INTE

INTERPHASE *Star Pilot GPS*

SANTA CRUZ   08/20/90
RNG 25NM   07:54:08
BRG 121°M

1
1   CROSS TRACK ERROR 0.25Mi

MODE | RANGE | CLEAR | TO WPT | STORE

1 2 3
ABC DEF
4 5 6
JKL MNO PQR
7 8 9
STU VWX YZ
0

Power

Operation Manual

Table of Contents

To Our Customer

Thank you for choosing the **Interphase Star Pilot 6**™ GPS receiver. Throughout the development of this fine product, we have primarily been concerned with creating a unit that offers the best possible value for your money. 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 **Star Pilot 6** 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. For the fastest repair service, it is important that you complete the **WARRANTY REGISTRATION CARD** and return it as soon as possible.

Important Notice

Navigation based solely on one method or one instrument should never be practiced. The **Star Pilot 6** GPS should be considered as an aid to navigation, not as the only means of navigation. While the Global Positioning System is usually reliable and accurate, certain conditions and some locations may cause a deterioration in performance of this or any other GPS. It is therefore important for the new user to learn about the limitations of this system.

Warranty Information

Interphase Technologies, Inc. provides a limited one-year warranty on the **Star Pilot 6**. Please note that there are limitations to our warranty. We strongly urge you to read this warranty reprinted at the back of this manual and closely follow its terms and conditions should your receiver require repair. Please note that all repair work performed during the warranty period must be performed by **Interphase** or an authorized **Interphase Service Center** for the unit to remain under warranty.

We have found that many problems experienced by GPS users are not caused by a defect in the unit, but instead are often the result of the user not completely understanding its proper method of operation. Therefore, we strongly recommend that should you experience a problem with your **Star Pilot 6** you first call **Interphase** and ask to speak to our **Technical Support Department**. We will be more than happy to try and assist you on the phone and, if required, will give you instructions on how to quickly get your set repaired.

Interphase maintains a staff of trained technicians in Santa Cruz, CA who can quickly repair and return your set to its original specifications. We strongly recommend that for the fastest service, if your set does require repair, you send it direct to **Interphase** and not return it to the dealer. For fastest response, please make a copy of or fill out and use the repair request form at the end of this manual. Mark the outside of the box **"FOR SERVICE REPAIR"**.

Interphase Star Pilot 6 GPS Video Operation Guide

Interphase has a video instructional aid for the **Star Pilot 6** GPS available. It includes a basic description of the Global Positioning System and terminology; a helpful glossary; a step-by-step lesson on how to start your unit, enter waypoints, track plotting, routing and use of many other special features of your **Star Pilot 6**. Whether you are a beginner or an experienced GPS user, this video is a very helpful addition to your operation manual.

See your **Authorized Interphase Dealer** for this video or call **Interphase (408) 427-4444**. The **Interphase** part # is 38-0002-017.

General Information

Congratulations on your selection of the **Interphase Star Pilot 6** GPS receiver. Its rugged waterproof design makes it ideal for installation on nearly any type of boat.

The **Star Pilot 6** features many advanced functions, and employs one of today's most sophisticated GPS receivers. The continuous six channel parallel receiver design tracks up to eight GPS satellites and is capable of providing accurate position information every second.
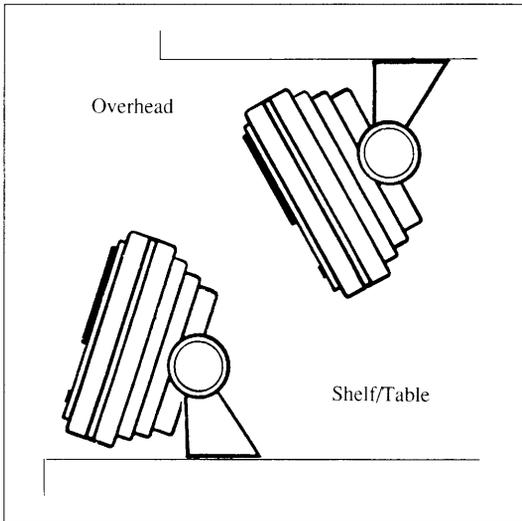
The **Star Pilot 6** design is compact and of waterproof construction. It has a long-life waterproof keypad which allows you to select every navigational feature you need with the touch of a button. It has a beeper for arrival alarm, anchor watch alarm and it will beep to acknowledge whenever a button is pressed.

The **Star Pilot 6** 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 6** features with the Set-Up display. You can activate an Anchor Alarm, Waypoint Arrival Alarm, set universal or local time.

The **Star Pilot 6** 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 6** 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 6'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.

Overhead

Shelf/Table

GPS antenna/receiver

Antenna cable

Power cable

Star Pilot 6 GPS display unit

Unit Installation

Display Unit

The compact size of the **Star Pilot 6** 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 6**.

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 6** display unit. Contact your nearby **Authorized Interphase Dealer** or the **Interphase Accessories Sales Department (408) 427-4444**.

