

**MAGELLAN**

# GSC 100

## Global Satellite Communicator



# User Manual

## **WARNINGS**

### **GOOD JUDGEMENT**

This product is an excellent navigation aid and communications tool, but does not replace the need for careful orienteering and good judgement. Never rely solely on one device for navigating.

### **USE CARE**

The Global Positioning System (GPS) is operated by the U.S. Government, which is solely responsible for the accuracy and maintenance of GPS.

The accuracy of position fixes can be affected by the periodic adjustments to GPS satellites made by the U.S. Government and is subject to change in accordance with the Department of Defense civil GPS user policy and the Federal Radionavigation Plan.

### **USE CAUTION**

Accuracy can also be affected by poor satellite geometry. When the accuracy warnings appear on the screen, use the data with extreme caution.

### **USE PROPER ACCESSORIES**

Use only Magellan cables and antennas; the use of non-Magellan cables and antennas may degrade performance or damage the receiver, and will void the warranty.

### **LICENSE AGREEMENT**

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## **RADIATION WARNING**

Although no single value of "safe radiation level" has been agreed upon by all countries, the American National Standards Institute (ANSI/IEEE C95.1 - 1992) recommends that people should not be exposed to radiation stronger than 1 milliwatt per square centimeter at the frequencies used in the Magellan GSC 100. Due to the GSC 100 transmission times being very brief, the amounts are well within acceptable limits as set forth by the American National Standards Institute.

## **LIGHTNING WARNING**

Due to the extension capability of the ORBCOMM telescopic antenna located on the GSC 100, it is strongly advised that operations of the GSC 100 cease when thunderstorm or electrical storm conditions are present.

## **OBTAINING LICENSING FOR ORBCOMM COMMUNICATORS**

Use of the ORBCOMM System outside the United States has only been authorized by a limited number of foreign Governmental Authorities. Use of the ORBCOMM System outside the United States is permissible only when all necessary permits, approvals and authorizations have been received from the applicable foreign Governmental Authorities.

In addition, use of the GSC 100 outside the United States is only permissible if it has been “type approved” for use in that country or territory. Both the ORBCOMM System and the GSC 100 may need to be approved prior to use in a foreign country or territory. For information on those countries or territories in which use of the ORBCOMM System and the GSC 100 is authorized, please contact ORBCOMM or your local service provider.

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# INTRODUCTION

## Welcome to the GSC 100

Congratulations on your purchase of the Magellan GSC 100 Satellite Communicator, the world's first hand-held global satellite communicator. You now have the ability to send and receive GlobalGrams, e-mail messages, to and from anywhere on Earth. Because the GSC 100 uses standard e-mail protocols, sending and receiving GlobalGrams is easy. Communicate to any e-mail (Internet, X.400) address or another GSC 100. And, with its integrated GPS capability, the GSC 100 not only lets you know where you are, it guides you anywhere you want to go. You can identify your position, plot and track your course or store waypoints. Your GSC 100 will get you anywhere and back again at the push of a button. You can also relay your position to anyone, anywhere - no matter how remote you may be - with a GSC 100 GlobalGram. And with its rugged, splashproof construction, the GSC 100 is ready for action, no matter where your adventures may take you.

To help you get started using your new GSC 100, turn to the section titled “Getting Started.” This quick-start session will have you sending and receiving GlobalGrams as well as recording landmark locations and navigating in no time at all. It is important to note that, prior to use, you must activate the unit within the ORBCOMM network, as they are the service provider. Activation Instructions have been provided to assist you in activating your GSC 100. A Quick Reference Guide has been provided to assist in operating the unit while making your way outdoors. After you've learned the basics, the rest of this manual will give you detailed information about all the features and functions of your GSC 100 Satellite Communicator. A Reference Section, Troubleshooting, and Appendix, with Glossary, are included as well.

## Packing List

Before you begin using your new unit, make sure that all the items listed on the GSC 100 box are included. If any of the items are missing or damaged, contact Magellan customer service immediately at (800) 707-9971.

Optional accessories are available from your local GSC 100 Global Satellite Communicator dealer.

## Conventions Used in this Manual

The reference section of this manual is designed to assist you in the use of your GSC 100. Each topic in the reference section includes a brief description of the activity chosen as well as a detailed description of the keys to press and sample screens showing how the function is performed. In the reference section you will be given instructions to follow. **Bolded** words indicate the key or keys to be pressed; *italics* indicate the name of the screen to be viewed; and, ALL CAPS indicate a menu item to be selected.

Also in the reference section are alerts to inform you of some cautions or notes that will assist you in using your Magellan GSC 100 Satellite Communicator.



The stop sign indicates the information enclosed is very important and should be read before moving on.



The Magellan logo denotes information that can help you use or understand your receiver. While this information is not required to perform the activity, it may provide you with a better understanding of the activity or shortcuts you can use.

## Messaging Activation

Prior to use, your GSC 100 unit must be activated within the ORBCOMM network by your local service provider. A set of Activation Instructions have been included with your GSC 100 to guide you through the activation process. Included in the Activation Instructions are the instructions, forms, payment information and a list of contacts. Activation allows your service provider to open an active account so that you can begin to send and receive GlobalGrams using your GSC 100. During the activation process you will receive a unique e-mail address for your GSC 100. Future system enhancements, or issues, will be communicated to you to keep you up and running. Activation procedures differ from country to country and should be verified by your local service provider.



