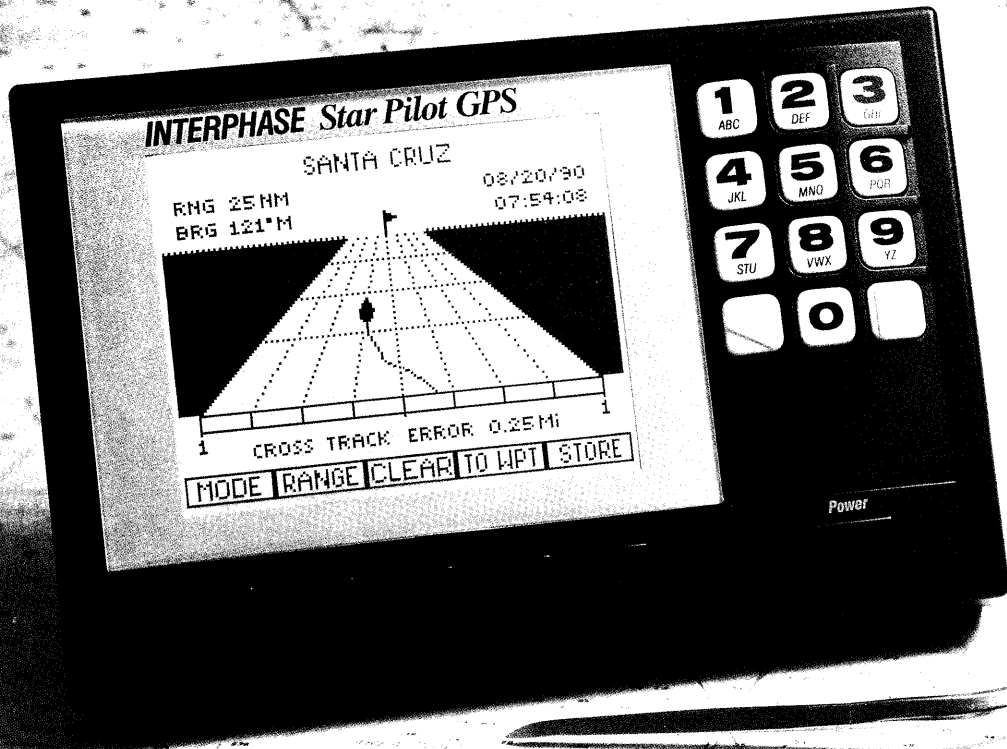


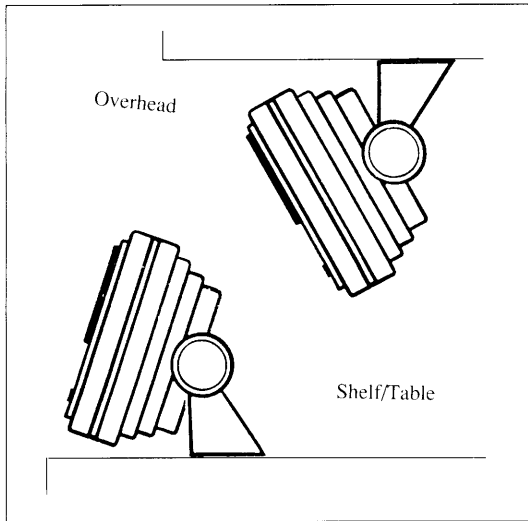
INTERPHASE Star Pilot



Operation Manual

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Unit Installation

Display Unit

The compact size of the **Star Pilot** allows for easy installation in most any boat. 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 temperature. Heat is one of the worst enemies of electronic components, and will accelerate component aging, thereby reducing the trouble-free life of your **Star Pilot**.
- 2) Mount the display in a location where it will be convenient to route the power and antenna cables.

NOTE: An optional, in-dash mounting bracket is available for the **Star Pilot** display unit. Contact your nearby **Authorized Interphase Dealer** or the **Interphase Accessories Sales Department (408) 427-4444**.

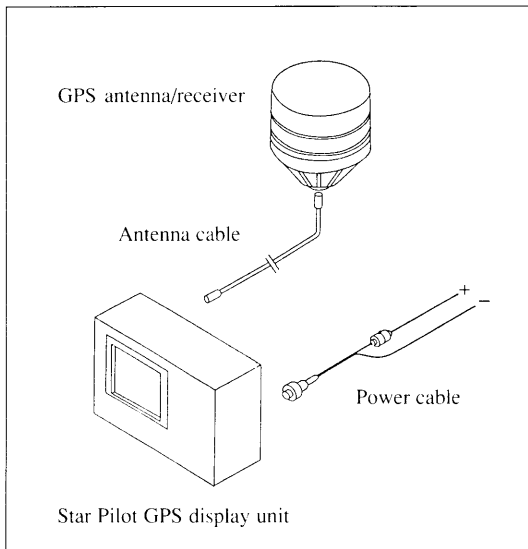
Power Connection

The **Star Pilot** requires a power source with a voltage level from 10 to 16 VDC. Low voltage may cause a dim display, reduced signal, weak beeper and a slow turn on. High voltage may eventually result in failure of some internal part. The nominal voltage found on most properly operating marine power systems is 13.6 VDC. It is recommended that you check the voltage supply which you intend to operate for the proper level.

Connect the two-pin plug on the end of the power supply cable to the power supply jack located at the rear of the unit. Connect the red wire to the positive terminal and the black wire to the negative terminal of your boat's 12 VDC battery, or the corresponding connections of the main distribution panel. Avoid connecting directly to the same circuit with any electronics which tend to draw a large amount of power, such as bilge pumps, refrigerators and transmitting radios.

The power cord included with the **Star Pilot** includes an in-line fuse holder with a 1.6 Amp fuse installed. Be certain when connecting the power cord to the battery that the correct polarity is observed or the fuse may blow and possible circuit damage may occur.

WARNING: Never replace the **Star Pilot's** in-line fuse with a fuse of a higher rating. Always replace with a fuse with a rating between 1 Amp. and 1.6 Amp.



General Information

Congratulations on your selection of the **Interphase Star Pilot** GPS receiver. Its rugged waterproof design makes it ideal for installation on nearly any type of boat.

The **Star Pilot** features many advanced functions, and employs one of today's most sophisticated GPS receivers. The sequential three channel receiver design tracks up to seven GPS satellites and is capable of providing accurate position information every second.