Power Connection

The **Star Pilot 6** 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 6** 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 6** 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. Before replacing the fuse check all connections. If the fuse continues to blow, return the entire system to **Interphase** for service.
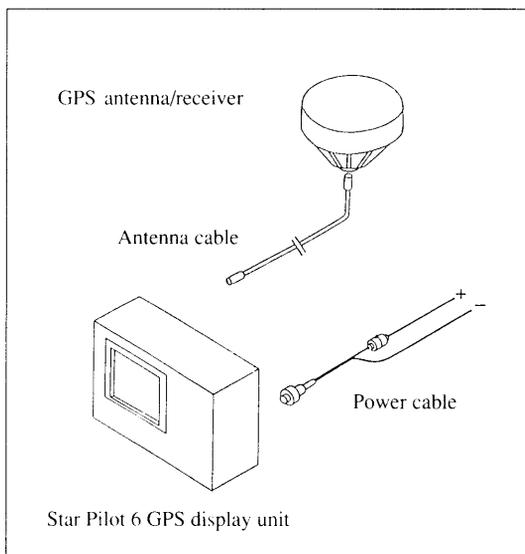
Antenna Installation
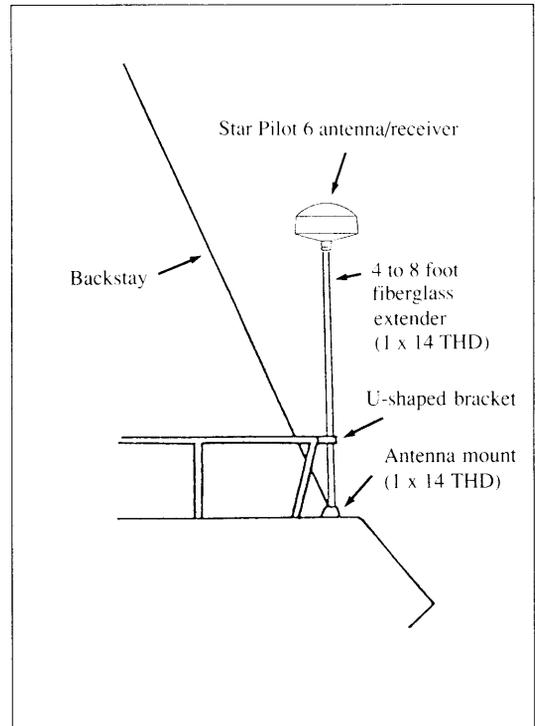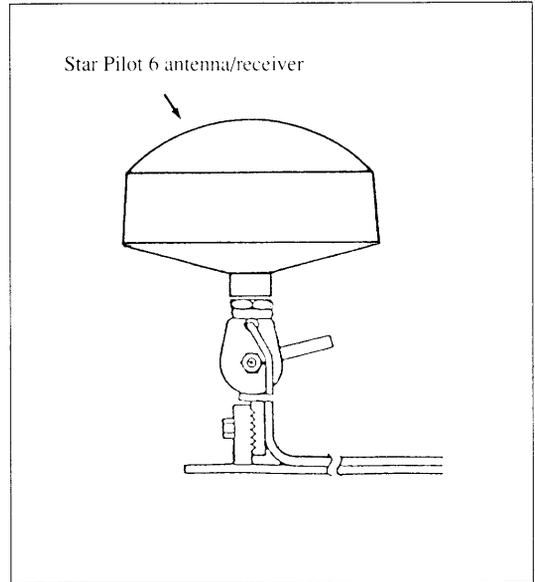
Star Pilot 6 GPS Antenna

The **Star Pilot 6** 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 6** 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.

Star Pilot 6 antenna/receiver

Star Pilot 6 antenna/receiver

Backstay

4 to 8 foot fiberglass extender (1 x 14 THD)

U-shaped bracket

Antenna mount (1 x 14 THD)

Alpha-Numeric keypad

Softkeys   Power/Backlight

| MENU | ESC | ∧ | ∨ | ENTR |

Basic Operation

The Star Pilot 6 Keyboard

The **Star Pilot 6** 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 6** 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 6** 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 6** 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 6** 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 6**, you will note a recurrence of the following sofkey labels. Their functions are identical in whichever MODE is being used.

When the MENU softkey is pressed, the **Star Pilot 6** 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 6** 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 6** 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 6** 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 6** will return to the previous screen and disregard the information you had started to enter for the selected waypoint.
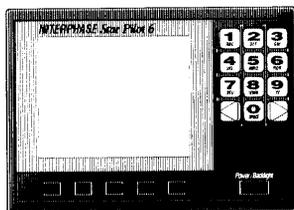
Up/Down arrow softkeys (∧ ∨) allow you to scroll through and select various functions. The ENTR (Enter) softkey is used to activate features and enter data into your receiver.

Power/Backlight Control

The Power/Backlight button is located on the lower right of the **Star Pilot 6**. To turn the unit On press the key once. To turn the unit Off press and hold down the key until the unit beeps, then the following message will be displayed: "Exit Sequence In Progress Do Not Disconnect Power Until Process Is Complete. Countdown: 36". The unit will then countdown from 36 to 0 and then shut off.

