your purchase receipt to verify the purchase date.

**RETURN TO:**

\_\_\_\_\_ (Your Name)  
\_\_\_\_\_  
\_\_\_\_\_ (Street Address - No P.O. Boxes Please)  
\_\_\_\_\_  
\_\_\_\_\_ (City) \_\_\_\_\_ (State) \_\_\_\_\_ (Zip)

Daytime Telephone: (\_\_\_\_\_) \_\_\_\_\_  
Evening Telephone: (\_\_\_\_\_) \_\_\_\_\_  
EMAIL Address: \_\_\_\_\_

Model: **Color Twinscope** Serial #: \_\_\_\_\_

Purchase Date \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Type of transducer: Transom mount \_\_\_\_\_ Thru-Hull \_\_\_\_\_ Other \_\_\_\_\_

Please describe the problems you are having with the unit in as much detail as possible in the space below. Please use another sheet of paper if necessary.

\_\_\_\_\_  
\_\_\_\_\_  
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*Notes*

***Interphase Technologies, Inc.***  
***5 Year Limited Warranty***

Any unit that fails during the first year of the warranty period will, at **Interphase'** option, be repaired or replaced at no charge to the customer provided it is returned to **Interphase**, freight prepaid with **proof of date of purchase** and a description of the malfunction. Repair or replacement during the warranty period will not extend the basic warranty period.

From the second through the fifth year, **Interphase** will, at its option, repair or replace defective units for a fixed fee. This fee will be set at the beginning of each year. More information about the fixed rate repair fee is available by calling Interphase at (831) 477-4944 or visit our website at: [www.interphase-tech.com](http://www.interphase-tech.com).

This warranty does not apply to an **Interphase** product that has failed due to improper installation, misuse, or accident, nor does it apply to products which have been repaired or altered outside the **Interphase** factory.

Transducers, GPS antennas and Radar Antennas are subject to extreme conditions beyond control of the manufacturer and **Interphase**. Due to these conditions, the warranty on these components is limited to one year against defects in workmanship or materials. The fixed fee for years two through five of the warranty does not apply to these components. Any costs incurred with transducer or antenna replacement are specifically excluded from this warranty other than the cost of the components themselves.

This warranty does not include incidental or consequential damages and **Interphase** disclaims any liability for any such damages. All implied warranties, if any, are limited in duration to the above stated one year warranty period. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, therefore, the above limitations may not apply to you.

**The completion and return of the enclosed Warranty Registration Card is a condition precedent to the warranty coverage. Owner must provide proof of date of purchase in order for warranty to be valid.**

This warranty gives you specific legal rights which may vary from state to state and province to province. This warranty is limited only to the original purchaser of the unit.

**INTERPHASE**  
*Forward Looking Technology*

2880 Research Park Dr Suite #140 Soquel, CA 95073  
PHONE: 831.477.4944 FAX: 831.462.7444  
[comments@interphase-tech.com](mailto:comments@interphase-tech.com) [www.interphase-tech.com](http://www.interphase-tech.com)

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