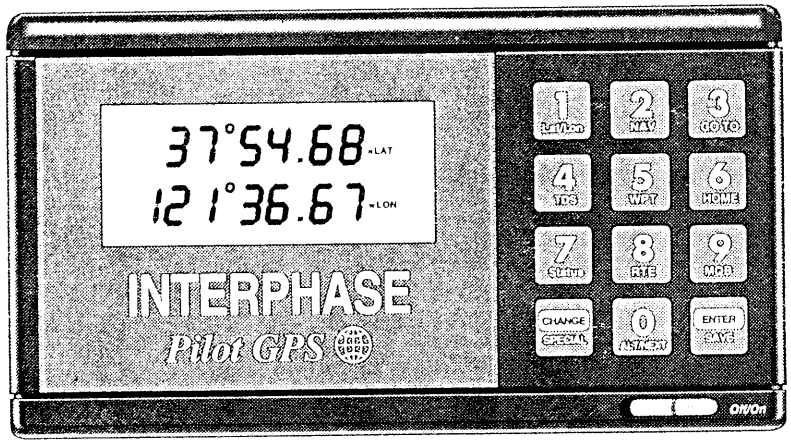
# INTERPHASE Pilot GPS™

## Global Positioning System Receiver




## Operation Manual

INTERPHASE
TECHNOLOGIES, INC.

2880 Research Park Drive, Suite 140
Soquel, CA 95073
phone: 831-477-4944 fax: 831-462-7444

Pub.

To Our Customer:

Thank you for choosing the **Interphase Pilot GPS** receiver. Throughout the development of this fine product, we have been primarily 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 are proud of the **Pilot GPS** and your satisfaction is very important to us. To this end, we welcome any comments or suggestions that you might have in regard to this equipment.

It is very important that you complete the WARRANTY REGISTRATION CARD and return it as soon as possible.

Sincerely,

INTERPHASE TECHNOLOGIES, INC.

## IMPORTANT NOTICE:

Navigation based solely on one method or one instrument should never be practiced. The **Pilot 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 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.

## Interphase Pilot GPS Video Operation Guide

**Interphase** has a video instructional aid for the **Pilot 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, save waypoints; and how to use the many special features of your **Pilot GPS**. Whether you are a beginner or an experienced GPS user, this video is a very helpful addition to your operation manual.

See your **Interphase Dealer** for this video or call **Interphase** at (408) 426-2007.







# *Table of Contents*

# *Warranty Information*

**Interphase Technologies, Inc.** provides a limited one-year warranty on the **Pilot GPS**. 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.

Should you experience a problem with your **Pilot GPS**, first refer to the **Trouble-shooting** section of this manual. Most common problems and their solutions are described here. If problems persist, call **Interphase Customer Service** (408) 426-2007. We will be happy to try to assist you 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".

# General Information

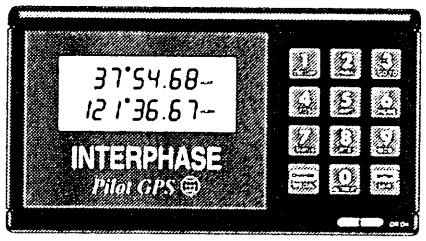
The **Interphase Pilot GPS**, with its rugged, water resistant construction, is ideal for installation on nearly any type of boat. It includes the latest advancements in multi-channel continuous receiver technology, tracking up to eight GPS satellites, capable of providing accurate position information every second. It is also completely differential ready for the ultimate in DGPS precision navigation.

The **Pilot GPS** is one of the most user friendly marine electronics available today. Position, navigation, waypoint access and special functions are all available with the simple touch of a button. The large 12-button silicon rubber keypad makes operation a snap. Included are an adjustable waypoint arrival alarm and anchor alarm.

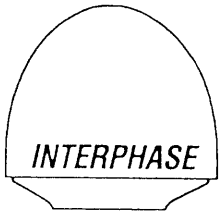
The **Pilot GPS** design is compact, yet the digital displays of Latitude, Longitude, TDs, cross-track error, magnetic bearing and distance in nautical miles to a destination, course over ground, time to go, boat speed in knots, time and date, and satellite status are clearly visible on the backlit LCD display. The **Pilot GPS** will store up to 100 waypoints and 10 routes. Navigational information can be calculated and displayed from the boat's current position, or from any waypoint to any other waypoint. One button "Take Me Home" and "Man Overboard" features are included for instant access and safety.

The **Pilot GPS's** very low power consumption (less than 0.5 Amps at 10-16 VDC) makes it ideally suited for many of today's smaller boats, or cruising boats, with limited power availablity.

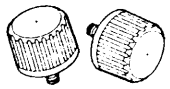




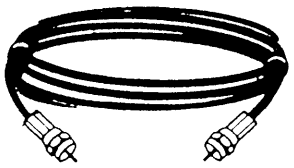

Interphase Pilot GPS display unit



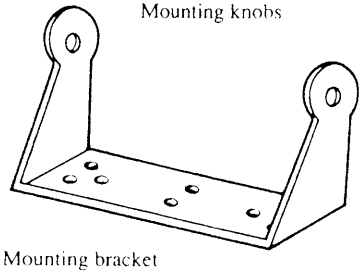

External antenna



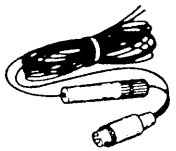
Mounting knobs



Antenna cable



Mounting bracket



12 VDC power cord



# Installation

## Display Unit

The compact size of the **Pilot GPS** 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 **Pilot GPS**.

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 **Pilot GPS** display unit. Contact your nearby **Interphase Dealer** or the **Interphase Accessories Sales Department** (408) 426-2007.

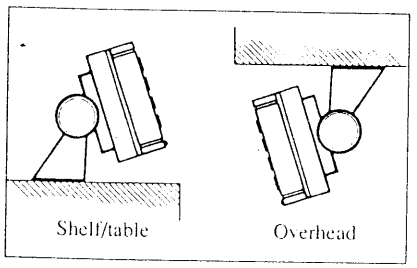
## Power Connection

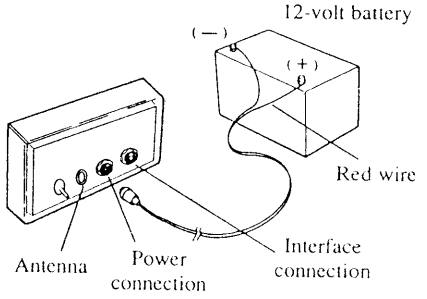
The **Pilot GPS** requires a power source with a voltage level from 10 to 16 VDC. Low voltage may cause a dim display, reduced signal, weak beeper and a slow turn on. High voltage may eventually result in failure of some internal part. The nominal voltage found on most properly operating marine power 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 **Pilot GPS** 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 **Pilot GPS** in-line fuse with a fuse rated higher than 2 Amp. Always replace with a fuse with a rating between 1 Amp. and 2 Amp. Before replacing the fuse check all connections. If the fuse continues to blow, return the entire system to **Interphase** for service.



## Antenna Installation

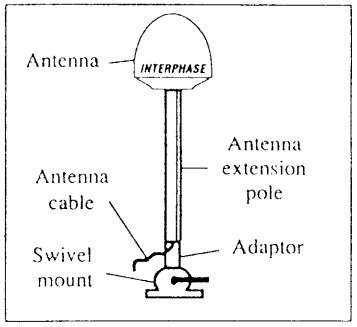
The Pilot GPS antenna is active, employing a 35 dB pre-amp and band pass filters. It is housed in a durable, completely waterproof casing designed for mounting in an open location. For optimum signal reception, mount the antenna with a 360 degree view of the sky so that it can have line-of-sight tracking 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. Avoid mounting at the top of a mast, since this location accentuates boat motion.

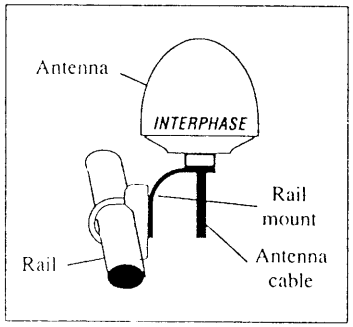
Care must also be taken in choosing a mounting location where radar beams or communications transmitter beams WILL NOT be directed towards the GPS antenna. For best results, mount the GPS antenna below and at least ten feet away from satellite communication equipment.

Mount the antenna on a level surface, such as a cabin top, or on the bow or stern rail. The Pilot GPS antenna is designed for a marine pole mount. The threaded socket at the base of the antenna accepts a 1"-14 straight thread which is a common antenna mount available at marine hardware suppliers. The antenna connector is located within the threaded socket, which allows the cable to be routed through the pole. We suggest using a 1', 2' or 4' Shakespeare marine antenna extension pole. Use a Newmar loran coupler adaptor, Part No. 228-N, to permit the cable to run out the side when you mount the pole to a standard marine antenna mount. For rail mount installation we recommend the Rail Base, Part No. 3001, from Blue Sea Systems, (206) 738-8230.

The Pilot GPS antenna cable is RG-59, 75 Ohm coaxial and is 30 feet in length. This cable is especially made for low loss of signal to the receiver. Spare or replacement cables are available from your local **Interphase Dealer** or by contacting the **Interphase Accessories Sales Department (408) 426-2007.**

Although we do not recommend cutting the antenna cable, or removing the antenna cable connectors, if a replacement becomes necessary, you can obtain parts at most electronic supply stores. Available from Radio Shack stores are standard Type F coaxial connectors (Part No. 278-228A, 278-214 or 278-223). For replacement antenna cable, use a multiple shielded 75 Ohm coaxial such as RG-59, or Radio Shack RG6-QS, Part No. 278-1317. For best results, it is recommended to have the original Pilot GPS cable and connector at the antenna end and not have more than 50 feet total cable length (There is no minimum recommendation on cable length). When routing the cable from the antenna to the Pilot GPS, avoid sharp bends or kinks in the cable, hot surfaces, rough or sharp surfaces and corrosive fluids or gases.








# *Basic Operation*

## The Pilot GPS Keypad

The Pilot GPS has been designed to be as easy to learn and operate as possible. The 12 large push button keys are clearly labeled and have been kept to a minimum. The **Pilot GPS** responds with an audible beep each time a key is pressed. The special silicon rubber keypad is durable and waterproof, designed to last for years and years.

There are two modes of operation with the **Pilot GPS** keypad. While navigating, you will be in the Function Mode and all the functions below each keypad number will be active, as well as SPECIAL and SAVE. The Editing Mode is in use whenever the flashing cursor is on the screen, and each keypad number will be active, as well as CHANGE, ALT/NEXT and ENTER.

## Common Function Keys

The SPECIAL feature is available in order to use additional features of the **Pilot GPS**. The Special features are described later in this manual, and this section should be carefully read before use, since some of the Special functions, if incorrectly executed, could result in erroneous navigational data.

The SAVE key is used while navigating to instantly store your boat's present position. This is the easiest and most accurate means of storing a waypoint in the **Pilot GPS**.

## Common Edit Keys

The CHANGE key is used when you are in the editing mode. If you make a mistake when entering a number, the **CHANGE** key is used to "erase" a previous entry, or to "go back a step".

The ALT/NEXT key is used in the editing mode. For example, **ALT** would be used to alternate through various choices such as North Latitude & South Latitude, or East Longitude & West Longitude. You would use **NEXT** to increment to the next waypoint when navigating routes.

The ENTER key is used to confirm data entry into the **Pilot GPS**, or to activate certain editing functions.

# *How To Use the Pilot GPS*

## Getting Started

Check to see that all the components shown on Page 6 were included with your **Pilot GPS**. If a part is missing, contact the **Interphase Customer Service Department** (408) 426-2007 as soon as possible.

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

## Turning the Pilot GPS On

To turn the **Pilot GPS** on, slide the power switch located on the lower right corner of the unit to the ON position. The **Pilot GPS** should respond with a BEEP and, after performing a brief SELF TEST of the receiver, the display will show:


That's all you need to do! The **Pilot GPS** is completely automatic upon turn on, and you should be "locked on" to satellite signals in just a few minutes. If you wish to speed things up for a first time turn on, see Special 01, Initialization, on Page 26.