To legally operate a GSC 100, it is the responsibility of the user to obtain permission from the local telecommunications regulatory authorities of the country you are operating within. Using your GSC 100 in any country without permission causes you to run the risk of confiscation of your unit or legal action from local authorities. Normal practice for taking telecommunication equipment into another country is to apply for a license prior to travel. If a license has not been obtained before travel, the equipment may be put into storage by local authorities until such time as a license is obtained.

During the activation process you will need the serial number for your unit. The serial number can be found on the outside of your GSC 100 box; on a sticker on the inside of the battery door; on the *COPYRIGHT* screen displayed during start-up; or on the ABOUT screen accessed from the GENERAL SETUP menu.

Also, prior to using the messaging capabilities, you must initialize your GSC 100's GPS receiver. This will allow the unit to acquire a position and find the ORBCOMM satellites needed to transmit/receive GlobalGrams as well as display the ORBCOMM satellite schedule.

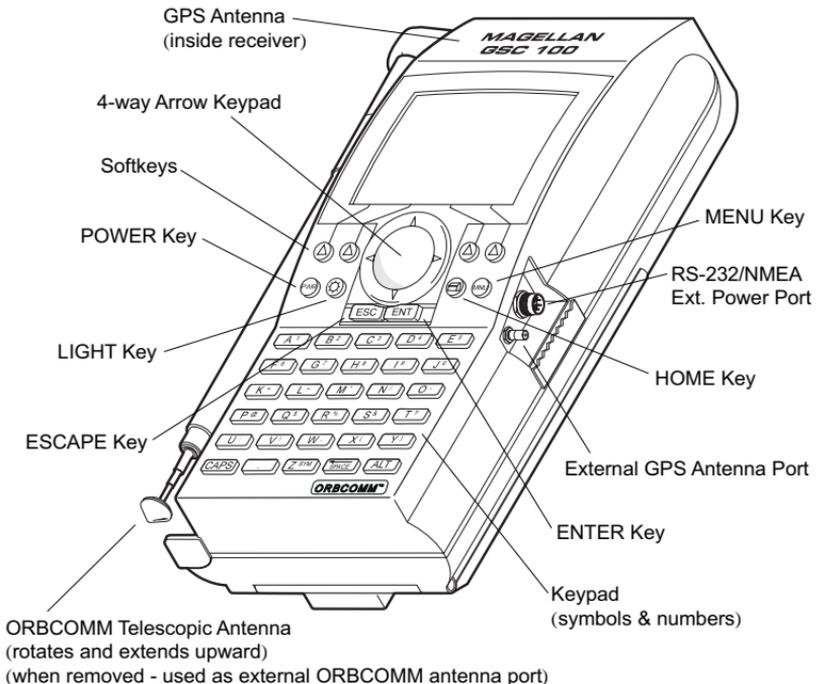
# GETTING STARTED

## Receiver Description

This section will outline the basic layout of the GSC 100 and the functions associated with the various keys.

### *Keypad Description*

The GSC 100 keypad consists of four SOFTKEYS, a four-way arrow keypad, a POWER key, a LIGHT key, a HOME key, a MENU key, an ESCAPE key, an ENTER key and 30 ALPHANUMERIC keys.



## **Softkeys**

There are four softkeys which are located just below the GSC 100 screen. These softkeys are used to control the operation of the unit and provide you with specific options particular to a given screen or function. Softkey function designations appear at the bottom of the screens and correspond to the options listed. These options differ from screen to screen. To execute any option listed, press the corresponding softkey.

## **Arrow Keys**

The four-way arrow keypad is used to scroll through menu items or to move the cursor during alphanumeric entries. When one of the arrow directions is pressed, the cursor will continue to move until the key is released.

## **Power Key**

The Power key turns the unit “ON” or “OFF.”

## **Light Key**

This key controls the backlights for the screen and keypad.

## **Home Key**

The Home key returns the user to the Main Menu screen from any function within the unit.

## **Menu Key**

The Menu key calls up a menu of available functions relative to the current screen display.

## **Enter Key**

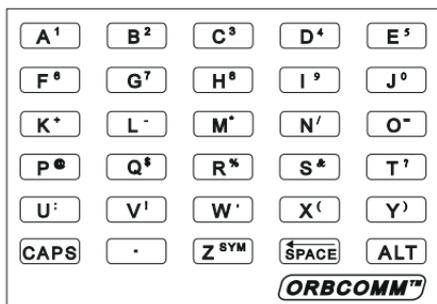
The Enter key accepts data input and is used to select items from menu screens.

## Escape Key

The Escape key is used to cancel the last executed action. For example, if pressing the Enter key from a menu allows the user to view Satellite Status, then pressing the Escape key immediately after the Enter key will return the user to the previous screen.

## Alphanumeric Keys

The Alphanumeric keys are labeled with two characters each.