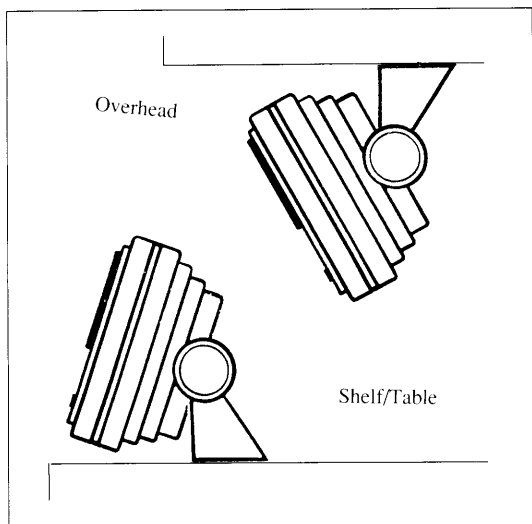
The **Star Pilot** design is compact and of waterproof construction. It has a long-life waterproof keypad which allows you to select every navigational feature you need with the touch of a button. It has a beeper for arrival alarm, anchor watch alarm and it will beep to acknowledge whenever a button is pressed.

The **Star Pilot** works in a fully automatic mode which you need only start up to initialize. There is no need to enter an approximate Latitude and Longitude position. You can select many of the **Star Pilot's** features with the Set-Up display. You can activate an Anchor Alarm, Waypoint Arrival Alarm, set universal or local time.

The **Star Pilot's** graphic navigation mode shows your distance off the desired course and how to steer, right or left, to get back on course, course over ground and speed over ground. The Data window in the navigation mode allows you to choose a view of estimated time of arrival, time to go, velocity made good, distance made good, present position latitude and longitude, current date and time, or local magnetic variation.

The **Star Pilot** makes it easy to store your current or favorite positions in any of 100 waypoints. Each waypoint is date stamped for future reference and a Waypoint Management Display lets you quickly scroll through and view your listing of waypoints. You can also pre-program up to 10 routes of 10 waypoints each for future use.

The **Star Pilot's** very low power consumption (typically less than 600 milliAmps at 12 Volts DC) makes it ideally suited for many of today's smaller boats, or cruising boats, with limited power availability.



Unit Installation

Display Unit

The compact size of the **Star Pilot** allows for easy installation in most any boat. 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 temperature. Heat is one of the worst enemies of electronic components, and will accelerate component aging, thereby reducing the trouble-free life of your **Star Pilot**.
- 2) Mount the display in a location where it will be convenient to route the power and antenna cables.

NOTE: An optional, in-dash mounting bracket is available for the **Star Pilot** display unit. Contact your nearby **Authorized Interphase Dealer** or the **Interphase Accessories Sales Department (408) 427-4444**.

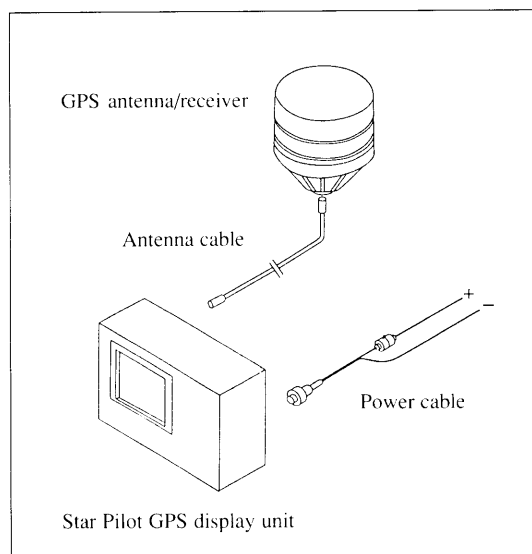
Power Connection

The **Star Pilot** requires a power source with a voltage level from 10 to 16 VDC. Low voltage may cause a dim display, reduced signal, weak beeper and a slow turn on. High voltage may eventually result in failure of some internal part. The nominal voltage found on most properly operating marine power systems is 13.6 VDC. It is recommended that you check the voltage supply which you intend to operate for the proper level.

Connect the two-pin plug on the end of the power supply cable to the power supply jack located at the rear of the unit. Connect the red wire to the positive terminal and the black wire to the negative terminal of your boat's 12 VDC battery, or the corresponding connections of the main distribution panel. Avoid connecting directly to the same circuit with any electronics which tend to draw a large amount of power, such as bilge pumps, refrigerators and transmitting radios.

The power cord included with the **Star Pilot** includes an in-line fuse holder with a 1.6 Amp fuse installed. Be certain when connecting the power cord to the battery that the correct polarity is observed or the fuse may blow and possible circuit damage may occur.

WARNING: Never replace the **Star Pilot's** in-line fuse with a fuse of a higher rating. Always replace with a fuse with a rating between 1 Amp. and 1.6 Amp.



Antenna Installation

Star Pilot GPS Antenna

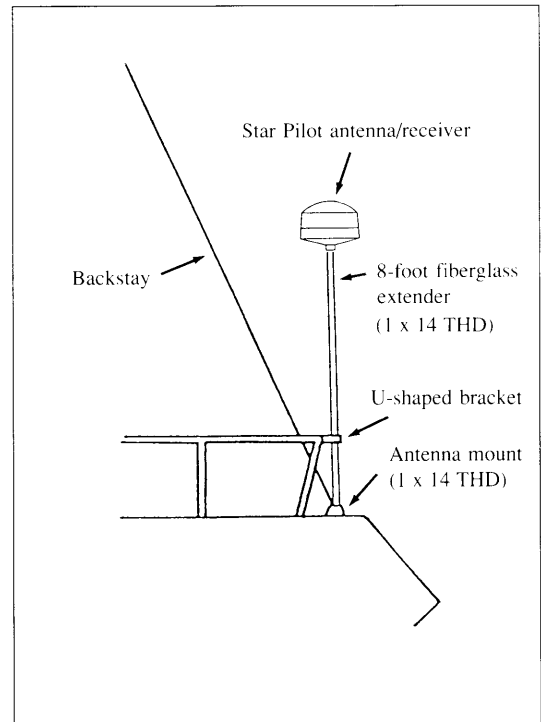
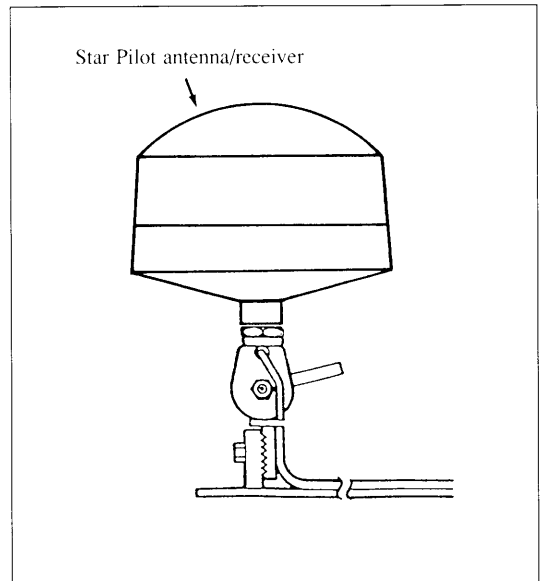
The **Star Pilot** GPS Antenna, with its receiver unit, is housed in a durable, waterproof casing designed for mounting in an open location. For optimum signal reception, mount the antenna with a 360° view of the sky so that it can have line-of-sight tracking of the satellites. Prevent objects such as poles, rails, other antennas and large cables from obstructing the view between the GPS antenna and the satellites.