WARNING: Do not turn off the **Star Pilot 6** using a circuit breaker or battery switch, or allow engine starting to cause voltage drops to the unit. Waypoints, routes, set up values and satellite almanac information may be lost.

The Display Backlight goes on automatically when you turn the **Star Pilot 6** on. It will automatically turn off after 10 seconds. A momentary push on the Power Key turns the Backlight on, but it will turn off automatically two minutes after the last key press on any softkey. If you want to keep the Backlight on continuously, press the Power Key twice (two beeps). A single press turns the Backlight off. The backlight does have a limited lifetime. For maximum life, use the Backlight sparingly.

Star Pilot 6 display unit

GPS antenna/receiver

Power cable

POSITION | PLOT | NAVIGATE

| 36°57.55N | |
| 122° 03.80 W | |

| 1 | 2 | 3 |
| WAYPOINT | STATUS | SETUP |

| 4 | 5 | 6 |

CONTRAST   ∧ ∨

SAN FRAN

36° 57.55N
122° 03.80W

ALT: 0 FT	SOG/COG
2D	0.8 KT
	247° T

| MENU | WPT | RTE | SMAL | SAVE |
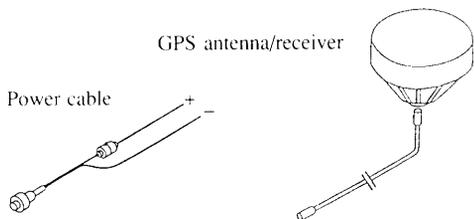
Getting Started

Check to see that all the components shown at left were included with your **Star Pilot 6**. If a part is missing, contact the **Interphase Customer Service Department (408) 427-4444** immediately.

WARNING: DO NOT operate the **Star Pilot 6** 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 6 On

To turn the **Star Pilot 6** on, press the Power/Backlight 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. To turn the unit off, press and hold down the Power/Backlight Key until it beeps.

The Menu Screen

Upon turn on, the **Star Pilot 6** performs a self-test to check for antenna or cable connection problems. An open vertical bar on the right part of the screen will fill up from bottom to top as the test is performed. If there are any problems, a message will appear: "No Response From GPS Antenna, Turn This Unit Off And Check Connections". During the self-test you can adjust the display contrast. When the self-test is completed successfully, the unit automatically brings up the Menu Screen.
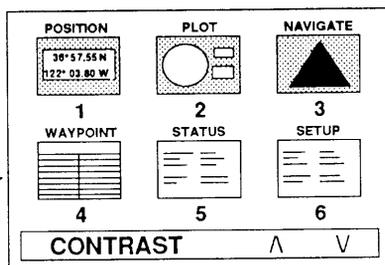
There are six modes for operation of the **Star Pilot 6**. The first three modes (keypad choices 1, 2, 3) are navigation screens. The Position Mode features an easy to view, large digit display of your present latitude and longitude. The Plot and Navigate Modes provide navigational information in graphic 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.
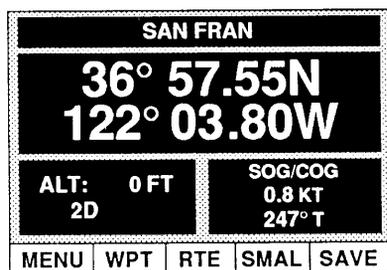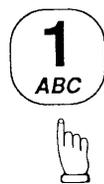
The Waypoint Mode manages the Waypoint and Route libraries. The Status Mode gives you information on the conditions of the **Star Pilot 6** itself, as well as the GPS satellites and system. The Set Up Mode can be used to set local time and the arrival and anchor alarms.

Use the keypad on the right side of the unit to choose an operational mode. The **Star Pilot 6** 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 20 for details on setting the time to Local Time.

At first the latitude and longitude digits may be all "0"s. Note the lower left corner of the display. Below the ALT: you will read OLD, 2D or 3D. OLD means that the **Star Pilot 6** 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 6** to obtain a new position fix. 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 6** up and running.

NOTE: Do not be alarmed if the last digits of the Latitude or Longitude sometimes fluctuate. This is normal when the **Star Pilot 6** 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 6** to remember.

The **Star Pilot 6** 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 6** in the Waypoint Mode.

Entering Waypoints

After turning the **Star Pilot 6** 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
PT SUR	EDIT DETAILS
PT PIED BLAN	OF A WAYPT,
PT CONCEPT	USE ARROW
	KEYS THEN
	PRESS ENTR,
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	36°57.51 N
	LONGITUDE
	123°03.80 W
	USE KEYPAD
	THEN PRESS
	ENTR
MENU · ESC · · ENTR	

```
              SAN FRAN
        36° 57.55N
        122° 03.80W
  ALT:    0 FT      SOG/COG
                     0.8 KT
     2D               247° T
  MENU  WPT  RTE  SMAL  SAVE
```

(1) Position Mode

Choosing Key #1 from the Menu Screen will call up the Position Screen. The upper part of the display will read "No Destination" when no waypoints are stored or selected, and will show either a waypoint name or a route and waypoint name when one has been preselected.