Primary characters are the letters and secondary characters are numbers and symbols located in the upper right corner of the keys. To access the secondary characters, press the **ALT** key and then press the key containing the number or symbol that you wish to use. To type capital letters you must have the **CAPS** key depressed prior to pressing the key. Both the **ALT** and **CAPS** keys are toggle keys so you will have to press them again to deactivate them. To access symbols that are not found on any of the keys, press the **ALT** key and then the **SYM** key which is the symbol key when in the ALT mode. A symbol pop-up menu will appear allowing you to move through it using the **ARROW** keypad. When you find the symbol you wish to use, highlight it, press **ENTER** and it will be inserted where the cursor is positioned. Within the **SYMBOLS MENU** there is also an option to include the **TIME**, **DATE** or

POS	TIME	DATE
\	;	#
,	"	^
-	<	>
	[	]
~	<	>

Position (POS) into your GlobalGram. The POS information is your last calculated GPS coordinates, including time, date and datum stamp. This information can be edited within the message.

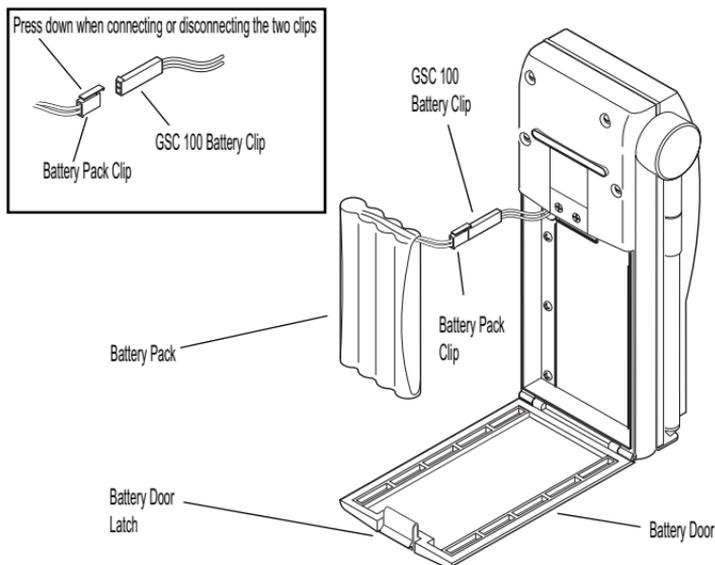
## Installing the Battery

The GSC 100 runs on either external power or battery power.



Prior to using your GSC 100 you should open the battery door, make sure the battery pack is connected and then apply external power to charge the battery, as it ships uncharged.

The unit uses one 9.6 VDC Rechargeable NiCad Battery Pack installed in the snap-open back panel.

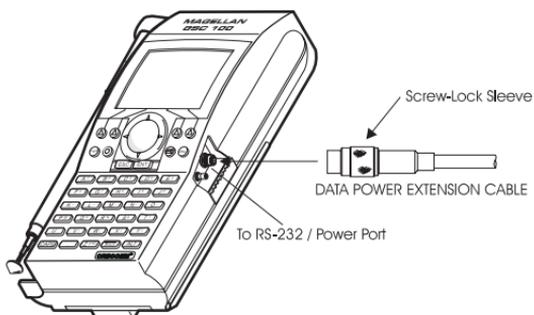


To install the battery pack, turn the GSC 100 on its face, making sure to protect the screen and keypad. Using a finger, push the battery door latch, shown above, downward. Holding the battery door from both sides, open it towards you. Stretch

out the battery pack and release the snap on the side of the battery pack clip, shown above. Pull the GSC 100 and the battery pack clips apart. You will have up to fifteen minutes to replace the battery before internal memory (messages, addresses, waypoints and routes) is lost. Take a replacement NiCad battery pack, available from Magellan, and clip it onto the GSC 100 battery clip and close the battery door.

## Charging the Battery

When the battery is low, depicted by the low battery icon shown in the status bar, you will need to recharge it for further use. To charge the 9.6 VDC Rechargeable NiCad Battery Pack, supplied with your GSC 100, you will need to connect the data power extension cable to the RS-232/Power port located on the side of the unit. Then connect the AC power cable into the data power extension cable and plug into external power. You will be able to operate the unit while the battery is charging although it will take longer to charge. It is recommended that you charge the battery while you are not using your unit to assure that the battery pack gets fully charged. It will take 6 hours of un-interrupted charging to fully recharge the battery pack.



It is imperative that, when connecting external power to your GSC 100, the connectors are properly aligned so as not to damage the pins.



Only the Magellan-supplied 9.6 VDC Rechargeable NiCad Battery Pack will work with your GSC 100. Do not attempt to use any other batteries as they may not work with your unit and any damage caused by their use will void the warranty.

## Turning the Receiver “ON” & “OFF”

To turn the GSC 100 “ON”, press the **POWER** key and wait for the unit to scroll through the start-up screens.

To turn the unit “OFF” press the same **POWER** key. This will start a shutdown sequence that counts down the seconds until the unit actually turns “OFF.” To immediately turn the receiver “OFF” press the **POWER** key again. This bypasses the countdown and the unit turns “OFF” immediately.