Care must also be taken in choosing a mounting location where radar beams or communications transmitter beams **WILL NOT** be directed towards the GPS antenna.

Mount the antenna on a level surface, such as a cabin top, or on a standard marine antenna extension pole. Use of a standard marine antenna mount with 1-inch threads is required to complete the installation.

The **Star Pilot** GPS antenna includes 30 feet of antenna cable. If extension cable is needed, call **Interphase Customer Service** at **(408) 427-4444** for advice.

WARNING: Never attempt to take off the connector on the end of the cable or to shorten or splice the cable. This could cause damage to the unit and void any warranty.



Basic Operation

The Star Pilot Keyboard

The **Star Pilot** has been designed to be as easy to learn and operate as possible. The raised push-button keys provide a tactile feel to each operation and the **Star Pilot** responds with an audible beep each time a key is pressed. All keys necessary for operation of the unit are on the front panel. In addition to the alpha-numeric keys on the right side, the **Star Pilot** uses a unique approach called "softkeys" along the bottom of the display. These five keys are labeled by the LCD display and are controlled by the unit's software, thus the name "softkeys".

The "softkey" approach allows for very easy operation, it almost guides you along, even though the **Star Pilot** possesses an amazing number of advanced features. It would take a considerable number of additional buttons and greatly add to the operational complexity if each function had a dedicated button instead of using the "softkey" approach.

Alpha-Numeric Keys

The **Star Pilot** is equipped with an alpha-numeric keypad. The alpha-numeric keypad consists of 12 pushbuttons. Each button is labeled with a number, letters or symbol. All alphabet and number entries are made using the Alpha-Numeric Keypad as shown below. The display screen shows you where the letter is to be entered by the highlighted cursor position.

Example—Press Key #1:

1 time = 1 2 times = A 3 times = B 4 times = C

and etc. for other keys and alpha-numeric characters. A space is entered by pressing Key #0 two times.

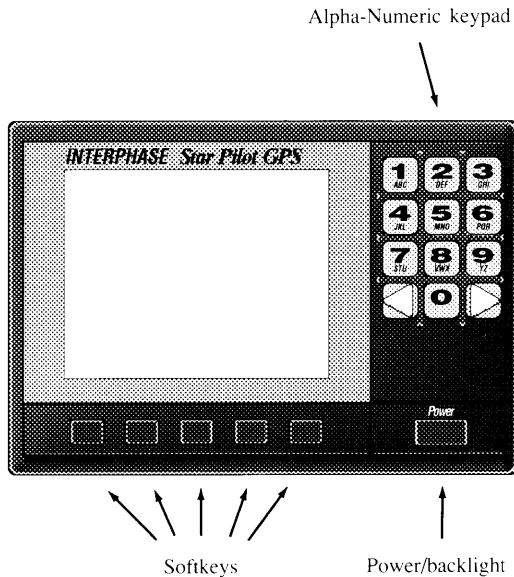
Press the Right Arrow on the Alpha-Numeric Keypad to move to the next letter entry. You may edit or correct an entry by using either the Left or Right Arrow Key to the letter position and changing the entry.

Common Softkey Functions

On some of the display screens seen during operation of the **Star Pilot**, you will note a recurrence of the following softkey labels. Their functions are identical in whichever MODE is being used.

MENU	ESC	^	v	ENTR
------	-----	---	---	------

When the MENU softkey is pressed, the **Star Pilot** will return to the Menu Screen. If you have been in a display in which you were entering information, and then press the MENU softkey, the **Star Pilot** will return to the Menu Screen with no changes being entered. Use of the MENU softkey is always required in order to move the **Star Pilot** from one Mode to another.

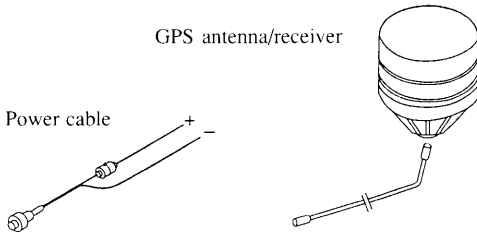
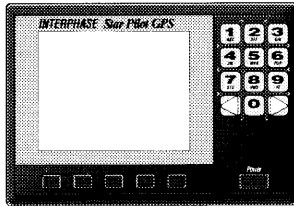


The ESC, or ESCAPE softkey, is seen on some of the displays which ask you to enter information, such as waypoint names or coordinates. Pressing the ESC softkey will return the **Star Pilot** to the previous screen with no changes being entered. This is useful, for instance, if you started entering a waypoint name and then decided not to use that waypoint. Using the ESC softkey, the **Star Pilot** will return to the previous screen and disregard the information you had started to enter for the selected waypoint.

Power/Backlight Control

The Power On/Off button is located on the lower right side of the **Star Pilot**. To turn the unit On press the Power Key once. To turn the unit Off press and hold the Power Key down until it beeps.

The Display Backlight goes on automatically when you turn the **Star Pilot** on. A momentary push on the Power Key alternates the Backlight On & Off.



Getting Started

Check to see that all the components shown at left were included with your **Star Pilot**. If a part is missing, contact the **Interphase Customer Service Department (408) 427-4444** immediately.

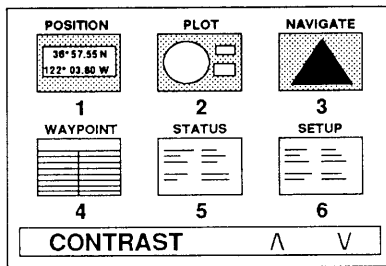
WARNING: DO NOT operate the **Star Pilot** with parts missing or with parts other than those obtained through **Interphase**; doing so could cause major navigational errors. Any malfunctions to the **Star Pilot** resulting from unauthorized parts are not covered by warranty.

Turning The Star Pilot On

To turn the **Star Pilot** on, press the Power Key located on the lower right corner of the unit one time. Use the Up or Down Arrow softkeys to adjust the display screen contrast.