The **Star Pilot 6** 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. You can change what information is displayed in this large box by pressing the SMAL softkey which will immediately change to read LARG. Now you can change the data in the large box by pressing the < > arrow keys on either side of Key #0. Pressing the > arrow advances the information display from Lat/Lon to SOG/COG, the RNG/BRG, VMG/DMG, SOA/RBA, ETA/TTG, DATE/TIME, MAG VAR and back to Lat/Lon (see Advanced Navigation Guide on Page 22 for definitions of abbreviations). Pressing the < arrow key reverses the order of advance.

The lower left part of the display has a small data box which always shows altitude and the signal receiving status. 3D or 2D display means your present position is current. OLD display means no position fixes are being updated. See Page 22 of Advanced Navigation Guide for more details.

Note that the altitude will only be displayed if the **Star Pilot 6** has fixes from four satellites and is operating in the 3D mode. The altitude accuracy will fluctuate plus or minus 50 meters, which is the normal tolerance for GPS altitude specifications.

The lower right part of the display is another small data box which is user configurable in the same way as the large data box described above. When the softkey reads SMAL, you can change the contents of the box by pressing the < > arrow keys.

You can switch to other operating modes by returning to the Menu Screen, or instantly switch back and forth between Position, Plot, Navigate and Status Modes by pressing the #1, #2, #3 or #5 keys when in those modes. You can also get to the Waypoint and Set Up Modes by pressing #4 and #6, but you can only return to the other modes through the Menu Screen from these two modes. When you switch between operating modes, the last displays set will become the defaults when you return to the different operating modes.

Saving Present Position As A Waypoint
If you wish to save the current position viewed on the Position Screen as 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 17 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 6** back to the Menu Screen.

```
┌─────────────────────────────┐
│  ▓ 122° 03.80 W ▓           │
│  ┌───────────┐              │
│  │     N     │  WAYPOINT    │
│  │           │  SAN FRAN    │
│  │ W   +   E │ ┌──────────┐ │
│  │           │ │36° 57.55 N│ │
│  │           │ ├──────────┤ │
│  │     S     │ │RNG / BRG │ │
│  │           │ │ ─ ─ _ NM │ │
│  │SCALE: 1 NM│ │ ─ ─ °M   │ │
│  └───────────┘ └──────────┘ │
│ MENU│ WPT │ RTE│SCLE│ SAVE │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│  ▓ 122° 03.80 ▓ SET SCALE   │
│  ┌───────────┐ ───────────  │
│  │     N     │   SCALES     │
│  │           │              │
│  │           │  CLEAR ALL   │
│  │ W   +     │    1NM       │
│  │           │    2NM       │
│  │           │    5NM       │
│  │           │   25 NM      │
│  │     S     │   100 NM     │
│  │SCALE: 1   │   250 NM     │
│  └───────────┘              │
│ MENU│ ESC │ ∧ │ ∨ │ ENTR   │
└─────────────────────────────┘
```

```
│ MENU│ WPT │ RTE│SCLE│ SAVE │
```

```
┌─────────────────────────────┐
│  ▓ 122° 03.80 ▓ NAVIGATE TO │
│  ┌───────────┐ ───────────  │
│  │     N     │  WAYPOINTS   │
│  │           │ ┌──────────┐ │
│  │           │ │SANTA CRUZ│ │
│  │           │ └──────────┘ │
│  │ W   +     │ SAN FRANCISCO│
│  │           │              │
│  │           │              │
│  │     S     │              │
│  │SCALE: 1   │              │
│  └───────────┘              │
│ MENU│ ESC │ ∧ │ ∨ │ ENTR   │
└─────────────────────────────┘
```

Features of Track Plot

If your track moves off the display area (out of the selected scale), the **Star Pilot 6** will automatically reset your present position to the center of the plot square and move the track plot dots accordingly. The scale will remain the same.

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(2) Plot Mode

To enter the Plot Mode, choose Key #2 from the Menu Screen. The **Star Pilot 6** 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 the present longitude of the center of the track plot square. The right side of the display shows the destination waypoint, and just below it in the middle of the right side of the display, the present latitude of the center of the track plot square. The lower right side of the display shows you the range (RNG), or distance to your destination, and bearing to steer (BRG). 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 6** will return centered on the Plot Screen with the map set to the selected scale.

In the Plot Mode an arrow icon with a dot in the center shows your boat's present position and heading, a diamond with a dot in the center shows your starting point, and a square with a dot in the center and a flag icon on top shows the waypoint location. The center dots mark the actual positions most accurately. When a waypoint is selected, a course line (Great Circle, not Rhumb Line) will be drawn between the starting point and the waypoint. Dots will record your progress over time as the boat icon moves.