## GPS Initialization

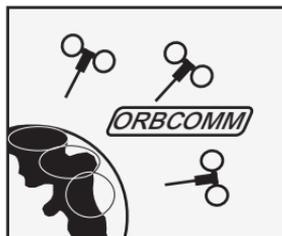
When you are using the unit for the first time, move the unit 300 or more miles without the unit taking a position fix or perform a system reset, you will need to initialize the GSC 100 with the current location, elevation, local time and date information. This is because the constellation of 24 GPS satellites circling the globe are in constant motion and before your receiver can tell you where you are, it needs to know roughly where the satellites are, relative to itself. It does this with the use of an almanac where it has stored in memory a general location, a time and a date. The almanac tells the receiver which satellites will be in view. Using the location and time you enter, the receiver can quickly find satellites and calculate your position sooner. Without initialization, the unit will take a longer period of time to provide position information or locate GPS or ORBCOMM satellites.

Upon power-up the unit will scroll through three initial ID screens stopping on the *ATTENTION* screen. The first screen is the *MAGELLAN ID* screen.

The next screen to be displayed is the *COPYRIGHT and POWER SOURCE* screen.

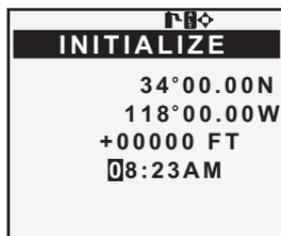
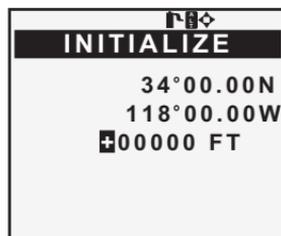
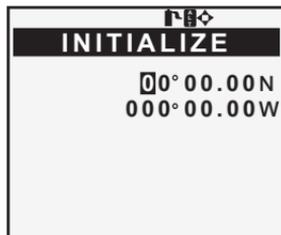
The final screen is the *ORBCOMM* ID screen.

The *ATTENTION* screen prompts you to initialize the unit prior to further use. By pressing **ENTER** you will be brought to the *INITIALIZATION* screen where you will enter your location, time and date information. Press **ENTER**.



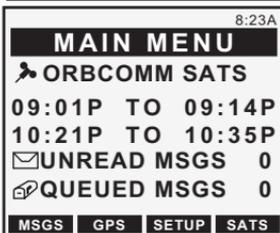
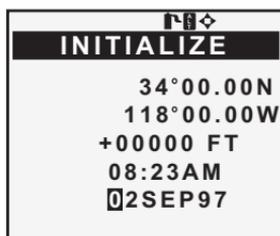
If your unit does not display the *ATTENTION* screen on power-up, go to the **SETUP OPTIONS** section of this manual for further instructions.

The first character in the latitude line is highlighted, indicating that it can be edited. Using the City Reference Chart, located in the back of this manual, enter the coordinates of the city that is closest to your location. Use the **ARROW KEYPAD**, or **NUMBER** keys, to enter your latitude and press **ENTER**. This accepts the new data and brings up the longitude line. Use the **ARROW KEYPAD**, or **NUMBER** keys, to enter your longitude and press **ENTER**. This accepts the new data and brings up the elevation line. If you know your elevation, enter it on this line and press **ENTER**. If you do not know your elevation, simply press **ENTER** to accept the default value. The receiver will now prompt you for the local time in 12-hour AM/PM format. **Take extra care to input the time correctly (to within 10 minutes), including the AM/PM designator.** Use the **ARROW KEYS** and the numeric keys to input the correct time.



Daylight Savings time does not affect the time in your unit, as long as you take a position fix after entering your local time. This allows the satellite to correct any time differences.

When the time is correct, press **ENTER**. Your receiver requires just one more piece of information, the date. Use the **ARROW KEYS** and the numeric keys to input the correct date. Press **ENTER**. Once you have completed the Initialization of the GSC 100 you will be brought back to the *MAIN MENU*. **Time and date will not be displayed if the receiver has already acquired a satellite and received that information from it.**



## Proper Handling - Signal Reception

Since the GSC 100 receives information it needs from satellites orbiting the earth, the antennas need to have a relatively unobstructed view of the sky.

**Blocked or Partially Blocked View of the Sky.** Physical obstructions will block satellite signals from reaching the receiver, as may be the case with the cliffs in the picture. If you are unable to get a position fix, send or receive messages, move the receiver so it has a clearer view of the sky.



**Clear View of the Sky.** The receiver now has a clear view of the sky in all directions, allowing it to choose from all of the satellites currently available. Do not attempt to use the unit in metal or concrete structures as the signals will be obstructed.



Due to the extension capability of the ORBCOMM telescopic antenna located on the GSC 100, it is strongly advised that operations of the GSC 100 cease when thunderstorm or electrical storm conditions are present.

The GSC 100 is designed to fit in your hand. The unit can also be mounted in a stand that can be purchased from your local GSC 100 dealer. Hold the receiver with the antenna extended upwards toward the sky and the unit comfortably in your hand and slightly away from your body so that you can see the screen.



**If you are sending or receiving GlobalGrams, the telescopic antenna, located on the side of the unit, needs to be fully extended. If you are using the unit to navigate, you do not need to extend the telescopic antenna.**



Best reception will occur when the unit is operated away from noise sources such as high voltage power lines and older internal combustion engines. If your unit is experiencing difficulty in establishing contact with satellites, move away from any such noise sources that may be present. Also, due to the radiation pattern of the ORBCOMM telescopic antenna, you may have better transmission quality if the antenna is held at an angle to the transmitting ORBCOMM satellite.