Upon "locking-on" to 3 or more satellites, the **Pilot GPS** will automatically display the current latitude and longitude position. If fixes are lost for more than 10 seconds, the display will alternate showing the last known position coordinates and "not Current". This is a warning that the **Pilot GPS** is not ready to use for navigation. To silence the "not Current" beeper, press the **STATUS** key.

## What Is a Waypoint?

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

The **Pilot GPS** stores up to 100 Waypoint positions numbered 00 to 99, however location 00, 98 and 99 have special functions. Location 00 is used by the **Pilot GPS** for making calculations from your starting position, 98 is used for the Man Overboard (MOB) location and 99 is usually reserved for your "Home" location as described later in this manual.

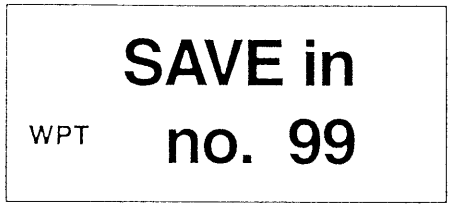
Waypoints can be stored using either of two methods. You can INSTANTLY store your boat's present position, or you can enter the Latitude/Longitude of any position you want using the KEYBOARD entry. **If you are planning on storing Loran C TD coordinates as a Waypoint, see Page 23.**



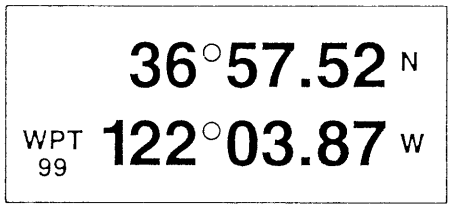
## Instant Waypoint Entry

The easiest and most accurate means of storing a Waypoint in the **Pilot GPS** is to:

Press the **SAVE** key. The **Pilot GPS** will respond with the following display:


You will note that the first digit of the TWO DIGIT Waypoint number is blinking. Using the keypad put in the first digit of the desired Waypoint number. Next, with the second digit blinking, put in the desired number. If both digits are correct, press **ENTER**. The **Pilot GPS** will then display the position coordinates and, in the bottom left of the display, show the TWO DIGIT number of the Waypoint just stored.

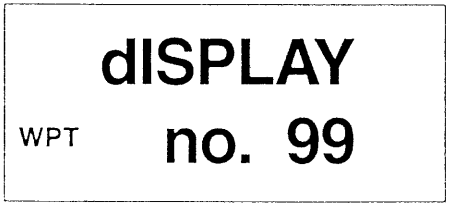



You can now press any function key to return to other operation.

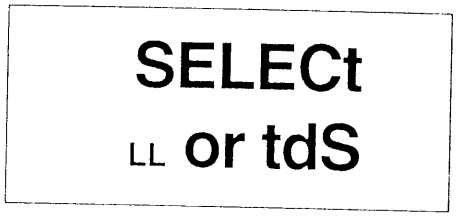
## Waypoint Entry by Keyboard (Or to Change a Waypoint)

(For TD Waypoint Entry, see Page 23). If you know the Latitude/Longitude of a position you wish to store as a Waypoint, or you wish to change a Waypoint to different coordinates, you can do a KEYBOARD entry as follows:

Press the **WPT** key. The **Pilot GPS** will then display:

Enter in a TWO DIGIT number for the Waypoint memory location. Press ENTER, and the **Pilot GPS** display will show the coordinates that are currently in the selected Waypoint memory location. If you wish to change the coordinates, press the **CHANGE** key. The **Pilot GPS** display will show:


Press the **LAT/LON** key. Enter the Latitude coordinates for the top line. After the last Latitude digit has been entered, use the **ALT** key to select the flashing N or S, for North or South, then press **ENTER**. Next, use the **ALT** key to select the flashing W or E, for West or East, then press **ENTER**. Now enter the Longitude coordinates (remember the leading "0" if less than 100 degrees). After the last Longitude digit has been entered, press **ENTER**.

The **Pilot GPS** display will show the position coordinates and in the bottom left of the display is the TWO DIGIT Waypoint number where they are now stored. It is recommended to keep a written log of your Waypoint positions for future use.

Push any function key to return to other operations.

## Storing a "Home" Location

The **Pilot GPS** uses Waypoint #99 as a special **"Home"** location.It is recommended to save this Waypoint for a special position, such as the entrance to your home harbor channel or an important navigational buoy. The best procedure is to actually be at the location you wish to store for "Home" and use the INSTANT ENTRY method previously described in this section of the manual.

By doing this simple **"Home"** location procedure, the **Pilot GPS** will always be ready to give you all the navigational information you need to get back **"Home"** with the single press of the **HOME** key.

## Going to a Waypoint

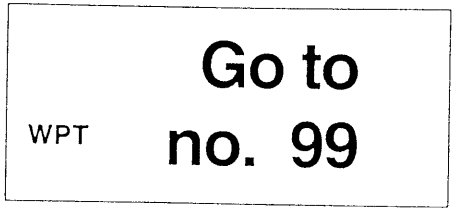
The **Pilot GPS** has been designed to be an easy to use GPS receiver. Follow these few simple steps to go to a waypoint:

First, press the **GO TO** key. The **Pilot GPS** display will respond:

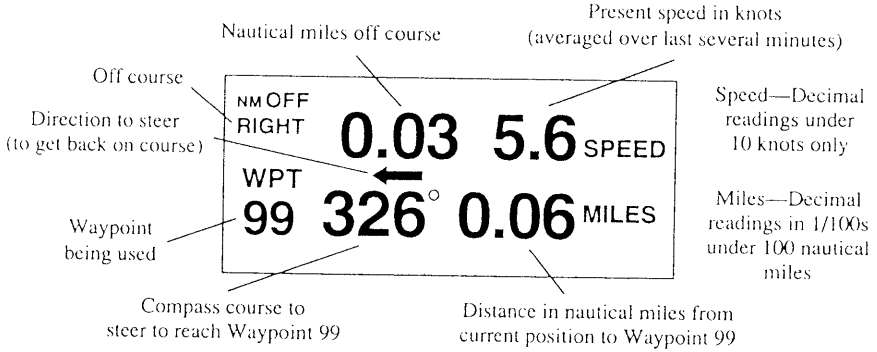




In this example we want to navigate to a Waypoint (for Routes see the section later in this manual). Push the **WPT** key. The **Pilot GPS** is always navigating to a Waypoint, even in the background if you are using other displays. The display will now show you the current Waypoint destination.


If you wish to continue going to the current Waypoint, press **ENTER** twice, then press the **NAV** key. If you want to navigate to a new Waypoint, simply enter the TWO DIGIT Waypoint number, then press **ENTER**. That's all there is to it! The **Pilot GPS** will show you the navigational information to steer from your boat's present position to the Waypoint.

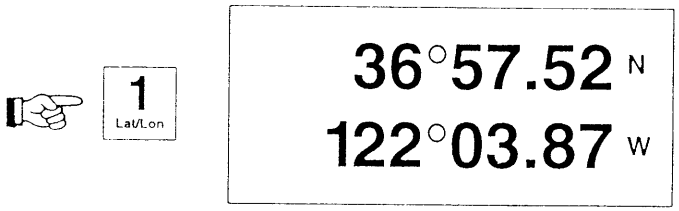



Use your ship's compass to steer to the Waypoint. It is important that you have your ship's compass compensated for your area's magnetic variation to be accurate. The **Pilot GPS** will let you know of any changes that develop to the proper course. The Direction To Steer Arrow will show you what direction to steer if you are off the straight line course from your starting point to the destination Waypoint. For example, if you are off to the right side of the course line, the Arrow will point to the left to get you back on track (and vice versa). Fine tune your steering by observing the Miles Off Course displayed above the steering arrow. Steer a slight amount for a small distance off course, and a larger amount for a further distance off course. If the Off Course distance seems too large, or the Arrow direction seems confusing, repeat the GO TO and NAV procedure to plot a new course line from your current position. **To silence the Waypoint Arrival Alarm, press any key.**

# *Pilot GPS Displays*

## LAT/LON Key

Press the **LAT/LON** key to bring up the Position screen in Latitude and Longitude coordinates.



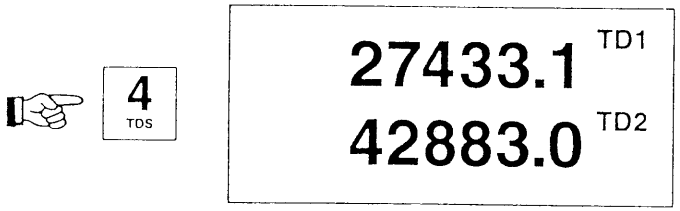

When you press the **LAT/LON** key, all displays of position, including waypoints, are shown in Latitude and Longitude. All entries of waypoints are done in Latitude and Longitude. The LAT/LON mode is maintained until the TDs key is pressed.

If the **Pilot GPS** loses its lock on satellite signals for more than 10 seconds, the display will alternate showing the last known Latitude and Longitude coordinates and "not Current".

**WARNING:** You cannot rely on the **Pilot GPS** position information when the display shows "not Current".

## TDs Key

When you press the **TDs** key, all displays of position, including waypoints, are shown in Loran C TD coordinates. Successive presses of the **TDs** key will rotate through the various combinations of TDs that could be used for the displayed position. If the position displayed or stored is outside of Loran C coverage, the **Pilot GPS** will not show TDs. The TD mode is maintained until the Lat/Lon key is pressed.




If the **Pilot GPS** loses its lock on satellite signals for more than 10 seconds, the display will alternate showing the last known position coordinates and "not Current".

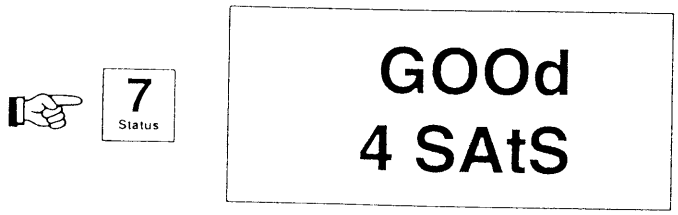
**WARNING:** You cannot rely on the **Pilot GPS** position information when the display shows "not Current".

See Page 23 for more details on TD coordinates.

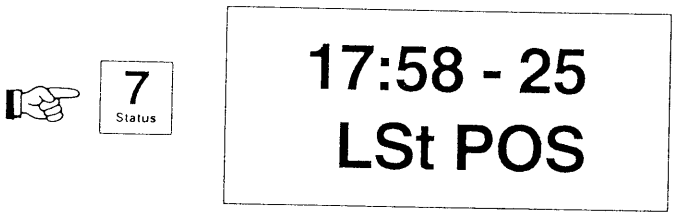


## STATUS Key

Press the **STATUS** key and the **Pilot GPS** will show how many satellites it has locked on to:




Upon turn on, the **Pilot GPS** starts searching for satellites and the above display will first show "SEArCH 0 SAtS", then progress to "SEArCH 1 SAt", "SEArCH 2 SAts" and finally display "GOOd 3 SAtS" or "GOOd 4 SAtS" upon locking on to the necessary 3 or 4 satellites to obtain a position fix. Press the **STATUS** key again to see the time of the Last Good Fix:

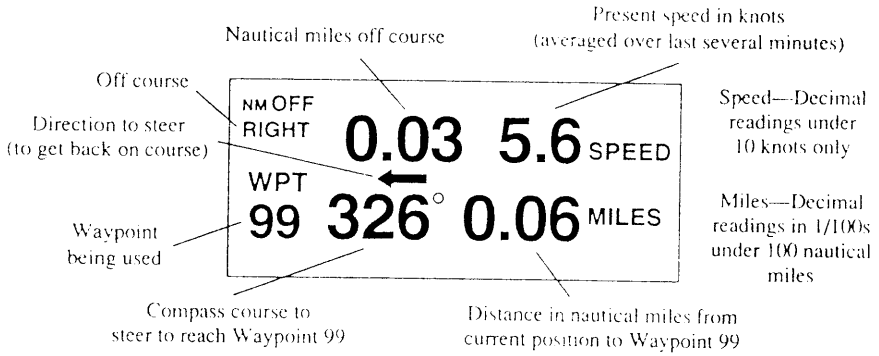



The above display of time of Last Good Fix (Position) uses a 24 hour clock. You need to enter your time zone offset (see Special 01, Page 27) in order to read local time. Pressing the **STATUS** key a third time displays the Loran C GRI chain which is being used for your current position (if applicable).