To Reset the **Star Pilot 6** 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 6** Track Plot 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 6** 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 6** will begin plotting to the first Waypoint of the Route. See Page 17 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.

(3) Navigate Mode

Press Key #3 from the Menu Display to start the **Star Pilot 6** 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 6** 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 6** 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 6** will begin navigating to the first Waypoint of the Route.

In the upper right corner of the display is a small data box which is user configurable like those in the Position Mode. Press the < > arrow keys to advance through Lat/Lon, SOG/COG, VMG/DMG, SOA/RBA, ETA/TTG, DATE/TIME and MAG VAR.
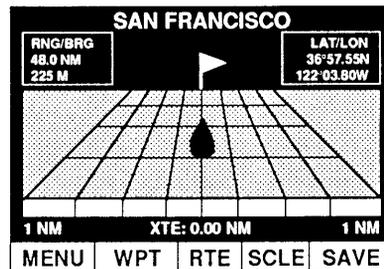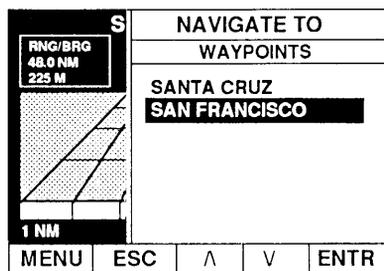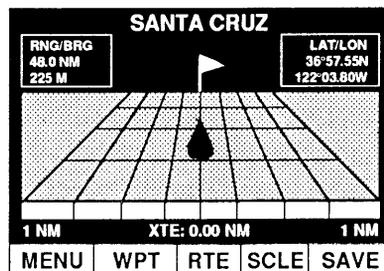
LAT - Latitude
LON - Longitude

SOG - Speed Over Ground
COG - Course Over Ground

VMG - Velocity Made Good (to waypoint)
DMG - Distance Made Good (to waypoint)

SOA - Speed of Advance (to waypoint)
RBA - Relative Bearing Angle (to waypoint)

ETA - Estimated Time of Arrival (to waypoint)
TTG - Time To Go (to waypoint)

DATE - Current Date
TIME - Current Time

MAG VAR - Local Magnetic Variation

For more details on these navigational terms, please refer to the Advanced Navigation Guide section, Page 22.

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 6** 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.

In the Auto mode, the Cross Track scale automatically adjusts to keep the boat icon in the active grid area. This automatic setting is the default. To set fixed scales press the SCLE softkey and it will allow you to choose between Auto, 1, 2, 5, 10, 20 and 50 mile (kilometer or nautical mile) scales. If your Cross Track Error is greater than the fixed scale, the boat icon will stop at the left or right edge, but the correct digital XTE reading will still be shown and updated below.

(4) Waypoint Mode

The **Star Pilot 6** 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.

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.

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 6** 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.

4
JKL

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

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

WAYPOINTS	EDIT LAT/LON
SANTA CRUZ **SAN FRAN**	LATITUDE **3**6°57.51 N LONGITUDE 123°03.80 W USE KEYPAD THEN PRESS ENTR
MENU	ESC			ENTR

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	∧	V	ENTR

```
            ROUTES

  SC TO SF          TO VIEW OR
  SC TO PT ARG      EDIT DETAILS
  BJ TO LPZ         OF A ROUTE,
  MONT TO BJ
                    USE ARROW
                    KEYS THEN
                    PRESS ENTR,

  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 ADD.
  SANTA CRUZ        CHANGE OR
  ANO NUEVO         DELETE A WPT
  PIGEON PT         ON THIS ROUTE
  PILLAR PT         USE ARROW
  ST FRANCIS        KEYS THEN
                    PRESS ENTR

  MENU | DONE | Λ | V | ENTR
```

Route Screen #3

```
  ROUTE            NEW WPT

  SC TO SF          *DEL WPT*
  SANTA CRUZ        SANTA CRUZ
  ANO NUEVO         PT SUR
  PIGEON PT         PT PIED BLAN
  PILLAR PT         PT CONCEPT
  ST FRANCIS

  MENU | ESC | Λ | V | ENTR
```

Route Screen #4

To enter a new Route, you must scroll down to a blank space and press 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 6** 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 6** 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 6** will then return to the Edit Route screen with the ROUTE and the Waypoint positions currently stored on the left side of the display. The right side of the display will again allow you to add, change or delete Waypoints on this Route. If you are finished, press DONE.

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.

(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 6** 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. The **Star Pilot 6** does not display Lat/Lon when the PDOP is 12 or greater.

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 6** Status Screen shows ERROR CODE. If the unit is operating normally, this will be 00. See Page 22 of the Advanced Navigation Guide for more details on error messages.