Do **NOT** place metallic decals or labels over the antenna portion of the receiver. Drastic reductions in signal levels can significantly decrease the GSC 100's signal reception.

## System (SYS) Modes

This section outlines the different modes of operation used in the GSC 100. There are three system, or operating, modes: AUTO MODE, GPS MODE and ORBCOMM MODE.

### ***GPS Mode***

The GPS mode should be engaged when the NMEA port is in use, for external marine products or an autopilot, where a constantly updated position fix is necessary. All other GPS functions can be utilized while in the AUTO mode. The unit will not transmit or receive messages while in this mode. In GPS mode, if your receiver is not communicating with a GPS satellite and your time and position coordinates are incorrect, your ORBCOMM satellite pass schedule will be inaccurate.

### ***ORBCOMM Mode***

When in the ORBCOMM mode, your receiver will continuously listen for ORBCOMM satellites regardless of the satellite schedule. ORBCOMM mode should be used when it is imperative that you send or receive GlobalGrams. If there is a scheduled pass at a certain time and you have a GlobalGram you need to send, or a GlobalGram you are expecting to receive, you would engage the ORBCOMM mode to ensure delivery or receipt of these messages. While in ORBCOMM mode, position information and satellite schedule are based on the last calculated satellite fix. GPS or AUTO modes need to be engaged to continuously update the position of your receiver.

### ***AUTO Mode***

The AUTO mode is the default operational mode as well as the recommended mode of operation. In AUTO mode, if you do not have any GlobalGrams queued or are not requesting messages, the unit will operate in GPS mode. If an ORBCOMM satellite comes into view and you have a GlobalGram queued, or have

activated the request messages function, the GSC 100 will automatically switch to ORBCOMM mode, perform the necessary transmit/receive functions, then switch back to the GPS mode after complete or when the ORBCOMM satellite is no longer in view. The mode icon will change between current operational modes as operation dictates. You will be able to use the ORBCOMM functions and still allow the unit to update important position information needed to generate ORBCOMM satellite schedules. Conversely, in AUTO mode, if your receiver is not communicating with a GPS satellite and your time and position coordinates are incorrect, your ORBCOMM satellite pass schedule will be inaccurate.

## Creating a GlobalGram

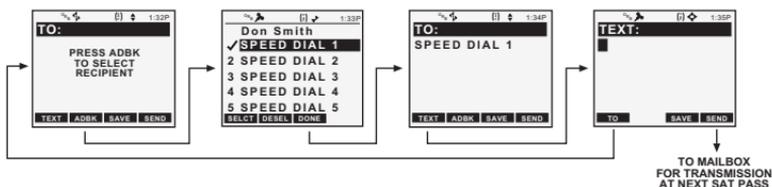
With your GSC 100 you have the ability to send and receive e-mail-type messages, or GlobalGrams, from anywhere in the world. **In order to transmit a GlobalGram your unit must have a clear view of the sky and the ORBCOMM antenna must be fully extended and your unit in either ORBCOMM or AUTO mode.** This section helps you get started sending GlobalGrams with your GSC 100. The REFERENCE section of this manual contains greater detail.



Before you can use the ORBCOMM messaging functions, you must first complete the Activation Procedures using the Activation Instructions that came with your GSC 100. If you have not received these Activation Instructions, contact Magellan Customer Service at (800) 707-9971.

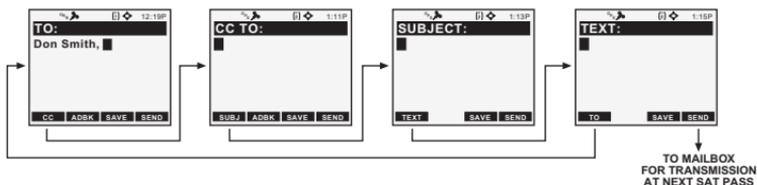
A STORE & FWD GlobalGram is sent when your GSC 100 is transmitting to an ORBCOMM satellite that is not in direct communication with an ORBCOMM Ground Earth Station. This will be reflected by the presence of a broken double arrow icon displayed in the status bar at the top of the screen when you are outdoors and a satellite is in view. You can only send a STORE & FWD GlobalGram to one speed dial address. See the REFERENCE section for message constraints, as well as instructions on SENDING STORE & FWD GLOBALGRAMS.

### STORE & FORWARD GLOBALGRAM SEQUENCE

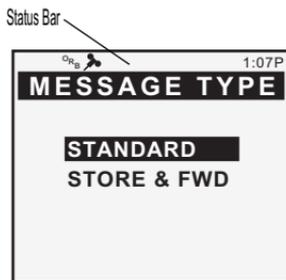


A STANDARD GlobalGram is sent when your GSC 100 is transmitting to an ORBCOMM satellite that is in direct communication with an ORBCOMM Ground Earth Station. This will be reflected by the presence of a double arrow icon displayed in the status bar at the top of the screen. **For a complete description of all the icons displayed in the status bar, please refer to the ICONS section of this manual.** You have the ability to send a STANDARD GlobalGram to seven recipients maximum, both primary and carbon-copy recipients combined.