The Menu Screen

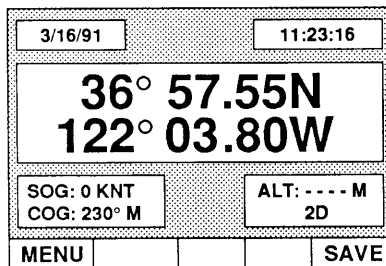
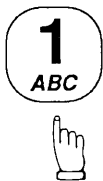
Upon turn on, the **Star Pilot** will first show the Menu Screen. There are six modes for operation of the **Star Pilot**. The first three modes (keypad choices 1, 2, 3) are navigation screens. The Position Mode features an easy to view, large digit display of your present latitude and longitude. The Plot and Navigate Modes provide navigational information in graphic formats, displaying a plot of your boat's course or a steering track to your destination. The next three modes (keypad choices 4, 5, 6) are for support of the navigation screens. The Waypoint Mode manages the Waypoint and Route libraries. The Status Mode gives you information on the conditions of the **Star Pilot** itself, as well as the GPS satellites and system. The Set Up Mode can be used to set local time and the arrival and anchor alarms.



Use the keypad on the right side of the unit to choose an operational mode. The **Star Pilot** is now started and is locking on to the GPS satellite signals. If this is the first time turn-on for the unit, it may take several minutes to get a position fix.

Press Key #1 to Choose the Position Mode

You will notice the current date and time on the top of the display. The time is displayed in UTC (Universal Time Coordinated). See the Set Up Mode section, Page 19 for details on setting the time to Local Time.



At first the latitude and longitude digits may be all "0"s. Note the lower right corner of the display. Below the ALT: you will read OLD, 2D or 3D. OLD means that the **Star Pilot** does not have a new position fix. If 2D or 3D is shown, the position is current. Be advised that it may take several minutes for the **Star Pilot** to obtain a new position fix. There may be times when the necessary three satellite positions are not readily available. When the unit completes its satellite search, the "0"s will change to your present position coordinates and the display OLD will change to 2D or 3D. You now have the **Star Pilot** up and running. Your position is being constantly updated every few seconds.

NOTE: Do not be alarmed if the last digits of the Latitude or Longitude sometimes fluctuate. This is normal when the **Star Pilot** is receiving position information.

What Is A Waypoint?

A Waypoint is usually a starting point, destination, buoy or channel marker, or any place you wish the **Star Pilot** to remember. It is can be a favorite fishing spot, harbor entrance, location of a reef, rocks or other important bottom structure.

The **Star Pilot** stores up to 100 Waypoint positions. Waypoints can be stored using either of two methods. You can INSTANTLY store your boat's present position with the SAVE key, which you will find when using any of the three Navigational Modes. You can store Waypoints at anytime by entering the Latitude & Longitude coordinates and naming the Waypoints while using the **Star Pilot** in the Waypoint Mode.

To Enter a Waypoint

After turning the **Star Pilot** ON and viewing the MENU Screen, press Key #4 to bring up the Waypoint Screen.

The Waypoint Log will be shown on the left side of the display. The cursor position will be noted by reverse video. To enter a new Waypoint, or to edit a previous Waypoint, use the Arrow Up or Down softkeys till the cursor is located at the position in the Waypoint Log that you wish to use. Then press the softkey under ENTR for ENTER.

After pressing the ENTR, or ENTER softkey, a Window will open on the right side of the display prompting you to give the Waypoint a NAME. Use the Keypad Left or Right Arrows to move the cursor to the appropriate letter space. There are 10 spaces for letters or digits. Using the method described in the Basic Operation of the Keypad, enter the Waypoint Name.

After you have finished giving your Waypoint a NAME, and have entered it, a new Window will open on the right side of the display. You will be prompted to enter in latitude and longitude coordinates. Use the Alpha-Numeric Keypad to move the cursor and enter the latitude coordinates. Press the ENTR softkey. Enter the longitude coordinates. Press the ENTR softkey. The Waypoint entry is complete and the display returns to the Waypoint Screen.

NOTE: Remember to enter N for NORTH Latitudes, W for WEST Longitudes, etc.



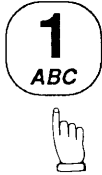
WAYPOINTS				
SANTA CRUZ		TO VIEW OR EDIT DETAILS OF A WAYPT, USE ARROW KEYS THEN PRESS ENTR,		
PT SUR	PT PIED BLAN			
PT CONCEPT				
MENU	RTE	^	v	ENTR



WAYPOINTS		EDIT NAME		
SANTA CRUZ		SAN FRAN		
SAN FRAN		EDIT NAME WITH KEYPAD THEN PRESS ENTR, OR PRESS DEL TO DELETE		
MENU	ESC	DEL		ENTR



WAYPOINTS		EDIT LAT/LON		
SANTA CRUZ		LATITUDE		
SAN FRAN		E6°57.51 N		
		LONGITUDE		
		123°03.80 W		
		USE KEYPAD THEN PRESS ENTR		
MENU	ESC			ENTR



3/16/91		11:23:16	
36° 57.55N 122° 03.80W			
SOG: 0 KNT COG: 230° M		ALT: --- M 2D	
MENU			SAVE



(1) Position Mode

Choosing Key #1 from the Menu Screen will call up the Position Screen. The upper part of the display will give you the current date and time (UTC), based on accurate data from satellite signals.

The **Star Pilot** uses GPS satellite signals to calculate a current position in Latitude and Longitude. This position is displayed in large, easy to read digits in the center part of the display.

The lower left part of the display, above the softkey labels, provides Speed Over Ground and Course Over Ground reading. These terms are abbreviated as SOG and COG. Please refer to the Advanced Navigation Guide, Page 21 for more details.

The lower right part of the display, above the softkey labels, shows you the altitude and the satellite receiving status. 3D or 2D display means your present position is current. OLD display means no position fixes are being updated. See Page 21 of the Advanced Navigation Guide for more details.

Note that the altitude will only be displayed if the Star Pilot has fixes on four satellites and is operating in 3D mode. The altitude accuracy will fluctuate plus or minus 50 meters, which is the normal tolerance for GPS altitude specifications.

3/16/91		SAVE IN WAYPOINTS	
36° 57.55N 122° 03.80W		SANTA CRUZ	
		SAN FRANCISCO	
SOG: 0 KNT COG: 230°			
MENU	ESC	∧	ENTR



Saving Present Position In A Waypoint

If you wish to save the current position viewed on the Position Screen in a waypoint, press the softkey under the label SAVE on the display.

Upon pressing the SAVE key, the Save Present Position Window opens to reveal your Waypoint Log. The Waypoint Log scrolls to the first empty location and date stamps the position. The display cursor will identify this location.

If you have decided to save this position, press the softkey under the label ENTR on the display. The cursor for this waypoint location will be shown solid for 1 second and then return to the previous Position Screen.