STATUS	
CONTROL S/W	VER 2.01
RCVR S/W	VER 1.0
GPS MODE	3-D AUTO
GPS HEALTH	GOOD
LAST FIX AT	13:44.07
PDOP	2.1
HDOP	1.3
VDOP	1.6
ERROR CODE	00

MENU				

5
MNO

GPS SET UP	
UNITS	US
BEARINGS	TRUE
SMOOTHING	1
TIME OFFSET	**-8 HRS**
ARRIVAL ALRM	OFF
ANCHOR ALRM	OFF
NAV CALCULATOR	

MENU	ESC	∧	V	ENTR

	TIME OFFSET
	HRS FROM UTC
BE	-8 HRS
SMO	PRESS ARROW
TIME	KEYS TO
ARRIVA	INCREASE OR
ANCHO	DECREASE THE
	OFFSET, THEN
N.	PRESS ENTR

MENU	ESC	∧	V	ENTR

GPS SET UP	
UNITS	US
BEARINGS	TRUE
SMOOTHING	1
TIME OFFSET	-8 HRS
ARRIVAL ALRM	**OFF**
ANCHOR ALRM	OFF
NAV CALCULATOR	

MENU	ESC	∧	V	ENTR

	ARRIVAL ALARM
	SET OPTION
BE	
SMO	ENABLED
TIME	**DISABLED**
ARRIVA	
ANCHO	DISTANCE
	0.10 MI
N.	

MENU	ESC	∧	V	ENTR

(6) Set Up Mode

Upon pressing Key #6, the **Star Pilot 6** GPS Set Up Screen allows you to change and adjust units of measure (U.S., Metric or Nautical), bearings (Magnetic or True), smoothing (Data Averaging), time offset, arrival and anchor alarms.

NOTE: If you change units while in the Plot Mode, the track plot is cleared.

Use the up/down arrow softkeys to choose the feature you wish to adjust, the press ENTR. Each feature has a window that tells you how to adjust the settings. After you have the setting you want, press ENTR. Pressing ESC returns you to the Set Up screen without entering any changes. You may press the MENU key to return to the Menu Screen.

The Smoothing function allows you to use different Data Averaging settings. These settings go from 1 (no averaging) to 99. The unit's default is 1. A Data Averaging setting of 3, for example, averages the last three position readings received from the satellites and "smoothes out" position and navigation readings. This feature is most useful when your boat is moving very slowly or not moving at all. As a general rule, the faster your boat speed, the less averaging you need. **Interphase** recommends that for the fastest power boats no averaging is used (1), for most power boat use such as fishing or cruising settings between 2 and 5, and for sailboats settings between 4 and 10.

Use Time Offset to set accurate display of local time (24 hour clock). After using the up/down arrow softkeys to highlight the Time Offset press ENTR. Then adjust the time offset in hour increments from UTC (Universal Time Coordinated, or Greenwich Mean Time) with the up/down softkeys and then press ENTR to complete the time offset entry.

The Arrival Alarm must be engaged for the **Star Pilot 6** to provide audio or visual notice of arrival at a navigational destination. To turn the Arrival Alarm on, select Arrival Alarm and press ENTR. Use the up/down arrow softkeys to highlight ENABLED (on) or DISABLED (off). After selecting your choice, press ENTR. When turning the Arrival Alarm on, after you press ENTR the display will highlight the numeric setting in the lower part of the display. The Arrival Alarm active settings are between 0.05 and 9.99 (miles, meters or nautical miles). If you set it below 0.05, the unit defaults back to 0.05.

0.05 miles = 264 feet   0.05 NM = 304 feet   0.05 KM = 50 meters

The Anchor Alarm can be set to sound an audible beep when your boat drifts past the set distance from your anchorage. Turning on and setting the Anchor Alarm is identical to the Arrival Alarm above.

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

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 will be 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 (1575 MHz) results in practically no interence 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 6** 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 6** 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 6** 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.

WARNING: As of April 1992, there are 16 working satellites in orbit. Full implementation of 21 satellites (and three spares) is currently projected for 1993. Users are cautioned that the system is still in an experimental operational status and the system may be turned off or satellites moved at any time, without warning. DO NOT place yourself or your vessel in a situation where GPS is your sole means of navigation. Check with the Coast Guard for current operational status and messages.

WARNING: Selective Availability (S/A) has been implemented by the U.S. DOD to restrict the accuracy of GPS positions. As of April 1992, the accuracy of the GPS system is such that 95% of the time a fix will be within 100 meters of the actual geographic position.

Waypoint

Bearing To Waypoint (BRG)

Range To Waypoint (RNG)

Present Position

Course Line

Cross Track Error (XTE)

Distance Made Good (DMG)

Course Made Good (CMG)

Start

Waypoint

Bearing To Waypoint (BRG)

Speed Over Ground (SOG on COG line)

Speed Of Advance (SOA on BRG line)

Present Position

Course Line

Start

Advanced Navigation Guide

The **Star Pilot 6** 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 6**. 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 6** 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.

Navigational Terms

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 on which you are currently heading.

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

RANGE (RNG) Distance from present position to the selected waypoint.

BEARING (BRG) Angle from True (magnetic) North to the waypoint at present position.

ESTIMATED TIME of ARRIVAL (ETA) This is an estimate based on the current time and your TIME TO GO (TTG) of when you will get to the selected waypoint.