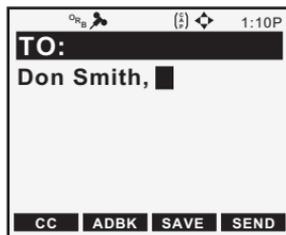
### STANDARD GLOBALGRAM SEQUENCE



To compose and send a GlobalGram, press the **MSG** softkey from the *MAIN MENU*. You are now at the *MESSAGE LIST*, where you will press the **NEW** softkey. You will be prompted to send either a **STANDARD** GlobalGram or a **STORE & FWD** GlobalGram.



If you are sending a GlobalGram to a recipient whose address you do not have stored at the GCC, your choice will be **STANDARD**. Use the **UP/DOWN ARROWS** to highlight **STANDARD** and press **ENTER**. You are now at the *TO screen* where you will manually enter the address of the recipient using the **ALPHANUMERIC KEYS**. Your GSC 100 also contains an address book where you can store your frequently used addresses. To create your address book, refer to the **REFERENCE** section of this manual for more details.



**You can move the cursor within these screens using the 4-way arrow keypad.**

Once you are back at the *TO screen*, press the **CC** softkey. Press this key even if you do not have any carbon-copy recipients because, from the *CC screen*, you access the *SUBJECT screen*. Enter the carbon-copy recipients using the same procedures as were used for the *TO screen*.



Press the **SUBJ** softkey to enter the *SUBJECT* screen of this message. After entering the subject of your message, using the **ALPHANUMERIC KEYS**, press the **TEXT** softkey. This brings you to the *TEXT* screen, where you will enter the text of your message. You have a 2000 character text screen limit for STANDARD GlobalGrams and a 229 character text limit for STORE & FWD GlobalGrams. Use the **ALPHANUMERIC KEYS** to enter your message and press the **SEND** softkey.



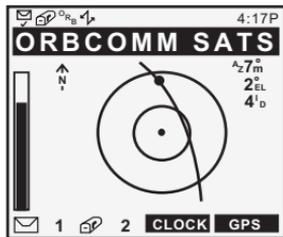
## Sending a GlobalGram

After you have pressed the **SEND** softkey, your message is SENT to the *MAILBOX*, where it is stored, to be transmitted to an ORBCOMM satellite at the next satellite pass. **To transmit this message you must be outdoors, away from any obstructions, with the unit held away from your body and the ORBCOMM antenna fully extended. Your unit must be in either AUTO or ORBCOMM mode in order to transmit to an ORBCOMM satellite.**

At the top of the screen in your unit will be a mailbox icon with the flag in the up position. This alerts you that the message has been sent to the *MAILBOX* to be transmitted at the next satellite pass. Once the message has been transmitted to the satellite, this icon will disappear and be replaced in the *MESSAGE LIST* by the mailbox icon with the flag in the down position.

You have the ability to monitor ORBCOMM satellite activity from the *SAT STATUS* screen.

From the *MAIN MENU*, press the **SATS** softkey. You are now at the *ORBCOMM SATS* screen, showing the location of the ORBCOMM satellite being utilized as well as its azimuth and elevation. On the left side of the screen is a signal strength bar showing that satellite's strength. The more the bar is filled, the better transmission you are getting. Also, below the satellite strength bar is both the closed envelope and mailbox with the flag in the up position icons. Next to these icons will be a number showing how many unread GlobalGrams you have and how many GlobalGrams have been sent to the *MAILBOX* for transmission. When there is no ORBCOMM satellite in view, this screen lists the time of the next pass.



For further details regarding the *SAT STATUS* screen, refer to the **ADDITIONAL FEATURES** section of this manual.

## Receiving a GlobalGram

In order for you to receive a GlobalGram with your GSC 100, you must request your unit to check for messages. Your unit must be in either **AUTO** or **ORBCOMM** mode, with a clear view of the sky and the **ORBCOMM** antenna fully extended, in order to receive a transmission from an **ORBCOMM** satellite.

To receive GlobalGrams from a satellite you must first request your unit to **CHECK MESSAGES**. Do this by pressing the **MNU** key from the **MAIN MENU** or the **MESSAGE LIST**, which will bring up a pop-up menu with the options of **CHECK MSGS**, **MAILBOX**, **CONTRAST** or **SYS MODE**. Use the **UP/DOWN ARROWS** to highlight **CHECK MSGS** and press **ENTER**. This sends a request to the satellite for any messages it may have received. **Your GSC 100 will send all queued messages prior to**

**checking for any incoming messages.** When you are receiving a transmission from a satellite, a double arrow icon will be displayed at the top of your screen. Any attachments to incoming GlobalGrams will be stripped out prior to receipt. Upon receipt of a GlobalGram, an envelope icon will appear at the top of the screen. To view this message, return to the **MESSAGE LIST** by pressing the **MSGS** softkey while at the **MAIN MENU**. The message you received will be preceded by the envelope icon. Use the **UP/DOWN ARROWS** to highlight the message and press **ENTER**. This opens up the message for you to read and changes the icon in front of it to an open envelope icon, while the envelope icon on the top of the screen disappears. Use the **UP/DOWN ARROWS** to scroll through the message.