You can rotate back to the first STATUS screen by pushing the **STATUS** key again, or you can push any key to go to another function.

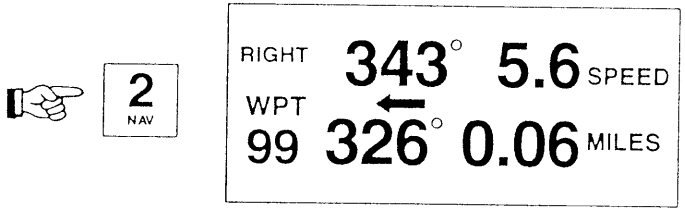
## NAV Key

Pressing the **NAV** key displays the basic navigational screens of the **Pilot GPS**. The navigation screens provide all the information you need to reach your destination Waypoint with great accuracy. Press the **NAV** key one time and the **Pilot GPS** will show:



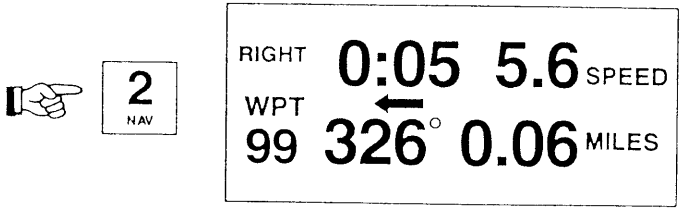

This screen is probably the most used navigation display, providing the course to steer and distance to the Waypoint destination (chosen with the GO TO key). The distance reads in 1/100's of a nautical mile under 100 miles. You will also note the Miles Off Course (Cross Track Error) in the upper left. The Speed shown is based on an average over several minutes.

Press the NAV key again and the display will show COURSE OVER GROUND (COG).




This display shows the average track (the direction the boat has been travelling), the current boat speed, magnetic bearing to the destination, and the current distance to the destination. Data displayed is averaged over several minutes. You will notice that the COG bearings in the upper left of the display will be interrupted occasionally to flash "COG".

Press the NAV key again and the display will show TIME TO GO (TTG).



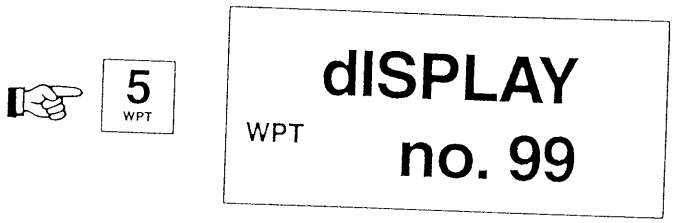

This display tells you how long it will take to get to your selected Waypoint, the average speed at which you are travelling, your compass bearing to the destination, and the distance to the destination. Data displayed is averaged over several minutes. You will notice TTG readings in the upper left of the display will be interrupted occasionally to flash "TTG".

You may switch between the three navigational displays by alternate pressing of the NAV key. Press any other function key to exit the navigational displays.



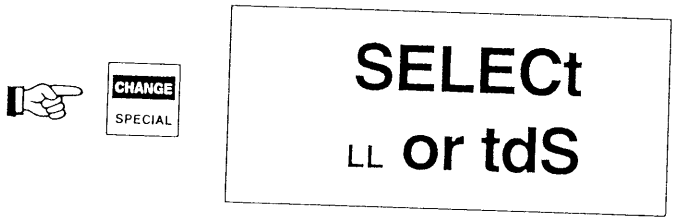
## WPT Key

The Pilot GPS is capable of storing up to 100 Waypoints. To view or edit Waypoints, press the WPT key. The Pilot GPS will show:

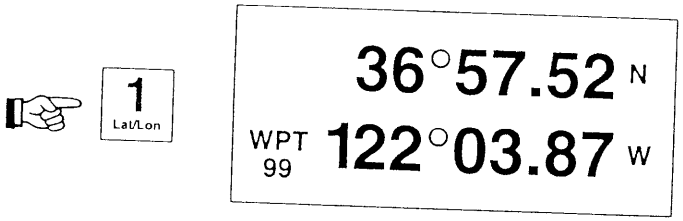



Enter in a TWO DIGIT number for the Waypoint memory location, then press ENTER. The Pilot GPS will display the Latitude/Longitude coordinates currently stored in the selected Waypoint memory location. If you wish to leave the coordinates as they are, push any function key to return to other operations.

To edit or create a new Waypoint press the CHANGE key. The Pilot GPS will show:




To edit the Waypoint using LATITUDE/LONGITUDE coordinates, press the LAT/LON key. The Pilot GPS will display:



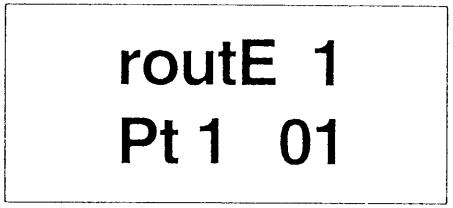

Type in the Latitude coordinates on the top line. Use the ALT key to select N or S, then press ENTER. Use the ALT key to select W or E, then press ENTER. Type in the Longitude coordinates on the bottom line, then press ENTER. Press any function key to go to other operation.

**To edit the Waypoint using Loran C TD coordinates, please refer to Page 23.**

## RTE Key

Once you have Waypoints stored in the Pilot GPS, you can create ROUTES. The Pilot GPS can store up to 10 individual Routes of 16 Waypoints each. To view or edit Routes, press the RTE key. The Pilot GPS will show:

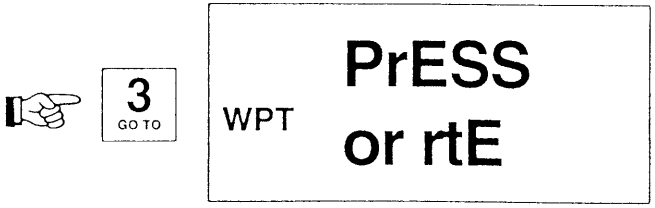

Routes are numbered 0 thru 9. Enter any number 0 thru 9, then press ENTER. The Pilot GPS will display:




Type in the TWO DIGIT Waypoint number you wish to store as the first in your Route, then press ENTER. If you do not wish to change the first Waypoint of the Route, or you are just reviewing the Waypoints of the Route, press ENTER twice. Repeat this procedure for successive Waypoint entries for your Route. To end a Route of less than 16 waypoints, after you have entered the last waypoint, put in WPT 00 as the final point. Press ENTER and the Route will be completed. Press any key to exit the Route mode.

## GO TO Key

To start navigating to a Waypoint or Route, press the GO TO key. The Pilot GPS will show:




To navigate to a WAYPOINT, press the WPT key. The Pilot GPS will display the current Waypoint destination it is navigating to. Type in the TWO DIGIT number of the new Waypoint destination, then press ENTER. The Pilot GPS will start navigating to the new Waypoint destination. **To silence the Waypoint Arrival Alarm, press any key.**

To start navigating a ROUTE, press the RTE key. The Pilot GPS will display the last Route it has navigated. Type in the Route number, 0 thru 9, that you wish to start navigating, then press ENTER.

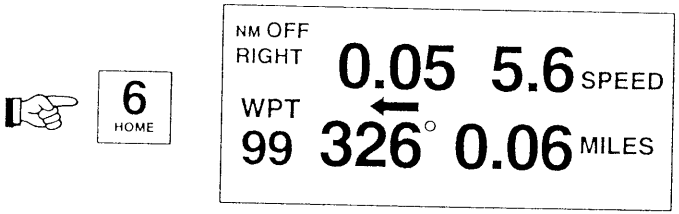


The Pilot GPS will now ask you whether you wish to navigate the Route in forward or reverse order. Press the appropriate key, and you will start navigating to the first Waypoint in the Route order. You will note that the route waypoint destination is flashing in the lower left of the display. If you wish to skip a Waypoint in the Route and go to the next one, press the NEXT key.

To stop navigating a Route, press GO TO and select a new destination.

## HOME Key

The Pilot GPS uses Waypoint #99 as a special **"Home"** location. You must have this special location previously stored in Waypoint #99 in order to use this handy feature. When you are done boating or fishing for the day, press the HOME key. The Pilot GPS will show:

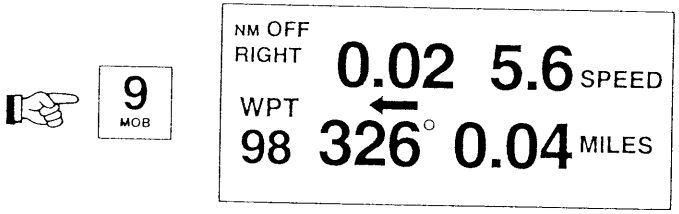



With the simple press of one button, the Pilot GPS is navigating back to your **"Home"** location and displaying all the navigational information you need. **To silence the "Home" Waypoint Arrival Alarm, press any key.**

To exit the **"Home"** navigation mode, press the GO TO key to choose a new Waypoint destination.

## MOB Key

In an emergency, such as "Man OverBoard" (MOB), you can instantly store and navigate to the position of concern. Press the MOB key, and the Pilot GPS will sound an alarm while showing "OVERBOARD", then display:




You will note that all the navigational information you need to return immediately to the location where you pressed the MOB key is displayed, down to 1/100th of a mile. As an added safety feature, if the keyboard is accidently bumped to cause the Pilot GPS to exit the Navigation screen during an emergency such as Man Overboard, simply press the NAV key. You will note that you are still navigating to the Man Overboard position. The MOB location was automatically stored as Waypoint #98 when you pressed the MOB key. **To silence the MOB Alarm, press any key.**

To exit the MOB navigation mode, press GO TO and select a new Waypoint destination.

# *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 (1575 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 present 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 **Pilot GPS** 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 **Pilot GPS** looks up in its data base the known position of each satellite 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 **Pilot GPS** needs to do is calculate all this data 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 are computed and any variations are noted or corrected as necessary, and transmitted to the appropriate satellites.

**WARNING:** While the GPS satellite constellation is considered fully implemented, its status is still considered as experimental. Users are cautioned that 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 (SA) has been implemented by the U.S. DoD to restrict the accuracy of GPS positions. 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.





## Differential GPS Made Simple

The basic GPS system has proven to be quite accurate for most boaters. There are some who desire, and some who require, even better accuracy. There are inherent errors with the GPS system that could not be avoided, such as atmospheric distortions, satellite atomic clock errors and reflected signals, called multipath error. These factors together could account for up to 15 to 20 meter accuracy error. The biggest error factor with the basic GPS system is the intentional source of Selective Availability, or SA, which the U.S. Department of Defense has installed so that no hostile force can use the accuracy of GPS against the U.S. or its allies. Now we're looking at potential errors of up to 100 meters. Thus was born the move towards differential GPS, or DGPS.

Differential GPS is a system of land based GPS receiving stations located at positions that have been very accurately surveyed. The reference GPS station receives the satellite signals, compares the position the satellites have given it with its known surveyed position and computes the difference. This difference is then transmitted via radio beacons from the land based reference station to all DGPS receivers within its range. Accuracy to about five meters is common when close in range to the GPS reference station.

DGPS requires that you have a special receiver connected to the **Pilot GPS**. This DGPS Beacon Receiver uses an antenna to receive the radio signals from the local GPS reference station, computes the corrections and relays them to the **Pilot GPS**. There are several manufacturers of DGPS Beacon Receivers which can interface to the **Pilot GPS**. Please contact **Interphase Customer Service**, (408) 426-2007 for details.

The U.S. Coast Guard DGPS beacons are scheduled to be fully operational in 1996. These Coast Guard DGPS broadcast areas are along coastal areas near harbors, the Great Lakes area and will include Hawaii and Puerto Rico. For inland areas not covered by marine beacons, use of private DGPS systems broadcast over FM radio frequencies are available. There are also some other countries in the planning stage to include DGPS coverage for their waters.

# Advanced Navigation Guide

The **Pilot GPS** 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 **Pilot GPS**. To utilize the system to its optimum, the following section on navigation should be studied. By becoming familiar with these navigational terms and concepts, you will increase your own navigational skills.