After pressing ENTR, the waypoint location will be date stamped. If a second entry is saved that day, the date stamp will be followed by a (WP2), etc. See Page 16 of the Waypoint Mode section to edit and name the waypoint locations.

NOTE: If at any time you wish to get out of the Save Present Position Window, press the softkey under ESC on the display. This will recall the Position Screen and no changes will be made on the Waypoint Log.

Pressing the softkey labeled MENU, below the lower left side of the display, brings the **Star Pilot** back to the Menu Screen.

3/16/91		11:23:16	
36° 57.55N 122° 03.80W			
SOG: 0 KNT COG: 230° M		ALT: --- M 2D	
MENU			SAVE

(2) Plot Mode

To enter the Plot Mode, choose Key #2 from the Menu Screen. The **Star Pilot** display will start by using the last Plot Mode data and destination.

The Plot Screen provides a graphic map of your boat's present position and progress towards the destination waypoint. The "N" at the top of the map indicates true north. At the top of the display above the map is your present longitude position. The right side of the display shows the destination waypoint, and just below it in the middle of the right side of the display, your present latitude position. The lower right side of the display shows you the range, or distance to your destination in nautical miles and the magnetic compass bearing to steer. Directly below the map shows the scale at which the map is set.

To set the Plot map to the desired scale, push the softkey under SCLE on the display. The SET SCALE window will open revealing the mile scales. Move the cursor using the Up or Down Arrow softkeys. When the cursor is set at the desired scale, press the ENTR softkey. The **Star Pilot** will return centered on the Plot Screen with the map set to the selected scale.

To Reset the **Star Pilot** Track Plot, that is, to erase all plot tracks and start a new track plotting, move the cursor to CLEAR ALL at the top of the miles scales and press the ENTR softkey.

To set the **Star Pilot** Plot Track to a new destination Waypoint, press the softkey under WPT.

The Navigate to WPT Window will open to view the Waypoint Log. Using the softkey Up or Down Arrows move the cursor to the Waypoint you desire as the destination.

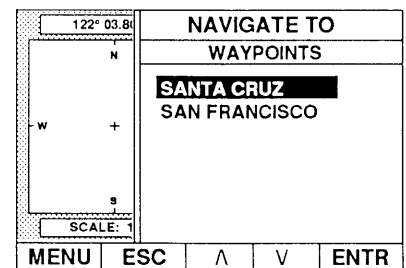
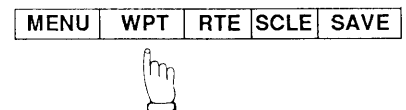
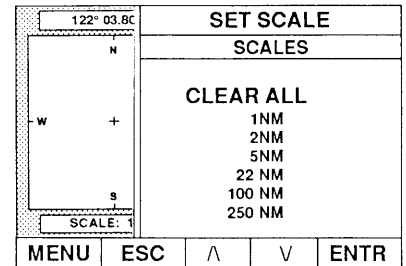
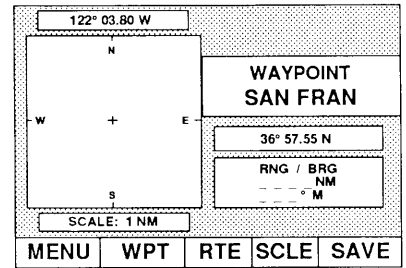
Press the softkey under ENTR to ENTER the Waypoint destination you wish to navigate to. The **Star Pilot** will then return to the Plot Screen.

Pressing the softkey under RTE operates in the same manner as Track Plotting to a Waypoint. After selecting the ROUTE, the **Star Pilot** will begin plotting to the first Waypoint of the Route. See Page 16 of the Waypoint Mode section for details on setting up Routes.

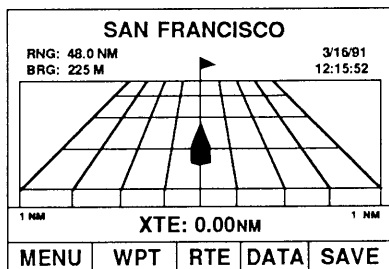
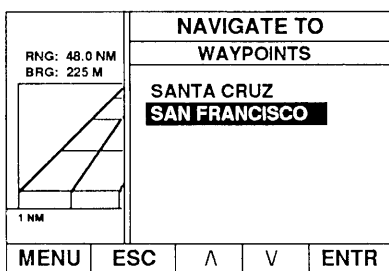
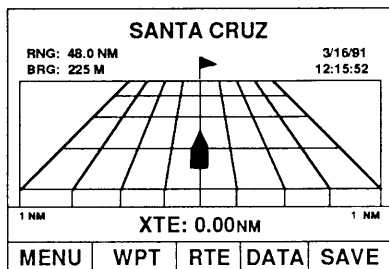
At any time while you are Track Plotting, you may SAVE your present position in the Waypoint Log by pressing the softkey under SAVE.

Features of Track Plot

If your track moves off the display area, the **Star Pilot** will automatically reset your present position to the center. The scale will remain the same.



3
GHI



(3) *Navigate Mode*

Press Key #3 from the Menu Display to start the **Star Pilot** in the Navigation Mode. The Navigation Screen graphically shows you the Range or Distance, and Compass Bearing to the destination Waypoint in the upper left of the display. The Destination Name is in the top center, and your Cross Track Error (XTE) is shown in the center bottom of the display above the softkey labels.

The 3D perspective navigate screen features a destination flag at the top of the navigation "highway". On each side of the center course line, at the bottom of the display, is an automatically adjusted Cross Track scale. The direction of the boat icon in the center of the display relates to the present course being steered. If your boat is stopped, or moving very slowly, the boat icon will change directions in a random way. Once you pick up speed and are underway, the boat icon will start representing your current heading.

The **Star Pilot** Navigation Screen will begin providing data to the last Destination Waypoint used. To start navigating to a new destination, press the softkey under WPT.

The Choose WPT Window will open to reveal your Waypoint Log. Using the Up or Down Arrow softkeys, move the cursor to the Waypoint location you wish to navigate to.

Press the softkey under ENTR. The **Star Pilot** will enter your new destination Waypoint and return to the Navigation Screen.

You may start navigating a Route by pressing the softkey under RTE. As when navigating to a Waypoint, you select a Route and the **Star Pilot** will begin navigating to the first Waypoint of the Route.

In the upper right corner of the display is a box containing navigational data. By alternately pressing the softkey under DATA, you may choose from the following pairs of Data displays:

SOG - Speed Over Ground
COG - Course Over Ground


LAT - Latitude
LON - Longitude

DATE - Current Date
TIME - Current Time

ETA - Estimated Time of Arrival
TTG - Time To Go

VMG - Velocity Made Good
DMG - Distance Made Good

COMPASS VAR - Local Magnetic Variation




For more details on these navigational terms, please refer to the Advanced Navigation Guide section, Page 21.