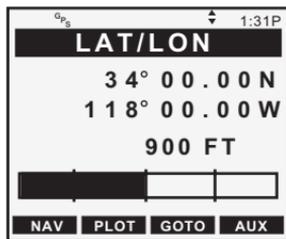


## Your First Position Fix

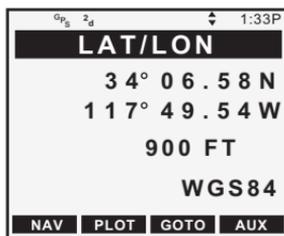
In order for your GSC 100 to display accurate navigation information, as well as the ORBCOMM satellite pass schedule, it must first get a position fix. This position fix allows the unit to locate itself, on the earth, relative to the location of both GPS and ORBCOMM satellites. To get a position fix with your GSC 100 receiver, you must be outside with a clear view of the sky and away from any large obstructions (buildings, large trees, etc.).

If your receiver is OFF, press the **POWER** key to turn the receiver ON, or if you have just finished initializing the unit, press the **HOME** key to go to the *MAIN MENU*. **Your unit needs to be in GPS or AUTO mode to get a fix.** Press the **GPS** softkey and then the NAV softkey and then your unit will display one of the *NAV* or *PLOT* screens. Press the **UP/ DOWN ARROW** until you get to the *POSITION* screen. You may also press the NAV softkey until the position screen is displayed.

The *POSITION* screen appears with the latitude, longitude and elevation that you entered during INITIALIZATION. The word “SEARCHING” appears, indicating that the receiver is searching the sky for satellites. In a short period of time, the receiver will locate the satellites and begin receiving information. The first indication of this is that the word “SEARCHING” is replaced with a bar graph indicating the receiver’s progress toward acquiring GPS data from the satellites.



Within a few minutes, the bar graph will disappear and be replaced with the map datum. This indicates that your receiver has computed your present position. All position and navigation information will now be based on the position information received.

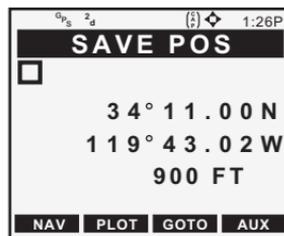


## Saving Your First Waypoint

You now have a position fix that defines your current location. During GPS operation, your receiver continuously computes your position and displays that information on the *POSITION* screen.

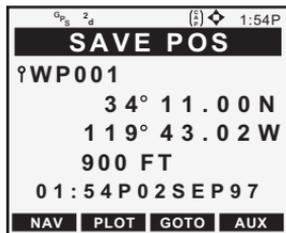
You can save this position in the receiver's memory for later use. This stored fix is referred to as a waypoint. A useful way to record this would be to assign a unique name to the position. That way, if you were to go to a new location, you could use your receiver to guide you back to the previous location.

From the *POSITION* screen, press **MNU** which will bring up a list of options. Using the **UP/DOWN ARROWS** highlight **SAVE POS** and press **ENTER**. This tells the receiver that you want to store the current position as a waypoint. The cursor is in the upper left corner, and the arrows icon displayed at the top of the screen lets you know that you are in the edit mode. Also, the CAPS mode is automatically enabled as the entry will be made using capital letters. Now, name this position.



The waypoint name can be created by the receiver or you can input a name that means something to you. If you press **ENTER** without creating a name, the receiver automatically assigns a waypoint name. Waypoint names, assigned by the receiver, appear in the format WPxxx, where the xxx is a sequential number (001, 002, etc.). Unless you select a different icon, by pressing the **UP/DOWN ARROW**, receiver-generated waypoint names use the pin icon.

To allow the receiver to name the waypoint, press **ENTER**. The screen to the right will appear briefly and then the receiver returns to the *POSITION* screen.



All waypoint names begin with an icon. You have the option of choosing one of nine different icons plus one unit-generated icon, shown below.

**AVAILABLE ICONS:**

a square: ■

a target: ⊕

a double box: ▣

a fish: ♠

a diamond: ◆

a diving symbol: ▣

a left flag: ▸

an anchor: ⚓

a right flag: ▹

a pin: ♣ (**unit-generated icon**)

These icons will be used to display the relative location of the waypoint on the *PLOT*, *POINTER* and *ROAD* screens.

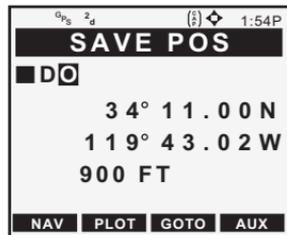
Now you will save your position, but this time you will assign a name to the waypoint.

Press **MNU**, highlight **SAVE POS** and press **ENTER**. Select an icon by pressing the **UP/DOWN ARROW**.

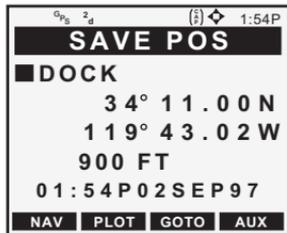


Selecting **CREATE WPT** instead of **SAVE POS** will allow you to enter a waypoint exactly as described above with the additional option of entering the latitude, longitude and elevation of the position. (See *Creating Waypoints*)

After you have selected an icon for this waypoint, use the **ARROW** or **ALPHANUMERIC** keys to enter the name that will be associated with this waypoint. This name will be used to distinguish this waypoint from others you will create.



When done, press **ENTER**. That position has now been saved as your first waypoint with the name you have assigned. You are now returned to the last viewed *NAV* or *PLOT* screen.



## Creating a GOTO

In this section, you will create a GOTO route to the waypoint that you just created. A GOTO is a direct line from your current position to any waypoint you have saved in memory.