TIME TO GO (TTG) This is calculated from the current distance to go (DTG) to your destination and your VELOCITY MADE GOOD (VMG) of how long it will take you to get to the selected waypoint.

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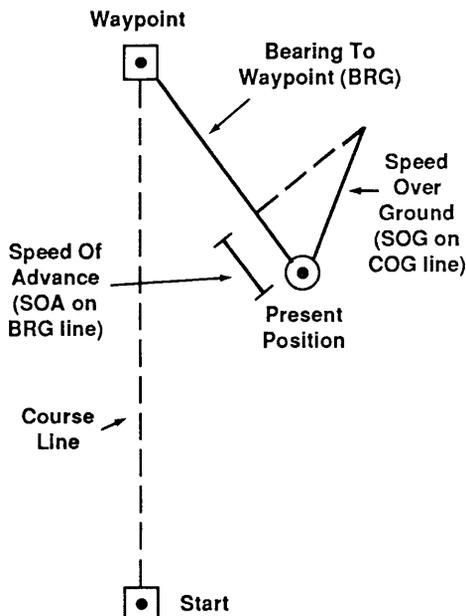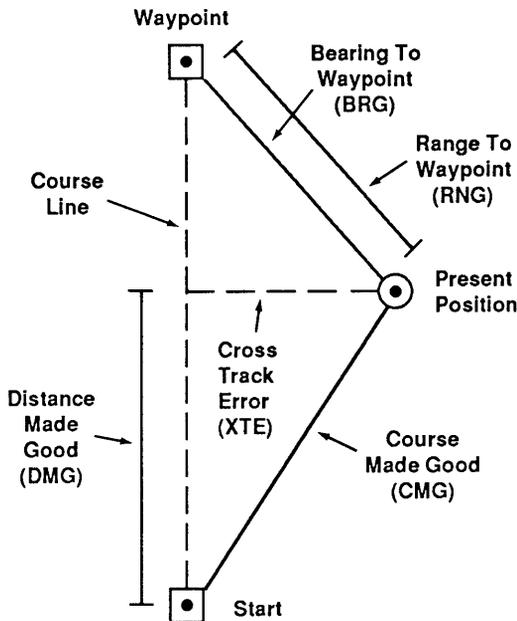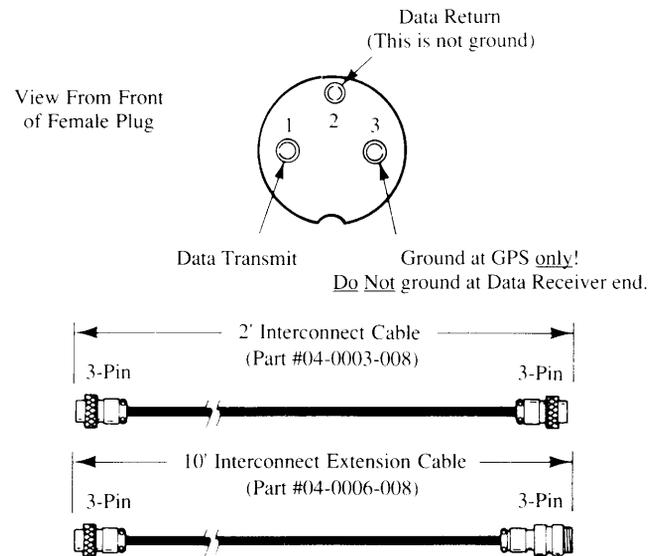
DISTANCE MADE GOOD (DMG) This is the portion of the distance your boat has travelled that is parallel to your desired track (start point to destination).

SPEED OF ADVANCE (SOA) This is the portion of your boat speed directly towards the waypoint from your current position. SOA is useful to sailing boats by helping to determine which tack will get them to the waypoint more quickly.

RELATIVE BEARING ANGLE (RBA) Also called Steering Angle, this is the angle between your current heading (COG) and the bearing to the waypoint (BRG). This is useful for adjusting autopilots, determining when to tack, or observing leeway.
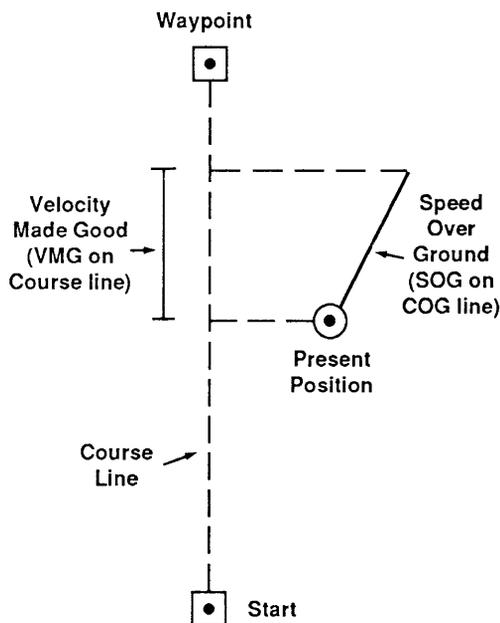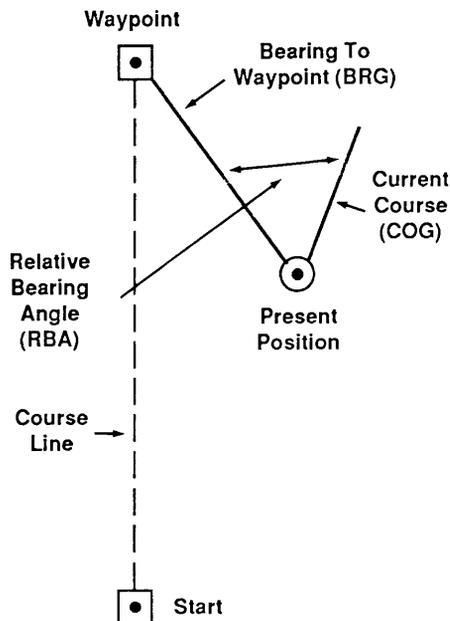
NMEA 0183 Data Output