As with the other navigational modes, you may store your present position in a Waypoint at any time by pressing the softkey under SAVE.

If the **Star Pilot** should momentarily lose contact with the satellites, or if you choose the Navigate Mode before the unit has located the minimal number of three satellites needed, navigation data will be blanks and at the bottom of the display replacing XTE will be the message POSITION UNKNOWN. When the unit finds the satellites, it will resume navigating to your Destination Waypoint.

NOTE: You must have the Arrival Alarm on to receive audio or visual alert of arrival to your destination.

4
JKL



WAYPOINTS				
SANTA CRUZ SAN FRAN		TO VIEW OR EDIT DETAILS OF A WAYPT, USE ARROW KEYS THEN PRESS ENTR,		
MENU	RTE	Λ	V	ENTR



(4) Waypoint Mode

The **Star Pilot** is capable of storing up to 100 Waypoints, which can be used to create up to 10 Routes of 10 Waypoints each. Waypoints must be stored into the Waypoint Log before they can be used to create Routes. To view or edit your Waypoint Log, press Key #4 from the MENU Screen.

The Waypoint Log will be seen on the left side of the display. The cursor can be scrolled to different Waypoint positions by using the Up or Down Arrow softkeys below the display. To view, enter or edit a Waypoint press the softkey under ENTR after the cursor is located at the Waypoint position desired.

WAYPOINTS		EDIT NAME		
SANTA CRUZ SAN FRAN		SAN FRAN EDIT NAME WITH KEYPAD THEN PRESS ENTR, OR PRESS DEL TO DELETE		
MENU	ESC	DEL		ENTR



After pressing the ENTR, or ENTER key, a Window will open requesting you to enter or edit the Waypoint Name. Use the Keypad Left or Right Arrows to move the cursor to the appropriate letter space. There are 10 spaces for letters or digits. Use the Alpha-Numeric Keypad to enter or edit the letter spaces. The cursor will show which letter space you are using.

When you have completed the NAME entry, press the ENTER softkey.

When you have completed the NAME entry, a new Window will open on the right of the display. You may enter or edit the latitude and longitude coordinates for the Waypoint by using the Alpha-Numeric Keypad to move the cursor to the desired digit space.

WAYPOINTS		EDIT LAT/LON		
SANTA CRUZ SAN FRAN		LATITUDE 6°57.51 N LONGITUDE 123°03.80 W USE KEYPAD THEN PRESS ENTR		
MENU	ESC			ENTR



NOTE: Remember to enter N for NORTH Latitudes, W for WEST Longitudes, etc.

When you have completed the latitude and longitude entry, press the ENTR softkey. The **Star Pilot** will return to the Waypoint Screen. Your Waypoint will be shown added to the Waypoint Log on the left side of the display.

Creating Routes

Once you have Waypoints stored in the Waypoint Log, you can create ROUTES. The **Star Pilot** can store up to 10 Routes. Each Route can sequence up to 10 Waypoints.

To create or edit a Route, press the softkey under RTE on the Waypoint Screen. If you have any Routes previously stored, they will be shown on the left side of the display.

Use the Up or Down Arrow softkeys to move the cursor to the Route you wish to edit. Press the softkey ENTR to ENTER the Route of choice.

WAYPOINTS				
SANTA CRUZ PT SUR PT PIED BLAN PT CONCEPT		TO VIEW OR EDIT DETAILS OF A WAYPT, USE ARROW KEYS THEN PRESS ENTR,		
MENU	RTE	Λ	V	ENTR



After you press the softkey ENTR, the Edit Name Route Window will open. The Route selected will be noted on the left side of the display. If you wish, you can press the softkey DEL to delete the entire ROUTE. Using the Alpha-Numeric Keypad, you may NAME or edit the Route Name.

When this is completed, press the softkey ENTR and the **Star Pilot** will display the ROUTE on the top of the left side and the Waypoints currently stored in the ROUTE below. If you wish to add a new Waypoint to a Route, or change a Waypoint's Route position, use the Up or Down Arrow softkeys to move the cursor to the desired position and press the softkey under ENTR.

The **Star Pilot** display will show you the ROUTE and the Waypoint positions on the left side of the display. Your Waypoint Log will be listed on the right side of the display under the label NEW WPT. Using the Up or Down Arrow softkeys, move the cursor to the Waypoint you wish to place in the sequential order position indicated under the ROUTE Waypoints on the left. Press the ENTR softkey, and the Waypoint selected will be entered in the ROUTE. To Delete a Waypoint from the Route, move the cursor to the *DEL WPT* at the top of the Waypoint Log. Press the ENTR softkey, and the Waypoint selected will be removed from the Route.

The **Star Pilot** will next display the ROUTE and its Waypoints on the left side of the display. The right side of the display will ask if you are finished editing the Route details. If you press the softkey NO, the **Star Pilot** will return to Route Screen #3. If you press the softkey YES, the **Star Pilot** will return to Route Screen #1. If you are done with all Route editing, you may press the MENU softkey and return to the Menu Screen.

If at any time during use of the Waypoint Screens, or Route Screens, pressing the softkey ESC when shown will return the unit to the previous screen, with no changes being entered. Press the MENU softkey when shown to exit the WAYPOINT MODE and return to the Menu Screen.

ROUTES				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
MENU		WPTS	Λ	V
ENTR				

Route Screen #1



ROUTE		EDIT NAME		
SC TO SF		SC TO SF		
SANTA CRUZ		EDIT NAME		
ANO NUEVO		WITH KEYPAD		
PIGEON PT		THEN PRESS		
PILLAR PT		ENTR, OR		
ST FRANCIS		PRESS DEL		
		TO DELETE		
MENU		ESC	DEL	ENTR

Route Screen #2



EDIT ROUTE				
SC TO SF		TO CHANGE		
SANTA CRUZ		A WAYPOINT		
ANO NUEVO				
PIGEON PT		USE ARROW		
PILLAR PT		KEYS THEN		
ST FRANCIS		PRESS ENTR		
MENU		ESC	Λ	V
ENTR				

Route Screen #3



EDIT ROUTE				
SC TO SF		ARE YOU		
SANTA CRUZ		FINISHED		
ANO NUEVO		EDITING THE		
PIGEON PT		DETAILS OF		
PILLAR PT		THIS ROUTE?		
ST FRANCIS				
MENU		ESC	YES	NO

Route Screen #4



STATUS	
CONTROL S/W	VER 0.12
RCVR S/W	VER 1.9
GPS MODE	3-D AUTO
GPS HEALTH	2 SATS
LAST FIX AT	13:44.07
PDOP	0.0
HDOP	3.0
VDOP	1.0
ERROR CODE	00
MENU	

(5) Status Mode

The STATUS MODE is selected by pressing Key #5 off the Menu Screen. This will bring up the Status Screen which provides the following data:

The top part of the **Star Pilot** Status Screen shows you the Software Version of the Control Unit, the Antenna/Receiver Unit and the GPS Mode currently being used, followed by the GPS Health message.