## 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 calculation.

COURSE OVER GROUND (COG) This is the true course over the ground on which you are currently heading.

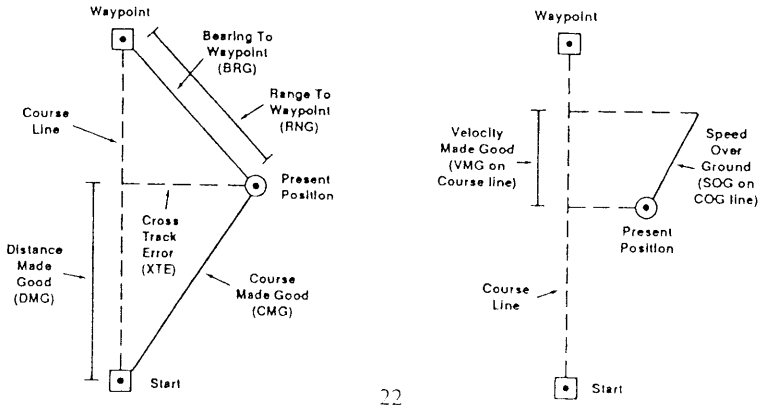
CROSS TRACK ERROR (XTE) This is the distance of your boat, either left or right, from the desired track (start point to destination).

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

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

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 your 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.



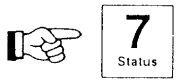



# Using TDs With the Pilot GPS

Although the **Pilot GPS** is calculating positions from satellite signals in Latitude and Longitude, you can instantly convert your current position, or Waypoint positions, to Loran C TD coordinates with the push of one button. (If you are in a location not covered by Loran C, the **Pilot GPS** will not display TDs).

You can easily store TDs in Waypoints for any of the Loran C GRIs in the **Pilot GPS**, even if you are thousands of miles away. Or, if you are operating the **Pilot GPS** in an area with overlapping GRIs, you can simply select whichever GRI you want it to use.

To check which GRI was last used by the **Pilot GPS**, press the **STATUS** key three times.

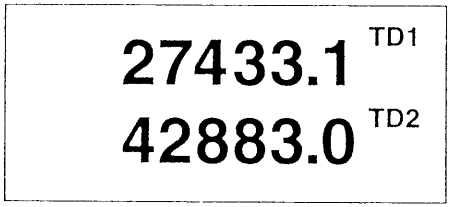




If you want to use TDs that are in a different GRI, enter SPECIAL 10. When the **Pilot GPS** displays the GRI you wish to use, press **ENTER**. You can now press any function key to go to other operations. The **Pilot GPS** is now calculating TD positions for the GRI you have selected.

## Current Position in TDs

To view your current position in TDs, press the **TDs** key. The **Pilot GPS** will show:

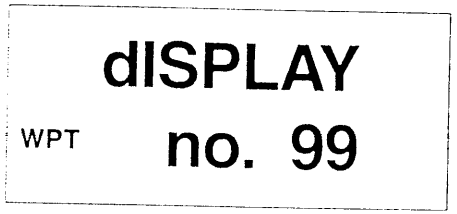




Alternate pressing the TDs key to display any remaining TDs that can be used for your current position. There may be 0, 1, 2 or 3 additional TDs depending on which Loran C GRI you are operating in.

## Storing Waypoints Using TDs

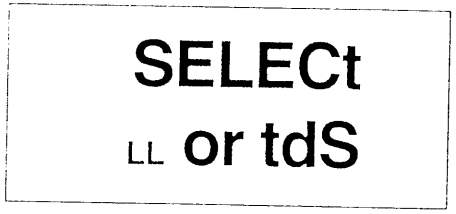
You can store TDs into Waypoints by following these simple steps:

Press the **WPT** key. The **Pilot GPS** will show:


Enter in a TWO DIGIT number for the Waypoint memory location, then press **ENTER**. The **Pilot GPS** will display the coordinates currently stored in the selected Waypoint.

If you wish to leave the Waypoint coordinates as they are, push any function key to return to other operations. To edit or create a new Waypoint press the **CHANGE** key. The **Pilot GPS** will show:

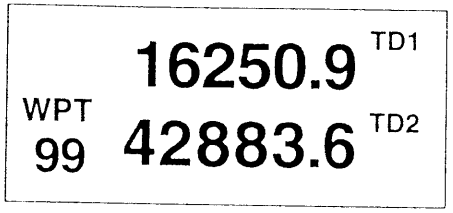

To edit or create a new Waypoint using TD coordinates, press the **TDs** key. The **Pilot GPS** will display:



Whichever Loran C GRI is current or is already used for that Waypoint will be flashing (or "no Gri" if the Waypoint location is outside of Loran C coverage areas). If the GRI is correct for the TDs you wish to store, press **ENTER**.



If you want to store TDs which are outside of your current GRI area, press **CHANGE**. The **Pilot GPS** will rotate displays of all Loran C GRIs it is programmed for. When you see the desired GRI displayed, press **ENTER**. The **Pilot GPS** will show:




Type in the two TD coordinates you wish to store. After entering the last digit of the bottom line, press **ENTER**.

**NOTE:** There could be some problems trying to use the 11 TD for locations near the Texas and Louisiana coast, and the 43 TD near West Palm Beach, Florida. This is due to proximity to the Loran C base line extension of these TD stations.

Press any function key to return to other operations (or push the **LAT/LON** key twice to return to the current LAT/LON position screen).

## Displaying TDs from Waypoints

If you wish to view the Loran C TD coordinates from a Waypoint memory location, first press the **WPT** key. Enter in a TWO DIGIT number for the desired Waypoint, then press **ENTER**.

The **Pilot GPS** will display the Latitude/Longitude coordinates stored for that Waypoint memory location. Press the **TDs** key to view the TD coordinates for the Waypoint. Alternate pressing the **TDs** key to display any remaining TDs for that Waypoint location.

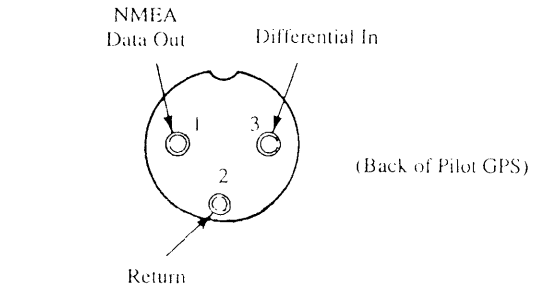
# DGPS & NMEA 0183 Interface

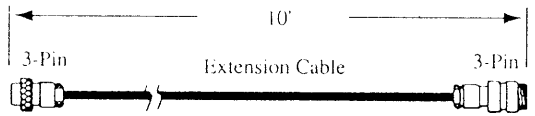
## DGPS Data Input

The Pilot GPS is completely ready to process DGPS data from most DGPS Beacon Receivers which output the industry standard RTCM SC104 format at a rate of 9600 Baud. Connect the DGPS data input to Pin 3, with return to Pin 2.

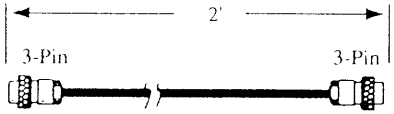
## NMEA 0183 Data Output

The Pilot GPS outputs the industry standard NMEA 0183 format at a rate of 4800 Baud. This serial data output can provide GPS data to some autopilots, track plotters or fishfinders. The NMEA 0183 GPS data outputs from Pin 1, with return to Pin 2.




(Part #04-0003-008)




Interconnection Cable

(Part #04-0006-008)

The NMEA 0183 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,,





# Special Features

The SPECIAL key allows you to use additional features of the **Pilot GPS**. Use these Special features only after a careful reading of this section of the manual, since some of the Special functions, if incorrectly executed, could result in navigational errors.

## Special 00 - Backlight On/Off

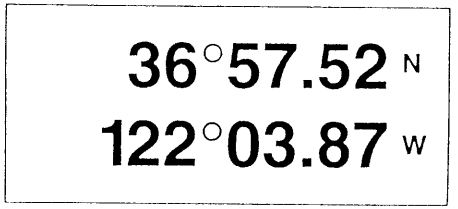
Enter a SPECIAL 00 to turn the display backlight On or Off. This Special functions as a "Toggle Switch"; that is, it alternates turning the backlight On and Off.

## Special 01 - Initialize

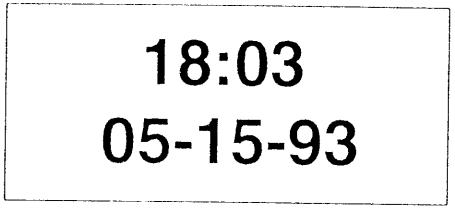
For first time turn on, if you have moved more than 100 miles from the last start up location, or if it has been over one week since you last started the **Pilot GPS**, you can greatly improve the acquisition time of locking on to satellite signals by using SPECIAL 01. Refer to Time Zone Offsets and Start Up Locations, Page 35, to complete this Special.

Press the **SPECIAL** key, type in 01, then press **ENTER**. The **Pilot GPS** display will show:


Put in the time offset for your location, then press **ENTER**. Press **Key 1** for PLUS or **Key 4** for NEG to select + or - hours. If you only wish to change your Time Offset, you may now press **Key 1** to indicate DONE. The **Pilot GPS** will display the Time Offset you have just entered. Press any other function key to go to other operations. To continue with the Initialization, press **Key 4**. The **Pilot GPS** will now show:



Enter the digits for Latitude. After the last digit of Latitude is entered, use the **ALT** key to select N for North or S for South, as appropriate, then press **ENTER**. Next, use the **ALT** key to select W for West or E for East, as appropriate, and again press **ENTER**. Now you enter the digits for Longitude (remember the leading "0" if less than 100 degrees Longitude). After you enter the last digit of Longitude, press **ENTER**. The **Pilot GPS** will show:



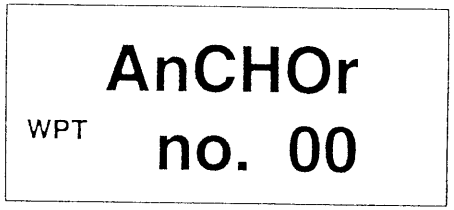

Enter the approximate local time (24 hour clock). Next, enter the digits for the month, day and year. The **Pilot GPS** is now initialized. Press the **STATUS** key and you can see how the receiver is doing as it searches for and locks on to satellites. You should typically be locked on to signals and see a GOOD message within three minutes of Initialization.

## Special 02 - View Time and Date

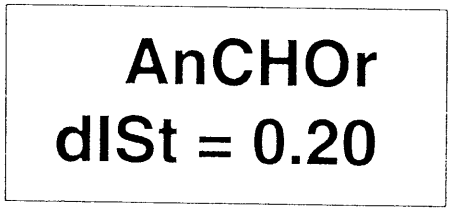
If you have entered your Time Offset (see Special 01), you can use SPECIAL 02 to view a display of the current local time (24 hour clock) and date. This is very accurate data provided from the GPS satellites.

## Special 03 - Anchor Watch

Special 03, called Anchor Watch, reports when your boat has drifted outside an imaginary circle surrounding your anchor Waypoint. When you release the anchor, press the **SAVE** key and select a Waypoint number for your anchoring position. Next, when you select SPECIAL 03, the **Pilot GPS** will first ask you for an anchor Waypoint, the display showing:




Enter the Waypoint number you have saved for your anchoring position. The **Pilot GPS** will ask for an "anchor distance", the display showing:



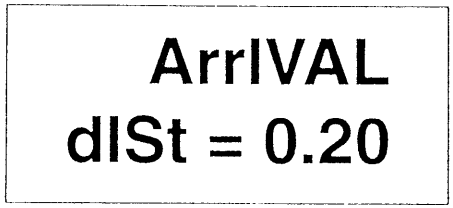





Put in any distance between 0.01 and 0.99 nautical mile, then press **ENTER**. If your boat drifts beyond this distance from your anchor Waypoint, the unit will beep to alarm you. **To silence the alarm and exit the Anchor Watch, press the GO TO key and select a new destination.**

## Special 04 - Arrival Alarm

This Special is used to set the arrival alarm distance from Waypoints. This distance represents the radius of an imaginary circle around the destination Waypoint. Upon entering this Special, the display will show:




Put in an arrival distance between 0.01 and 0.99 nautical mile, then press **ENTER**. Upon arriving within this distance from a destination Waypoint, the **Pilot GPS** will start beeping to alarm you. **To silence the alarm, press any key.**

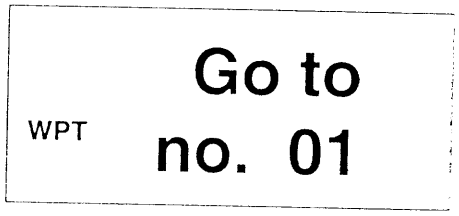
## Special 05 - Display Altitude

This Special displays your current position's approximate altitude in feet. This calculation can only be made when the **Pilot GPS** has locked on to four satellites. This is the most difficult position calculation for any GPS receiver to make, and you can expect considerable fluctuations from surveyed altitudes.