The extra connector on the **Star Pilot 6** rear panel is a serial data output interface which can provide GPS data to some autopilots, track plotters or fishfinders. The serial data is in the NMEA 0183 format and is transmitted continuously and may not be compatible will all NMEA 0183 interface equipment. The NMEA 0183 data is transmitted at 4800 baud, 8 data bits, no parity, 1 stop bit. To use the data, the interconnections are:

Data Return
(This is not ground)

View From Front
of Female Plug

1   2   3

Data Transmit   Ground at GPS only!
                Do Not ground at Data Receiver end.

2' Interconnect Cable
(Part #04-0003-008)
3-Pin   3-Pin

10' Interconnect Extension Cable
(Part #04-0006-008)
3-Pin   3-Pin

The data sentences are as follows:

$GPRMC,224317,A,3657.55,N,12203.80,W,00.1,325,140591,15.5,E*7A
$GPRMB,A,0.02,R,STRT,WEST,3657.54,N,12303.80,W,047.9,270,00.1,V*01
$GPGLL,3657.55,N,12203.80,W
$GPBWC,224317,3657.54,N,12303.80,W,270,T,255,M,047.9,N,WEST
$GPVTG,325,T,309,M,00.1,N,00.2,K
$GPAPA,A,A,0.02,R,N,V,V,255,M,WEST
$GPAPB,A,A,0.02,R,N,V,V,255,M,WEST,255,M,,

Waypoint

Bearing To
Waypoint (BRG)

Current
Course
(COG)

Relative
Bearing
Angle
(RBA)

Present
Position

Course
Line

Start

Waypoint

Velocity
Made Good
(VMG on
Course line)

Speed
Over
Ground
(SOG on
COG line)

Present
Position

Course
Line

Start

7 PIN FEMALE 09-0029-008
NO MALE

Star Pilot 6 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 6** 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 6** 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 6** display unit to ensure they are clean, dry and there are no bent pins. Also check the cable to ensure it has not been cut or crushed.

No GPS TM (Time) - This means the **Star Pilot 6** 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 6** has located one satellite.

2 SAT - The **Star Pilot 6** has located two satellites.

GOOD - The **Star Pilot 6** has found a third satellite and can now calculate a current Lat/Lon position. If the **Star Pilot 6** locates a fourth satellite it will be operable in 3D Mode and can calculate altitude as well.

PDOP Too High - This means that even with the minimal three satellites in view, the orientation of the satellites in the sky is such that the **Star Pilot 6** cannot provide accurate fixes.

Error Codes

FF - This means the **Star Pilot 6** has lost contact with the Antenna/Receiver. If cable connections are solid and clean between the Antenna and **Star Pilot 6**, 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 6** system should be returned to the **Interphase Factory Service Center**.

00 - This means the **Star Pilot 6's** systems are error free.

Any other Error Code means there is a problem with the Antenna/Receiver. Try turning the **Star Pilot 6** 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
U.S., Metric & Nautical units
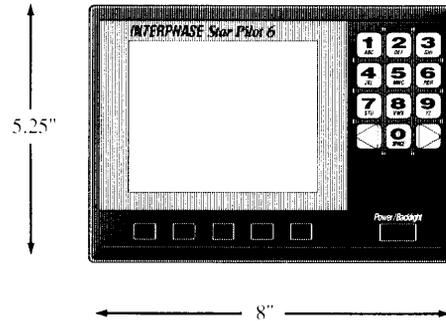
Physical:

Antenna/receiver size: 6" diameter, 4" high, 30' cable
Antenna/receiver weight: 1 lb.
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 50°C, antenna/receiver -20° to +70°C
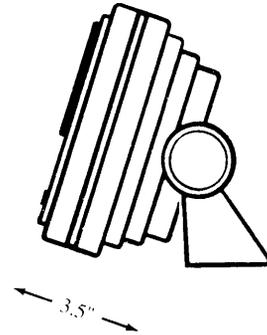
General:

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

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**.

Specifications subject to change without notice.