The GPS Health message gives information regarding the Antenna/Receiver's current status in its effort to get signals from the satellites.

The center part of the display provides the time of the last position fix.

Next are the values for PDOP, HDOP and VDOP. These are mathematical values from computing the geometry of the satellites being used to calculate your current position.

PDOP stands for Position Dilution Of Precision. The lower the rating the better your position fix. Above 12 is not usable. A PDOP of 1-3 is excellent, 4-6 good, 7-9 acceptable, 10-12 marginal, and 12+ unacceptable.

HDOP stands for Horizontal Dilution Of Precision. It indicates the accuracy of latitude and longitude coordinates.

VDOP stands for Vertical Dilution Of Precision. It indicates the accuracy of altitude data (important for 3D fix only).

The bottom of the **Star Pilot** Status Screen shows ERROR CODE. If the unit is operating normally, this will be 00. See Page 21 of the Advanced Navigation Guide for more details on error messages.

(6) Set Up Mode

Upon pressing Key #6, the **Star Pilot's** GPS Set Up Screen displays information on the units of measure, compass bearing and the AUTO GPS mode. The Altitude measurements, when 3D fixes are available, displays in meters. Units of Distance are in nautical miles. Bearings given on Navigation Screens are magnetic, and are automatically calculated from your present position. The **Star Pilot** operates in a fully automatic GPS Mode. Whenever possible, four satellite fixes are used for the most accurate 3D positioning. When only three satellites are available, the **Star Pilot** will provide 2D latitude and longitude positioning.

The **Star Pilot** allows you to choose the Time Offset from Universal Time Coordinated (UTC), to provide you with an accurate display of local time (24 hour clock). To offset the time, use the Up or Down Arrow softkeys to position the cursor at Time Offset. Press the ENTR softkey. The Time Offset window will open, and you need only use the Up or Down Arrow softkeys to increase or decrease the offset by hour units. Press the ENTR softkey to complete the time offset entry.

The Arrival Alarm must be engaged for the **Star Pilot** to provide audio or visual notice of arrival at a navigational destination. To set the Arrival Alarm on or off, use the Up or Down Arrow softkeys to position the display cursor on ARRIVAL ALARM. Press the ENTR softkey. Use the Arrow softkeys to position the cursor on ENABLED (to turn on) or DISABLED (to turn off). Press the ENTR softkey. When the Arrival Alarm is engaged, the **Star Pilot** will provide audio and visual notice when your boat is within .05 nautical miles of your destination.

The Anchor Alarm can be set to sound if your boat drifts more than .10 nautical miles from the location you set anchor. To set the Anchor Alarm on or off, use the Up or Down Arrow softkeys to position the display cursor on ANCHOR ALARM. Press the ENTR softkey. Use the Arrow softkeys to position the cursor on ENABLED (to turn on) or DISABLED (to turn off). Press the ENTR softkey.

NOTE: To silence either audible ALARM, press any key once.



GPS SET UP				
ALT UNITS	METERS			
DIST UNITS	NM			
BEARINGS	MAG			
GPS MODE	AUTO			
TIME OFFSET	-8 HRS			
ARRIVAL ALARM	OFF			
ANCHOR ALARM	OFF			
MENU	ESC	^	v	ENTR



TIME OFFSET				
	HRS FROM GMT			
	-8 HRS			
	PRESS ARROW			
	KEYS TO			
	INCREASE OR			
	DECREASE THE			
	OFFSET, THEN			
	PRESS ENTR			
MENU	ESC	^	v	ENTR

GPS SET UP				
ALT UNITS	METERS			
DIST UNITS	NM			
BEARINGS	MAG			
GPS MODE	AUTO			
TIME OFFSET	-8 HRS			
ARRIVAL ALARM	OFF			
ANCHOR ALARM	OFF			
MENU	ESC	^	v	ENTR



ARRIVAL ALARM				
	SET OPTION			
	ENABLED			
	DISABLED			
MENU	ESC	^	v	ENTR

The Basics of GPS

GPS, or Global Positioning System, is a satellite navigation system designed to provide worldwide positioning and time information with all weather capability, quick response time and accuracy to within several yards. GPS is maintained by the United States Department of Defense 24 hours a day.

GPS is a system of 24 satellites orbiting at an altitude very high above the earth. Because of the great altitude, the satellites' signals are not interfered with by the terrain or geography, and the high frequency of the signals (1500 MHz) results in practically no interference from shipboard engines or other electronic systems.

GPS uses the principle of ranging to give you your position. This is done by measuring the distance from your position to the position of at least three satellites. The distance to a satellite is calculated by measuring how long it takes radio signals to arrive from the known position of each of the respective satellites in their orbits.

The satellites and the **Star Pilot** must be precisely timed to generate the exact same radio signal at the exact same time in order to measure the time and distance calculations with a high degree of accuracy. This is accomplished by the use of atomic clocks on all the satellites, and by comparing what part of the radio signal code is received at the exact same time from all the satellites.

To complete its calculations for your position, the **Star Pilot** looks up in its data base the known position of each of the satellites at that exact time. Because the GPS satellites are in such a high orbit, their positions at any given time are quite predictable. Now, all the **Star Pilot** needs to do is calculate all this for three or four satellites every few seconds, and you have continuous position updating!

GPS satellites are constantly monitored by Department of Defense ground stations. Satellite clocks and exact positioning information is computed and any variations are noted or corrected as necessary, and transmitted to the appropriate satellites. Other possible sources of errors, such as atmospheric drag and geometric position measurement discrepancies, are eliminated by the sophisticated, mathematical programming within the **Star Pilot** GPS system.

Advanced Navigation Guide

The **Star Pilot** is designed to be the easiest to use GPS system available today. The previous sections of the operation manual have detailed the basics of installation and operation of the **Star Pilot**. To utilize the system to its optimum, the following section on navigation should be studied. By becoming more familiar with these navigational and GPS terms and concepts, you will increase your own navigational skills.

GPS Modes

The **Star Pilot** operates in an automatic GPS Mode. When three satellites are available, 2D fixes for latitude and longitude are given. If four satellites are available, 3D fixes for latitude, longitude and altitude are given.

LATITUDE/LONGITUDE (LAT/LON) Latitude is the distance measured in degrees North and South of the equator. Longitude is the distance measured in degrees West and East of the prime meridian at Greenwich, England.