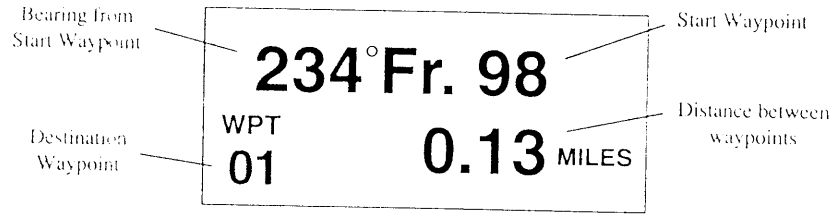
## Special 06 - Navigation Calculator

This is a convenient reference Special which calculates the True compass bearing and distance between any two Waypoints stored in the **Pilot GPS** memory. Press SPECIAL 06, then **ENTER**. The **Pilot GPS** shows:

Put in your Start Waypoint, then press ENTER. The display will then ask:




Put in the Waypoint number you wish to Go To, then press ENTER. The display will now show:




The information displayed on the top line gives you the True bearing Fr. (From) the Start Waypoint. In the lower left is the destination Waypoint you are Going To, followed by the distance in nautical miles between the two Waypoints.

NOTE: The bearing is given in TRUE degrees, not MAGNETIC. Add or subtract magnetic variance to calculate the Magnetic course between the Waypoints.

## Special 07 - Display Speed as VMG

The Pilot GPS normally expresses the speed shown in the navigation displays as Speed Over Ground (SOG). As an alternative, you may display speed in terms of Velocity Made Good (VMG), also known as Course Speed. SPECIAL 07 allows you to determine which speed mode is currently being used. Either displayed speed is in knots and is averaged over a few minutes. Most boaters will want to use Ground Speed. VMG is especially for sailing boats to indicate closing speed on the desired waypoint irregardless of course or bearing changes (tacking) made enroute. The Pilot GPS defaults to SOG upon turning Off and back On.

## Special 08 - Magnetic Variance

By selecting SPECIAL 08 you are requesting that the Pilot GPS display the magnetic variation for your present position.

## Special 09 - Differential On/Off

Enter a SPECIAL 09 to select Differential GPS processing or regular GPS processing. If you select differential GPS, you must then turn the unit Off and back On in order to change back to regular GPS. The use of this Special is dependent upon having a Differential Beacon Receiver properly hooked up to the Pilot GPS. Call Interphase Customer Service (408) 426-2007 for further details.





## Special 10 - GRI Selection

This Special allows you to select which Loran-C GRI is to be used by the Pilot GPS for its Latitude/Longitude to TDs conversions. If you wish to view which GRI the Pilot GPS is currently using, use the STATUS key as described earlier in the manual.

## Special 11 - Display Software Version

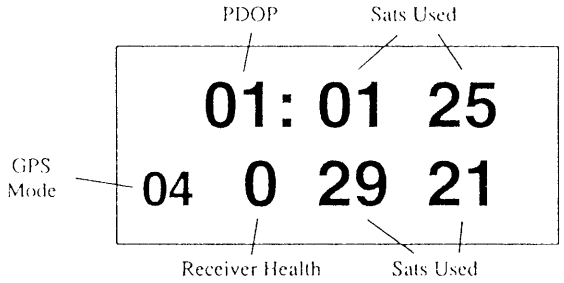
This Special displays the software versions of your Pilot GPS. The top line, "GPS", is for the receiver. The bottom line, "C-d", is for the operations software of the control display. For service calls it can be helpful to have this information ready.

## Special 12 - Change Starting Waypoint

When you start navigating to a new destination Waypoint, the Pilot GPS automatically designates your current position as Waypoint 00, the starting point of your course line. By using SPECIAL 12, you can designate any previously stored Waypoint as the starting point of your course line.

## Special 13 - Satellite Information

SPECIAL 13 provides status information monitoring the success of satellite acquisition. A typical display may show:




PDOP stands for Position Dilution Of Precision. The lower the rating the better your position fix. Above 12 is not usable. A PDOP of 00 means no satellites are currently being tracked, 0-03 is excellent, 04-06 good, 07-09 acceptable, 10-12 marginal and above 12 unacceptable.

The satellites being used by the Pilot GPS are identified by their respective satellite numbers.

GPS Mode pertains to the functioning condition of the receiver, and is displayed as follows:

00 = no satellites being tracked
01 = 1 satellite tracked (this is enough to provide time)
03 = 3 satellites tracked (minimum for 2D position fix)
04 = 4 satellites tracked (3D position fix;includes altitude)

Health of the receiver is information of current status on efforts to get signals from the satellites.

Receiver health is coded as follows:
0 = doing position fixes (good)
1 = no GPS Time yet
3 = PDOP is above 12 (not usable for fixes)
8 = no usable satellites
9 = 1 usable satellite
A = 2 usable satellites
B = 3 usable satellites.

A typical Health sequence upon start up would be 1, 9, A, 0.

## Special 14 - Select Map Datum

SPECIAL 14 is used to select which map datum the **Pilot GPS** is to reference when calculating position fixes. The default datum is 000 (WGS-84; World Geodetic Survey-1984), which is the most recent world wide survey. Since some charts around the world may reference other local geodetic surveys, the **Pilot GPS** allows you to select from 181 map datums.

WARNING: The map datum selected is stored in the **Pilot GPS** memory. You must do SPECIAL 14 again to change it. Considerable navigational errors may result from using the wrong datum.

This list provides the number code to enter for each of the 181 map datums available:

### Master Datum List

| Number | Map Datum |
|---|---|
| 000 | WGS-84 (default) |
| 001 | Tokyo |
| 002 | NAD-27 |
| 003 | Alaska/Canada |
| 004 | European |
| 005 | Australian |
| 006 | WGS-72 |
| 007 | NAD-83 |
| 008 | NAD-02 |
| 009 | Mexican |
| 010 | Hawaiian |
| 011 | Astronomic |
| 012 | U.S.Navy |
| 013 | European |
| 014 | Australian 1984 |
| 015 | Adindan-Mean |
| 016 | Adindan-Ethiopia |
| 017 | Adindan-Mali |
| 018 | Adindan-Senegal |
| 019 | Adindan-Sudan |
| 020 | Afgooye-Somalia |
| 021 | Ain El Abd-Bahrain |
| 022 | Anna 1 Astro 1965 |
| 023 | Arc 1950-Mean |
| 024 | Arc 1950-Botswana |
| 025 | Arc 1950-Lesotho |
| 026 | Arc 1950-Malawi |
| 027 | Arc 1950-Swaziland |
| 028 | Arc 1950-Zaire |
| 029 | Arc 1950-Zambia |
| 030 | Arc 1950-Zimbabwe |
| 031 | Arc 1960-Mean |
| 032 | Arc 1960-Kenya |
| 033 | Arc 1960-Tanzania |
| 034 | Ascension Is. 1958 |
| 035 | Astro Beacon E 1945 |
| 036 | Astro B4 Sorol Atoll |
| 037 | Astro Pos 71/4 |
| 038 | Astro Station 1952 |
| 039 | Australian Geo 1966 |
| 040 | Bellevue (IGN) |
| 041 | Bermuda 1957 |
| 042 | Bogota Observatory |
| 043 | Compo Inchauspe |
| 044 | Canton Island 1966 |
| 045 | Cape-South Africa |





| Number | Map Datum |
|---|---|
| 046 | Cape Canaveral-Mean |
| 047 | Carthage-Tunisia |
| 048 | Chatham 1971 |
| 049 | Chua Astro-Paraguay |
| 050 | Corrego Alegre-Brazil |
| 051 | Djakarta-Batavia |
| 052 | DOS 1968, Gizo I |
| 053 | Easter Island 1967 |
| 054 | Euro 1950-Mean |
| 055 | Euro 1950-Cyprus |
| 056 | Euro 1950-Egypt |
| 057 | Euro 1950-Eng/Scot |
| 058 | Euro 1950-Eng/Ire |
| 059 | Euro 1950-Greece |
| 060 | Euro 1950-Iran |
| 061 | Euro 1950-Sardinia |
| 062 | Euro 1950-Sicily |
| 063 | Euro 1950-Norway |
| 064 | Euro 1950-Port/Spain |
| 065 | European 1979 |
| 066 | Gandajika Base-Maldives |
| 067 | Geodetic Datum 1949 -New Zealand |
| 068 | Guam 1963 |
| 069 | GUXI Astro Guad. |
| 070 | Hjorsey 1955-Iceland |
| 071 | Hong Kong 1963 |
| 072 | Indian-Thai/Viet |
| 073 | Indian-India/Nepal |
| 074 | Ireland 1965 |
| 075 | ISTS 073 Astro 1969 |
| 076 | Johnston Island 1961 |
| 077 | Kandawala-Sri Lanka |
| 078 | Kerguelen Island |
| 079 | Kertau 1948-Malayan |
| 080 | La Reunion-Masc. |
| 081 | L.C.5 Astro-Cayman Brac. |
| 082 | Liberia 1964 |
| 083 | Luzon-Phillipines |
| 084 | Luzon-Mindanao |
| 085 | Mahe 1971-Seychelles |
| 086 | Marco Astro |
| 087 | Massawa-Eritrea |
| 088 | Merchich-Morocco |
| 089 | Midway Astro 1961 |
| 090 | Minna-Nigeria |
| 091 | Nahrwan-Masirah |
| 092 | Nahrwan-UAE |
| 093 | Nahrwan-Saudi |
| 094 | Namibia |
| 095 | Naparima-BWI |
| 096 | NAD 27-Western US |
| 097 | NAD 27-Eastern US |
| 098 | NAD 27-Alaska |
| 099 | NAD 27-Bahamas |
| 100 | NAD 27-San Salvador |
| 101 | NAD 27-Canada |
| 102 | NAD 27-Alberta/BC |
| 103 | NAD 27-East Canada |
| 104 | NAD 27-Manitoba/Ont |
| 105 | NAD 27- NW Ter/Sask |
| 106 | NAD 27-Yukon |
| 107 | NAD 27-Canal Zone |
| 108 | NAD 27-Caribbean |
| 109 | NAD 27-Central Amer |
| 110 | NAD 27-Cuba |
| 111 | NAD 27-Greenland |
| 112 | NAD 27-Mexico |
| 113 | NAD 83-Alaska |
| 114 | NAD 83-Canada |
| 115 | NAD 83-CONUS |
| 116 | NAD 83-Mex/Cent Am |
| 117 | Observatorio 1966 |
| 118 | Old Egyptian 1907 |
| 119 | Old Hawaiian-Mean |
| 120 | Old Hawaiian-Hawaii |
| 121 | Old Hawaiian-Kauai |
| 122 | Old Hawaiian-Maui |
| 123 | Old Hawaiian-Oahu |
| 124 | Oman |
| 125 | Ord Sur Brit 1936-Mean |
| 126 | OSB-England |
| 127 | OSB-Isle of Man |
| 128 | OSB-Scotland/Shetland |
| 129 | OSB-Wales |
| 130 | Pico De Las Nieves |
| 131 | Pitcairn Astro 1967 |
| 132 | Prov So Chilean 1963 |
| 133 | Prov S American 1956-Mean |
| 134 | Prov S American 1956-Bolivia |
| 135 | Prov S American 1956-N Chile |
| 136 | Prov S American 1956-S Chile |
| 137 | Prov S American 1956-Colombia |
| 138 | Prov S American 1956-Ecuador |
| 139 | Prov S American 1956-Guyana |
| 140 | Prov S American 1956-Peru |

| Number | Map Datum | Number | Map Datum |
|---|---|---|---|
| 141 | Prov S American 1956-Venezuela | 161 | South Asia |
| 142 | Puerto Rico | 162 | Southeast Base |
| 143 | Quatar National | 163 | Southwest Base |
| 144 | Quornoq-So Greenland | 164 | Timbalai 1948 |
| 145 | Rome 1980 | 165 | Tokyo-Mean |
| 146 | Santa Braz-Azores | 166 | Tokyo-Korea |
| 147 | Santo DOS-Vanuatu | 167 | Tokyo-Okinawa |
| 148 | Sapper Hill 1948 | 168 | Tristan Astro 1968 |
| 149 | S American 1969-Mean | 169 | Viti Levu 1916-Fiji |
| 150 | S American 1969-Argentina | 170 | Wake-Eniwetok |
| 151 | S American 1969-Bolivia | 171 | Zanderij-Surinam |
| 152 | S American 1969-Brazil | 172 | Bukit Rimpah |
| 153 | S American 1969-Chile | 173 | Camp Area Astro |
| 154 | S American 1969-Columbia | 174 | Gunung Segara |
| 155 | S American 1969-Ecuador | 175 | Herai North |
| 156 | S American 1969-Guyana | 176 | Hu-Tzu-Shan |
| 157 | S American 1969-Paraguay | 177 | Tananarive Observ 1925 |
| 158 | S American 1969-Peru | 178 | Yacare |
| 159 | S American 1969-Trin/Tob | 179 | Tokyo-GSI coordinates |
| 160 | S American 1969-Venezuela | 180 | RT-90 (Sweden) |

## Special 15 - LCD Display Test

SPECIAL 15 allows you to self-test the **Pilot GPS** LCD display. All digit segments and all characters will be shown. This information may be useful for service calls.

## Special 16 - Display Datum

This Special displays which map datum is currently being used by the **Pilot GPS**. See Special 14 for a list of datums available.

## Special 98 - Test Drive Speed & Direction

When you are in the Demonstration Mode (Special 99), you can use SPECIAL 98 to start simulated "cruising", change the simulated direction, or you can halt the simulated speed and direction. Press SPECIAL 98, then press ENTER. The **Pilot GPS** will show:

```
SPEEd = 0
dir = 1234
```

If you do not wish to have simulated speed and direction, press 0. If you do wish to have simulated speed, then you must give the **Pilot GPS** a direction; press 1 for North, 2 for East, 3 for South or 4 for West. If you select a direction, the simulated speed will be 6 knots. Simulated speed is always 6 knots, or it is 0.





## Special 99 - Test Drive/Demo

SPECIAL 99 is a feature of the **Pilot GPS** which provides GPS navigation instruction and is useful for GPS operation demonstrations. You can also pre-program trips and routes, make navigational calculations of bearing and distance between any Waypoints.

You need not have the antenna connected to use this Special. Press SPECIAL 99, then press **ENTER**. The **Pilot GPS** will briefly show "tESt DrIVE", and then will display the Lat/Lon position screen. Put in your simulated Latitude and Longitude coordinates. After you put in the last Longitude digit, press **ENTER**. The **Pilot GPS** is now in Demo mode.

You can exit the Test Drive/Demo by either entering Special 99 again, or by turning the **Pilot GPS** off.

# *Time Zone Offsets*

## Time Zone Offsets & Start Up Locations

In normal operation, your **Pilot GPS** remembers all of your waypoints and where it was last shut off. When the **Pilot GPS** is shipped to you all data (including start-up information and waypoints) is erased or in a random condition. Therefore, the first time you turn on the **Pilot GPS**, it can be helpful to initialize the unit by doing Special 01, then enter a Time Offset and Start Up location to speed up acquisition time of satellite signals.

The internal memory is maintained by a 3V lithium battery which has a life expectancy of at least five years from date of manufacture. At some future date, the battery will need to be replaced and the memory retention will be good for another five years.

## Time Zone Offsets

Entering a Time Offset will provide you with an accurate display of local time (24 hour clock), as well as speed up your "locking on" to satellite signals. During the Initialization (Special 01), the **Pilot GPS** will ask for the number of hours, plus or minus, from UTC (Universal Time coordinated), or Greenwich Mean Time. See the below table for U.S. Time Offsets:

| Time Zone | Standard Time | Daylight Savings Time |
|---|---|---|
| Eastern | -05 Hours | -04 Hours |
| Central | -06 Hours | -05 Hours |
| Mountain | -07 Hours | -06 Hours |
| Pacific | -08 Hours | -07 Hours |

# *Start Up Locations (U.S.)*

Use the following table to find the location nearest you. Enter these numbers exactly as they appear. These numbers are not to be used for navigation, but only as start-up data for the Pilot GPS.

| | | LAT | LON | GRI |
|---|---|---|---|---|
| ALABAMA | Bayou La Batre | 30 20.00 | 088 15.00 | 7980 |
| | Gulf Shores | 30 15.00 | 087 40.00 | 7980 |
| | Mobile | 30 40.00 | 088 00.00 | 7980 |
| ALASKA | Anchorage | 61 10.00 | 149 50.00 | 7960 |
| | Juneau | 58 25.00 | 134 30.00 | 7960 |
| | Ketchikan | 55 20.00 | 131 35.00 | 7960 |
| ARIZONA | Page | 36 57.00 | 111 27.00 | 9610 |
| | Roosevelt Res. | 33 45.00 | 111 00.00 | 9610 |
| | Yuma | 32 40.00 | 114 40.00 | 9610 |
| CALIFORNIA | Big Sur | 36 10.00 | 121 45.00 | 9940 |
| | Bodega Bay | 38 20.00 | 123 00.00 | 9940 |
| | Cresent City | 41 45.00 | 124 10.00 | 9940 |
| | Eureka | 40 50.00 | 124 10.00 | 9940 |
| | Fort Bragg | 39 30.00 | 123 50.00 | 9940 |
| | Grover City | 35 05.00 | 120 35.00 | 9940 |
| | Half Moon Bay | 37 30.00 | 122 25.00 | 9940 |
| | Imperial Beach | 32 40.00 | 117 10.00 | 9940 |
| | Long Beach | 33 45.00 | 118 15.00 | 9940 |
| | Monterey | 36 35.00 | 121 50.00 | 9940 |
| | Morro Bay | 35 20.00 | 120 50.00 | 9940 |
| | Newport Beach | 33 40.00 | 118 00.00 | 9940 |
| | Oceanside | 33 15.00 | 117 25.00 | 9940 |
| | Point Arena | 38 50.00 | 123 40.00 | 9940 |
| | P. Conception | 34 25.00 | 120 25.00 | 9940 |
| | Port Hueneme | 34 10.00 | 119 10.00 | 9940 |
| | Redondo Beach | 33 50.00 | 118 20.00 | 9940 |
| | Rockport | 39 45.00 | 123 45.00 | 9940 |
| | San Diego | 32 45.00 | 117 15.00 | 9940 |
| | San Francisco | 37 50.00 | 122 25.00 | 9940 |
| | San Simeon | 35 35.00 | 121 10.00 | 9940 |
| | Santa Barbara | 34 25.00 | 119 40.00 | 9940 |
| | Santa Cruz | 36 55.00 | 122 00.00 | 9940 |
| | Santa Monica | 34 00.00 | 118 25.00 | 9940 |
| | Ventura | 34 15.00 | 119 20.00 | 9940 |





| | | LAT | LON | GRI |
|---|---|---|---|---|
| CONNECTICUT | | | | |
| | Bridgeport | 41 10.00 | 073 10.00 | 9960 |
| | New Haven | 41 15.00 | 072 55.00 | 9960 |
| | New London | 41 20.00 | 072 05.00 | 9960 |
| | Stamford | 41 05.00 | 073 30.00 | 9960 |
| DELAWARE | | | | |
| | Delaware Bay | 39 00.00 | 075 20.00 | 9960 |
| | Rehoboth Beach | 38 40.00 | 075 10.00 | 9960 |
| FLORIDA | | | | |
| | Apalachicola | 29 45.00 | 085 00.00 | 7980 |
| | Boca Raton | 26 20.00 | 080 00.00 | 7980 |
| | Bradenton | 27 30.00 | 082 35.00 | 7980 |
| | Cape Coral | 26 35.00 | 082 00.00 | 7980 |
| | Cedar Key | 29 10.00 | 083 00.00 | 7980 |
| | Clearwater | 28 00.00 | 082 50.00 | 7980 |
| | Cocoa Beach | 28 20.00 | 080 35.00 | 7980 |
| | Crystal River | 28 55.00 | 082 40.00 | 7980 |
| | Daytona Beach | 29 15.00 | 081 00.00 | 7980 |
| | Destin | 30 25.00 | 086 30.00 | 7980 |
| | Fort Lauderdale | 26 10.00 | 080 10.00 | 7980 |
| | Fort Pierce | 27 30.00 | 080 20.00 | 7980 |
| | Hollywood | 26 00.00 | 080 10 00 | 7980 |
| | Jacksonville B. | 30 15.00 | 081 20.00 | 7980 |
| | Jensen Beach | 27 15.00 | 080 10.00 | 7980 |
| | Key Biscayne | 25 40.00 | 080 10.00 | 7980 |
| | Key Largo | 25 10.00 | 080 25.00 | 7980 |
| | Key West | 25 30.00 | 081 50.00 | 7980 |
| | Marathon | 24 40.00 | 081 10.00 | 7980 |
| | Marco | 25 55.00 | 081 45.00 | 7980 |
| | Melbourne | 28 05.00 | 080 30.00 | 7980 |
| | Miami | 25 45.00 | 080 10.00 | 7980 |
| | Naples | 26 10.00 | 081 50.00 | 7980 |
| | New Smyrna B | 29 00.00 | 080 55.00 | 7980 |
| | Panama City | 30 10.00 | 085 40.00 | 7980 |
| | Pensacola | 30 25.00 | 087 15.00 | 7980 |
| | Pompano Beach | 26 15.00 | 080 05.00 | 7980 |
| | Port Ritchey | 28 20.00 | 082 45.00 | 7980 |
| | Port St. Joe | 29 50.00 | 085 20.00 | 7980 |
| | Punta Gorda | 26 55.00 | 082 00.00 | 7980 |
| | Sarasota | 27 20.00 | 082 30.00 | 7980 |
| | St. Aug'tine B. | 29 50.00 | 081 10.00 | 7980 |
| | St. Petersburg | 27 45.00 | 082 40.00 | 7980 |
| | Tampa | 27 55.00 | 082 30.00 | 7980 |
| | Tarpon Springs | 28 10.00 | 082 50.00 | 7980 |
| | Titusville | 28 40.00 | 080 40.00 | 7980 |
| | Venice | 27 05.00 | 082 30.00 | 7980 |
| | Vero Beach | 27 40.00 | 080 20.00 | 7980 |
| | West Palm Beach | 26 50.00 | 080 00.00 | 7980 |