SPEED OVER GROUND (SOG) This is the true speed calculated from the time and distance over the ground you have travelled. SOG does not consider water speed or destination for its calculations.

COURSE OVER GROUND (COG) This is the true course over the ground that you are currently headed.

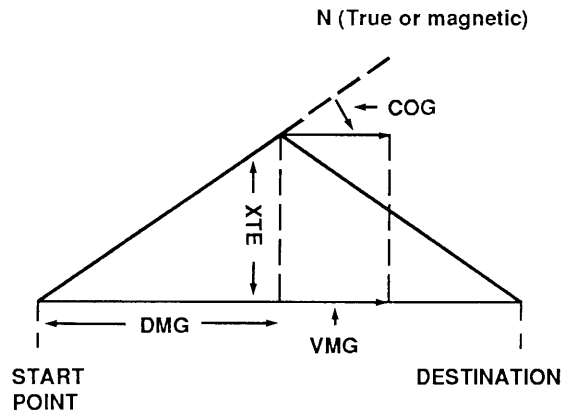
CROSS TRACK ERROR (XTE) This is the distance of your boat, either left or right, from the desired track (start point to destination).

ESTIMATED TIME of ARRIVAL (ETA) This is an estimate based on the current time and your **TIME TO GO (TTG)**.

TIME TO GO (TTG) This is calculated from the current distance to your destination and your **VELOCITY MADE GOOD (VMG)**.

VELOCITY MADE GOOD (VMG) This is the portion of your boat's speed that is parallel to your desired track (start point to destination). VMG is especially useful for sailing boats where closing speed on the desired waypoint is displayed regardless of course or bearing changes (tacking) made enroute.

DISTANCE MADE GOOD (DMG) This is the portion of the distance your boat has travelled that is parallel to your desired track (start point to destination).



Star Pilot Error Messages & Troubleshooting Tips

The lower right side of the Position Screen displays either 2D, 3D or OLD. 2D or 3D means your position fixes are current. If you see OLD, the **Star Pilot** is informing you that it is not receiving new position fixes. Press the MENU softkey, and then push Key #5 to bring up the STATUS Screen.

GPS Health Messages

No Response - This means the **Star Pilot** does not have contact with the Antenna/Receiver. This message will normally appear for a short time upon first turning the unit on. If this message does not change, inspect the cable connections at the Antenna module and at the back of the **Star Pilot** display unit to ensure they are clean, dry and there are no bent pins.

No GPS TM (Time) - This means the **Star Pilot** is receiving signals but has not locked on to a satellite. It is still searching and computing. If this message does not change after a minute or two, make sure there are no obstructions to the antenna's view of the sky.

1 SAT - The **Star Pilot** has located one satellite.

2 SAT - The **Star Pilot** has located two satellites.

GOOD - The **Star Pilot** has found a third satellite and can now calculate a current Lat/Lon position. If the **Star Pilot** locates a fourth satellite it will be operable in 3D Mode and can calculate altitude as well.

PDOP - 12 or higher means that even with the minimal three satellites in view, the quality of the signals from them is not enough to provide accurate fixes.

Error Codes

FF - This means the **Star Pilot** has lost contact with the Antenna/Receiver. If cable connections are solid and clean between the Antenna and **Star Pilot**, try turning the unit off and back on to reset it. If the "FF" does not change within a few moments, there is a problem in either the Antenna/Receiver Module, the cable or connectors, or the Display/Control Unit, and the complete **Star Pilot** system should be returned to the **Interphase Factory Service Center**.

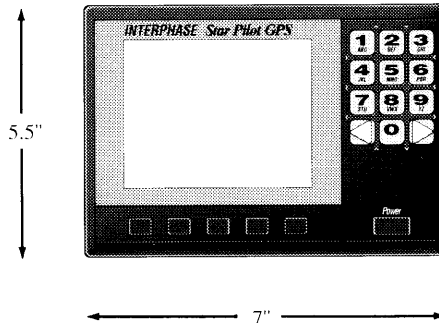
00 - This means the **Star Pilot's** systems are error free.

Any other Error Code means there is a problem with the Antenna/Receiver. Try turning the **Star Pilot** off, then on again. If the Error Codes persist contact the **Interphase Technical Support Group (408) 427-4444** for advice.

Specifications

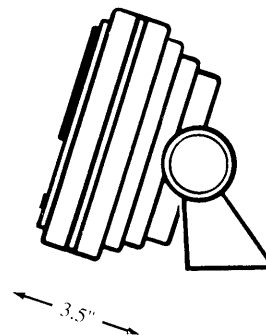
Main Features:

- Latitude, longitude, altitude
- Time of day and date (real time clock)
- 100 waypoint memory
- 10 route programming capability
- Graphic track plotter
- Graphic navigation showing cross track error
- Course and distance to waypoints
- Estimated time of arrival
- Waypoint arrival and anchor alarms
- High resolution electroluminescent backlit SuperTwist LCD
- Local and universal time
- Satellite status



Physical:

- Antenna/receiver size: 6" diameter, 5.25" high, 30' cable
- Antenna/receiver weight: 1.4 lbs.
- Display unit weight: 2.25 lbs.
- LCD display dimensions: 3.25" x 4.25"
- LCD display resolution: 128 x 160 pixels; 20,480 pixels total; 1,575 pixels per square inch
- Power: 12 VDC nominal (10-16 VDC), less than 600 mA
- Operating temperature range: Unit— 0 to 60°C, antenna/receiver -20° to +70°C



General:

- Three-channel, digital GPS receiver, tracks up to seven satellites
- Update rate: 1 second capability
- Accuracy (typical): Position, 15 meters RMS
- Velocity: 0.1 Kt RMS steady rate
- Dynamics: 0-650 mph

Specifications subject to change without notice.

Software Updates—

Interphase periodically updates software in navigational instruments and offers these updates to its customers. For more information on **Interphase** software update programs call the **Interphase Technical Service Group** at **(408) 427-4444**.

How To Obtain Service

If you feel your display unit or antenna/receiver is not operating properly and you need service, we strongly recommend you first call our **Technical Support Group (408) 427-4444** to make sure your equipment needs to be returned to the factory.

If you do need to return your instruments, please remember to include both your display unit and antenna/receiver. It is best to ship it in the original product box to the following address:

**Service Department
Interphase Technologies, Inc.
1201 Shaffer Road
Santa Cruz, CA 95060**

In addition, to speed your repair please fill out the following, copy or tear out of this manual, and tape to your unit for our technicians to review.

RETURN TO: _____

Day phone (_____) _____

Evening phone (_____) _____

Model: **Star Pilot**

Serial # _____

Purchase date _____ / _____ / _____

In warranty? Yes _____ No _____

Please describe the problem in as much detail as possible.

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