| | LAT | LON | GRI |
|---|---|---|---|
| **GEORGIA** | | | |
| Brunswick | 31 10.00 | 081 25.00 | 7980 |
| Savannah | 32 00.00 | 081 10.00 | 7980 |
| **HAWAII** | | | |
| Honolulu | 21 20.00 | 157 50.00 | 4990 |
| Kailua-Kona | 19 50.00 | 155 60.00 | 4990 |
| Lahaina | 20 50.00 | 156 40.00 | 4990 |
| **IDAHO** | | | |
| Coeur d'Alene | 47 32.00 | 116 39.00 | 8290 |
| Idaho Falls | 43 30.00 | 112 01.00 | 9940 |
| Sandpoint | 48 17.00 | 116 34.00 | 8290 |
| **ILLINOIS** | | | |
| Chicago | 41 50.00 | 087 35.00 | 8970 |
| Evanston | 42 00.00 | 087 45.00 | 8970 |
| Waukegan | 42 20.00 | 087 50.00 | 8970 |
| **INDIANA** | | | |
| Gary | 41 30.00 | 087 15.00 | 8970 |
| **LOUISIANA** | | | |
| Abbeville | 29 55.00 | 092 05.00 | 7980 |
| Cameron | 29 45.00 | 093 20.00 | 7980 |
| Houma | 29 30.00 | 090 40.00 | 7980 |
| Lake Charles | 30 10.00 | 093 10.00 | 7980 |
| Morgan City | 29 35.00 | 091 10.00 | 7980 |
| New Iberia | 30 00.00 | 091 50.00 | 7980 |
| New Orleans | 30 00.00 | 090 00.00 | 7980 |
| Slidel | 30 10.00 | 089 45.00 | 7980 |
| **MAINE** | | | |
| Bar Harbor | 44 20.00 | 068 15.00 | 9960 |
| Belfast | 44 25.00 | 069 00.00 | 9960 |
| Brunswick | 44 00.00 | 070 00.00 | 9960 |
| Millbridge | 44 30.00 | 067 50.00 | 9960 |
| Perry | 45 00.00 | 067 00.00 | 9960 |
| Rockland | 44 00.00 | 069 00.00 | 9960 |
| Portland | 43 40.00 | 070 20.00 | 9960 |
| **MARYLAND** | | | |
| Annapolis | 39 00.00 | 076 30.00 | 9960 |
| Cambridge | 38 35.00 | 076 05.00 | 9960 |
| Crisfield | 38 00.00 | 075 50.00 | 9960 |
| Lexington Park | 38 15.00 | 076 25.00 | 9960 |
| Ocean City | 38 20.00 | 075 05.00 | 9960 |





| | LAT | LON | GRI |
|---|---|---|---|
| **MASSACHUSETTS** | | | |
| Boston | 42 20.00 | 071 00.00 | 9960 |
| Eastham | 41 50.00 | 070 00.00 | 9960 |
| Falmouth | 41 30.00 | 070 35.00 | 9960 |
| Gloucester | 42 35.00 | 070 40.00 | 9960 |
| Lynn | 42 30.00 | 070 55.00 | 9960 |
| New Bedford | 41 40.00 | 070 55.00 | 9960 |
| Newburyport | 42 45.00 | 070 50.00 | 9960 |
| Plymouth | 42 00.00 | 070 40.00 | 9960 |
| Pocasset | 41 40.00 | 070 40.00 | 9960 |
| Provincetown | 42 05.00 | 070 10.00 | 9960 |
| Quincy | 42 15.00 | 071 00.00 | 9960 |
| Sagamore | 41 45.00 | 070 30.00 | 9960 |
| Salem | 42 30.00 | 070 55.00 | 9960 |
| S. Yarmouth | 41 40.00 | 070 10.00 | 9960 |
| **MICHIGAN** | | | |
| Alpena | 45 00.00 | 083 30.00 | 8970 |
| Bay City | 43 40.00 | 083 55.00 | 8970 |
| Benton Harbor | 42 05.00 | 086 35.00 | 8970 |
| Cheboygan | 45 40.00 | 084 30.00 | 8970 |
| Copper Harbor | 47 30.00 | 087 55.00 | 8970 |
| Detroit | 42 20.00 | 083 00.00 | 9960 |
| Escanaba | 45 40.00 | 087 05.00 | 8970 |
| Gould City | 46 10.00 | 085 45.00 | 8970 |
| Grand Marais | 46 40.00 | 086 00.00 | 8970 |
| Hessel | 46 00.00 | 084 25.00 | 8970 |
| Holland | 42 50.00 | 086 15.00 | 8970 |
| Houghton | 47 05.00 | 088 30.00 | 8970 |
| Ludington | 43 55.00 | 086 30.00 | 8970 |
| Manistee | 44 15.00 | 086 20.00 | 8970 |
| Manistique | 45 55.00 | 086 15.00 | 8970 |
| Marquette | 46 35.00 | 087 20.00 | 8970 |
| Menominee | 45 10.00 | 087 35.00 | 8970 |
| Monroe | 41 50.00 | 083 15.00 | 8970 |
| Munising | 46 25.00 | 086 35.00 | 8970 |
| Muskegon | 43 10.00 | 086 25.00 | 8970 |
| Northport | 45 05.00 | 085 40.00 | 8970 |
| Onekama | 44 25.00 | 086 20.00 | 8970 |
| Ontonagon | 46 50.00 | 089 20.00 | 8970 |
| Petoskey | 45 20.00 | 085 00.00 | 8970 |
| Port Austin | 44 00.00 | 083 00.00 | 8970 |
| Port Hope | 44 00.00 | 082 50.00 | 9960 |
| Port Huron | 43 00.00 | 082 30.00 | 8970 |
| South Haven | 42 25.00 | 086 20.00 | 8970 |
| St. Ignace | 45 50.00 | 084 45.00 | 8970 |
| Tawas City | 44 20.00 | 083 25.00 | 8970 |
| Whitefish Point | 46 45.00 | 085 00.00 | 8970 |
| **MINNESOTA** | | | |
| Duluth | 46 45.00 | 092 00.00 | 8970 |
| Grand Marais | 47 50.00 | 090 20.00 | 8970 |
| Grand Potage | 48 00.00 | 089 40.00 | 8970 |
| Silver Bay | 47 15.00 | 091 15.00 | 8970 |
| Two Harbors | 47 00.00 | 091 40.00 | 8970 |

| | LAT | LON | GRI |
|---|---|---|---|
| **MISSISSIPPI** | | | |
| Bay St. Louis | 30 20.00 | 089 20.00 | 7980 |
| Biloxi | 30 25.00 | 088 55.00 | 7980 |
| Gulfport | 30 20.00 | 089 05.00 | 7980 |
| Pascagoula | 30 20.00 | 088 35.00 | 7980 |
| **MONTANA** | | | |
| Fort Peck | 47 58.00 | 106 30.00 | 8290 |
| Polson | 47 40.00 | 114 10.00 | 8290 |
| Yellowstone Lake | 44 27.00 | 110 03.00 | 9610 |
| **NEBRASKA** | | | |
| Ogallala | 41 08.00 | 101 44.00 | 8970 |
| Omaha | 41 18.00 | 095 57.00 | 8970 |
| **NEW HAMPSHIRE** | | | |
| Portsmouth | 43 00.00 | 070 45.00 | 9960 |
| **NEW JERSEY** | | | |
| Asbury Park | 40 15.00 | 074 00.00 | 9960 |
| Atlantic City | 39 20.00 | 074 25.00 | 9960 |
| Cape May | 38 55.00 | 074 55.00 | 9960 |
| Delaware Bay | 39 15.00 | 075 15.00 | 9960 |
| Perth Amboy | 40 30.00 | 074 15.00 | 9960 |
| Point Pleasant | 40 05.00 | 074 00.00 | 9960 |
| Sandy Hook | 40 30.00 | 074 00.00 | 9960 |
| Stone Harbor | 39 00.00 | 074 45.00 | 9960 |
| **NEW MEXICO** | | | |
| Elephant Butte | 33 25.00 | 107 10.00 | 9610 |
| Fort Sumner | 34 30.00 | 104 17.00 | 9610 |
| **NEW YORK** | | | |
| Bayshore | 40 45.00 | 073 15.00 | 9960 |
| Buffalo | 42 50.00 | 078 55.00 | 9960 |
| Dunkirk | 42 30.00 | 079 20.00 | 9960 |
| Greenport | 41 05.00 | 072 20.00 | 9960 |
| Kings Point | 40 50.00 | 073 45.00 | 9960 |
| Lakeside Beach | 43 20.00 | 078 15.00 | 9960 |
| Long Beach | 40 35.00 | 073 35.00 | 9960 |
| Mastic | 40 50.00 | 072 50.00 | 9960 |
| Montauk | 41 00.00 | 072 00.00 | 9960 |
| New Rochelle | 40 55.00 | 073 45.00 | 9960 |
| Northport | 40 55.00 | 073 21.00 | 9960 |
| Oswego | 43 25.00 | 076 30.00 | 9960 |
| Riverhead | 40 55.00 | 072 40.00 | 9960 |
| Rochester | 43 15.00 | 077 35.00 | 9960 |
| Roosevelt Beach | 43 20.00 | 078 50.00 | 9960 |
| Sag Harbor | 41 00.00 | 072 15.00 | 9960 |
| South Hampton | 40 50.00 | 072 20.00 | 9960 |
| Stony Brook | 41 00.00 | 073 10.00 | 9960 |
| Watertown | 44 00.00 | 076 00.00 | 9960 |





| | LAT | LON | GRI |
|---|---|---|---|
| **NORTH CAROLINA** | | | |
| Elizabeth City | 36 20.00 | 076 10.00 | 9960 |
| Englehard | 35 30.00 | 076 00.00 | 9960 |
| Hatteras | 35 15.00 | 075 45.00 | 9960 |
| Hobacken | 35 15.00 | 076 30.00 | 9960 |
| Kitty Hawk | 36 05.00 | 075 45.00 | 9960 |
| Morehead City | 34 45.00 | 076 40.00 | 9960 |
| New Bern | 35 10.00 | 077 00.00 | 9960 |
| Washington | 35 30.00 | 077 00.00 | 9960 |
| Wilmington | 34 15.00 | 078 00.00 | 9960 |
| **NORTH DAKOTA** | | | |
| Bismark | 46 48.00 | 100 46.00 | 8290 |
| Grand Forks | 47 55.00 | 097 05.00 | 8290 |
| Lake Sakakawea | 47 49.00 | 101 58.00 | 8290 |
| **OHIO** | | | |
| Ashtabula | 41 55.00 | 080 50.00 | 9960 |
| Cleveland | 41 30.00 | 081 45.00 | 9960 |
| Sandusky | 41 25.00 | 082 40.00 | 9960 |
| Toledo | 41 40.00 | 083 30.00 | 9960 |
| **OREGON** | | | |
| Astoria | 46 10.00 | 123 50.00 | 9940 |
| Brookings | 42 05.00 | 124 25.00 | 9940 |
| Coos Bay | 43 20.00 | 124 20.00 | 9940 |
| Florence | 44 00.00 | 124 05.00 | 9940 |
| Gold Beach | 42 25.00 | 124 20.00 | 9940 |
| Lincoln City | 44 55.00 | 124 00.00 | 9940 |
| Newport | 44 40.00 | 124 00.00 | 9940 |
| Port Orford | 42 45.00 | 124 30.00 | 9940 |
| Portland | 45 35.00 | 122 40.00 | 9940 |
| Reedsport | 43 40.00 | 124 10.00 | 9940 |
| Seaside | 46 00.00 | 124 00.00 | 9940 |
| Tillamook | 45 30.00 | 123 55.00 | 9940 |
| **PENNSYLVANIA** | | | |
| Erie | 42 10.00 | 080 05.00 | 9960 |
| **RHODE ISLAND** | | | |
| Narragansett | 41 25.00 | 071 25.00 | 9960 |
| Newport | 41 30.00 | 071 20.00 | 9960 |
| Warwick | 41 40.00 | 071 20.00 | 9960 |
| **SOUTH CAROLINA** | | | |
| Charleston | 32 50.00 | 080 00.00 | 7980 |
| Georgetown | 33 20.00 | 079 20.00 | 7980 |
| Hilton Head Is. | 32 10.00 | 080 45.00 | 7980 |
| Myrtle Beach | 33 40.00 | 079 00.00 | 7980 |
| **SOUTH DAKOTA** | | | |
| Pierre | 44 22.00 | 100 20.00 | 8290 |
| Sioux Falls | 43 33.00 | 096 43.00 | 8970 |

| | LAT | LON | GRI |
|---|---|---|---|
| **TEXAS** | | | |
| Aransas Pass | 27 50.00 | 097 10.00 | 7980 |
| Baytown | 29 40.00 | 095 00.00 | 7980 |
| Beaumont | 30 00.00 | 094 10.00 | 7980 |
| Corpus Christi | 27 45.00 | 097 20.00 | 7980 |
| Freeport | 28 55.00 | 095 10.00 | 7980 |
| Galveston | 29 20.00 | 094 40.00 | 7980 |
| Port Arthur | 29 55.00 | 094 00.00 | 7980 |
| Port Isabel | 26 00.00 | 097 15.00 | 7980 |
| Port Lavaca | 28 35.00 | 096 30.00 | 7980 |
| Port Mansfield | 26 30.00 | 097 20.00 | 7980 |
| **UTAH** | | | |
| Provo | 40 15.00 | 111 40.00 | 9610 |
| Salt Lake City | 40 45.00 | 111 52.00 | 9610 |
| **VIRGINIA** | | | |
| Burgess | 37 50.00 | 076 15.00 | 9960 |
| Cape Charles | 37 15.00 | 076 00.00 | 9960 |
| Hampton | 37 00.00 | 076 15.00 | 9960 |
| Virginia Beach | 36 50.00 | 076 00.00 | 9960 |
| **WASHINGTON** | | | |
| Anacortes | 48 30.00 | 122 35.00 | 5990 |
| Bellingham | 48 45.00 | 122 30.00 | 5990 |
| Cape Flattery | 48 20.00 | 124 40.00 | 5990 |
| Everett | 48 00.00 | 122 10.00 | 5990 |
| Ilwaco | 46 15.00 | 124 00.00 | 9940 |
| La Push | 47 50.00 | 124 35.00 | 5990 |
| Neah Bay | | | |
| Oak Harbor | 48 15.00 | 122 35.00 | 5990 |
| Port Angeles | 48 05.00 | 123 35.00 | 5990 |
| Port Townsend | 48 05.00 | 122 45.00 | 5990 |
| Queets | 47 30.00 | 124 20.00 | 5990 |
| Seattle | 47 35.00 | 122 25.00 | 5990 |
| South Bend | 46 40.00 | 123 55.00 | 9940 |
| Tacoma | 47 15.00 | 122 35.00 | 5990 |
| Westport | 46 50.00 | 124 05.00 | 9940 |
| **WISCONSIN** | | | |
| Ashland | 46 40.00 | 090 50.00 | 8970 |
| Green Bay | 44 35.00 | 087 55.00 | 8970 |
| Kenosha | 42 35.00 | 087 50.00 | 8970 |
| Manitowoc | 44 05.00 | 087 40.00 | 8970 |
| Marinette | 45 05.00 | 087 35.00 | 8970 |
| Milwaukee | 43 00.00 | 087 55.00 | 8970 |
| Port Wing | 46 50.00 | 091 30.00 | 8970 |
| Red Cliff | 46 50.00 | 090 45.00 | 8970 |
| Sheboygan | 43 45.00 | 087 45.00 | 8970 |
| Sister Bay | 45 15.00 | 087 10.00 | 8970 |
| Sturgeon Bay | 44 50.00 | 087 20.00 | 8970 |
| Superior | 46 45.00 | 092 00.00 | 8970 |
| **WYOMING** | | | |
| Pathfinder Res. | 42 22.00 | 107 10.00 | 9610 |
| Shoshone Lake | 44 17.00 | 110 50.00 | 9610 |





# *Start Up Locations (International)*

| | | | |
|---|---|---|---|
| Acapulco | 16 49.00 N<br>099 57.00 W | Manila | 14 37.00 N<br>120 46.00 E |
| Ajman | 25 15.00 N<br>054 30.00 E | Marseille | 43 18.00 N<br>005 25.00 E |
| Ankara | 40 04.00 N<br>032 46.00 E | Marquesas Is. | 08 50.00 S<br>141 00.00 W |
| Athens | 38 00.00 N<br>023 38.00 E | Montreal | 45 36.00 N<br>073 38.00 W |
| Azores | 37 47.00 N<br>025 41.00 W | Nantes | 47 13.00 N<br>001 37.00 W |
| Bangkok | 13 50.00 N<br>100 29.00 E | Noumea | 22 18.00 S<br>166 48.00 E |
| Barcelona | 41 25.00 N<br>002 08.00 E | Oslo | 59 46.00 N<br>010 33.00 E |
| Belize City | 17 31.00 N<br>088 10.00 W | Panama | 08 35.00 N<br>081 08.00 W |
| Buenos Aires | 34 20.00 S<br>058 30.00 W | Perth | 31 50.00 S<br>116 10.00 E |
| Cabo San Lucas | 22 45.00 N<br>109 45.00 W | Quebec | 46 49.00 N<br>071 13.00 W |
| Cairo | 30 11.00 N<br>031 01.00 E | Reykjavik | 64 10.00 N<br>021 54.00 W |
| Cape Town | 33 48.00 S<br>018 28.00 E | Riga | 56 55.00 N<br>024 05.00 E |
| Caracas | 10 30.00 N<br>066 58.00 W | Rome | 42 06.00 N<br>012 30.00 E |
| Copenhagen | 55 43.00 N<br>012 27.00 E | San Juan | 18 30.00 N<br>066 10.00 W |
| Cyprus | 35 00.00 N<br>031 00.00 E | Schwechat | 48 09.00 N<br>016 29.00 E |
| Fiji Is. | 18 40.00 S<br>175 00.00 E | Seoul | 37 37.00 N<br>126 48.00 E |
| Guatemala | 14 37.00 N<br>090 32.00 W | Shanghai | 31 13.00 N<br>121 18.00 E |
| Guayaquil | 02 16.00 S<br>079 53.00 W | Singapore | 01 18.00 N<br>103 52.00 E |
| Hamburg | 53 34.00 N<br>010 02.00 E | Sri Lanka | 08 45.00 N<br>082 30.00 E |
| Helsinki | 60 10.00N<br>024 53.00E | Stockholm | 59 16.00 N<br>017 50.00 E |
| Hong Kong | 22 21.00 N<br>114 07.00 E | Sydney | 33 55.00 S<br>151 17.00 E |
| Hrvatska | 45 24.00 N<br>015 18.00 E | Tahiti | 17 30.00 S<br>149 30.00 W |
| Kuwait | 29 00.00 N<br>048 45.00 E | Tokyo | 35 45.00 N<br>139 43.00 E |
| Lisbon | 38 42.00 N<br>009 05.00 W | Tonga Is. | 18 50.00 S<br>175 20.00 W |
| London | 51 29.00 N<br>000 09.00 E | Toronto | 43 40.00 N<br>079 23.00 W |
| Malta | 35 52.00 N<br>013 30.00 E | Vancouver | 49 16.00 N<br>123 06.00 W |

# Troubleshooting

### NO TURN ON MESSAGE

If the Pilot GPS just beeps after turning it On, make sure it is properly installed and that your DC voltage supply is 10 to 16 Volts. If it simply will not turn On (not even a beep), first check the in-line fuse on the power cable (DO NOT replace with larger than 2 Amp). If it still will not turn On, have a marine electronic technician check the installation.

### CONTINUOUS SEARCH MESSAGES

If the Pilot GPS continues to display "0 SAtS" for an extended time, the receiver may not be in contact with the antenna. Inspect the cable connections at the antenna module and at the back of the **Pilot GPS** 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.

If the **Pilot GPS** is not consistent in locking on to the minimal three satellites necessary to provide a position, make sure there are no obstructions to the antenna's view of the sky.

### NOT CURRENT MESSAGES

Please note that there can be brief periods of time when the **Pilot GPS** could have the minimal three satellites in view, but the orientation of the satellites in the sky is such that an accurate fix cannot be provided. If you get a "not Current" message for a brief time, there need not be cause for concern.

If the **Pilot GPS** continues to have a problem staying locked on to satellites, try turning it off, then on again. Re-initialize the receiver by doing Special 01. If this does not correct the problem, contact your nearest authorized Service Center, or call **Interphase Customer Service** for assistance.

### LATITUDE/LONGITUDE

The convention for expressing Latitude and Longitude coordinates in marine electronics (and the **Pilot GPS**), is in degrees, minutes and hundredths of a minute, as opposed to degrees, minutes and seconds used on most charts. This is done because of the greater accuracy possible with modern, electronic navigation devices. To convert seconds to hundredths, multiply by 1.67; to convert hundredths to seconds, multiply by 0.6.

### SPEED & DISTANCE

The **Pilot GPS** displays speed in knots (nautical miles per hour). Distance is displayed in nautical miles. A nautical mile is equal to 6072 feet, as compared to a U.S., or statute, mile which is equal to 5280 feet. To convert statute miles to nautical miles, multiply by 1.15; to convert nautical miles to statute miles, divide by 1.15.

Seven segment display alphabet:






# Specifications

### Main Features:

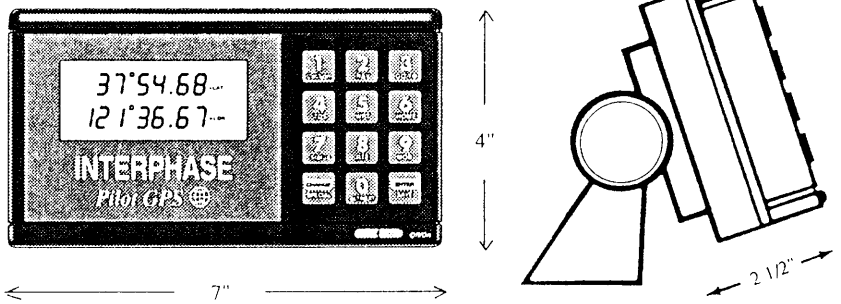
- Multi-channel sequential receiver
- Latitude/Longitude, TD conversion
- Time of day and date (24 hour clock)
- 100 Waypoint memory
- 10 Routes (reversible), 16 waypoints each
- Waypoint Arrival and Anchor alarms
- Differential ready, RTCM SC104 protocol
- 181 selectable map datums, default is WGS-84
- Digital displays of Lat/Lon, TDs, Cross Track Error (XTE), Speed Over Ground (SOG), Velocity Made Good (VMG), Course Over Ground (COG), course and distance to waypoint, Time To Go (TTG), altitude, time, date, satellite status

### Physical Characteristics:

- Unit dimensions: 7"W x 4"H x 2.5"D
- Unit weight: 1.2 lbs.
- Antenna dimensions: 3.05" diameter, 3.10" H
- Antenna weight: 4.3 oz.
- Antenna cable: RG-59, 75 Ohm, F-type connectors, 30' L, 13.4 oz.
- Power: 12 VDC nominal (10-16 VDC), < 0.5 amps
- Operating temperature range: Unit 0 to 60°C (32 to 140° F), Antenna -40 to 85°C (-40 to 185°F)

### Performance Specifications

- L1 frequency, C/A Code (SPS), multiple-channel sequencing receiver, tracks 8 satellites
- Update rate: 1 second capability
- Accuracy (Position): 25 meters without SA
- DGPS Accuracy (Position): 2 to 5 meters
- Velocity: 0.1 m/sec
- Acceleration: 2 g




| Parts List | Part Number |
|---|---|
| - 12 VDC Power Cord | 04-0001-008 |
| - Mounting Bracket | 17-0028-017 |
| - In Dash Bracket (option) | 17-0052-014 |
| - Knobs | 10-0008-017 |
| - Antenna | 36-0006-026 |
| - Antenna Cable (30') | 04-0012-026 |
| - Operation Manual | 25-0024-026 |

# How To Obtain Service

If you feel your set is not operating properly, first refer to the sections of this manual on **Troubleshooting** and **Interference Problems**. This information solves the most common problems. If problems persist, call **Interphase Customer Service (408) 426-2007** or send your unit in with the information below filled out.

2880 Research Park Drive, Suite 140
Soquel, CA 95073
phone: 831-477-4944 fax: 831-462-7444

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: _____
(Name)
_____
(Street Address)
_____
(City) (State) (Zip)

Day Phone ( _____ ) _____

Evening Phone ( _____ ) _____

Model: Pilot **GPS** Serial # _____

Purchase Date _____/_____/_____ In warranty? Yes _____ No _____

Please describe the problem in as much detail as possible in the space below.

_____

_____

_____

_____

_____

_____

_____





# *Interphase Technologies, Inc. Limited Warranty*

**Interphase Technologies, Inc.** warrants this product to be free from defects in material and workmanship for one year from the date of purchase.

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

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

This warranty does not include incidental or consequential damages and **Interphase** disclaims any liability for any such damages. All implied warranties, if any, are limited in duration to the above stated one year warranty period. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, therefore, the above limitations may not apply to you. **The completion and return of the enclosed registration card is a condition precedent to the warranty coverage.** This warranty gives you specific legal rights which may vary from state to state and province to province. This warranty is limited only to the original purchaser of the unit.