To create a GOTO to the waypoint you just created, press the **GOTO** softkey. This will bring up the *GOTO screen* where you will use the **UP/DOWN ARROWS** to highlight the waypoint you just saved and press **ENTER**. You have now created a GOTO to the landmark named DOCK, setup in the preceding section. Your GSC 100 returns to the last viewed NAV screen and immediately begins computing the information you need to get to DOCK, no matter where you are. As you travel towards that position you will see the information on the *NAV1* and *NAV2 screens* showing you your distance from that position.



It is necessary to have a current position fix in order for the receiver to compute navigation information. If you do not have a position fix, the navigation information will be displayed with dashes until a position fix is acquired.

## Navigating with the GSC 100

The GSC 100 has six different screens that provide you with information that you can use to navigate by; The *POSITION*, *NAV 1*, *NAV 2*, *POINTER*, *PLOTTER* and *ROAD screens*.

Press the **NAV** softkey and use the **UP/DOWN ARROWS** to cycle through the three screens showing navigation information. If you press the **PLOT** softkey and use the **UP/DOWN ARROWS** you will be able to cycle through an additional three screens that graphically direct you towards your desired destination.

# REFERENCE

This section explains the various functions of your receiver as used in both the ORBCOMM and GPS modes and is organized in this order. Functions are listed in order of usage and are accompanied by screen representations and keystroke diagrams.

## General Usage

The GSC 100 is used as an ORBCOMM Transceiver allowing you to create, receive, forward and delete GlobalGrams that are sent via ORBCOMM satellites from anywhere in the world. In ORBCOMM mode, GlobalGrams can be created and sent, edited, received, forwarded, copied, replied to and deleted. You will also be able to attach important GPS position information to the messages, including the time and date. It is also used as a GPS Receiver computing position fixes, which are stored as named waypoints and used to create routes. In GPS mode, waypoints can be viewed, edited, and projected to create new waypoints, or deleted. Routes can be created, activated, deactivated, reversed, edited and cleared. This section covers these and other functions which will enable you to take full advantage of your receiver's dual capabilities.

### *Turning the Receiver ON*

To turn the receiver "ON", press the **POWER** key. If the batteries are installed correctly or the external power is properly connected, the Magellan, Copyright and ORBCOMM screens will quickly flash on the screen, followed by the *MAIN MENU*.



If these screens do not appear, please check that the battery installation and/or external power is properly connected and turned "ON."

## ***Turning the Receiver OFF***

To turn the receiver “OFF”, press the **POWER** key. The *POWER DOWN* screen is displayed for five seconds. Pressing the **POWER** key again before the counter reaches 1 will cause the receiver to turn “OFF” immediately; pressing any other key will stop the receiver from turning “OFF.”



## ***Inputting Data***

The **UP/DOWN** and **LEFT/RIGHT ARROWS** have two functions depending on how the **ARROW ICONS** are displayed in the top right corner of the various screens, next to the time.



Some screens use the **UP/DOWN** and **LEFT/RIGHT ARROWS** to access additional pages, while on other screens they allow you to input data, such as waypoint names or coordinates, or to select menu items. You will also be able to move the cursor within the text field while **CREATING A MESSAGE.**”

The **ARROW ICONS** in the status line indicate which mode is currently being used. Whenever there are additional screens to view from the one displayed, the receiver shows **UP/DOWN ARROW** icon in the upper right corner of the display.

## ***Turning the Light ON and OFF***

To activate the display light, press the **LIGHT** key. To deactivate the display light, press the **LIGHT** key again.



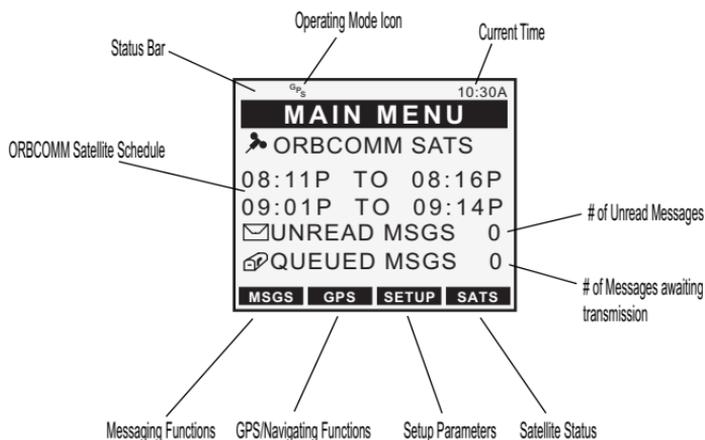
The receiver will indicate that the light is “ON” with a light bulb icon in the status line to the left of the arrow icons.



Use of the display light causes an increase in battery drain resulting in shorter battery life. See the Specifications section of this manual for the approximate battery life.

## The Main Menu

Once the unit has scrolled through the start-up screens, the *MAIN MENU* will be displayed. This is where you will access messaging functions, GPS functions, setup parameters or satellite status information. These are accessed through the softkey options of MSGS, GPS, SETUP and SATS. This screen also lists the next two ORBCOMM satellite passes as well as alerting you to the number of UNREAD and QUEUED messages. Unread messages are GlobalGrams that have been received but not opened or read and are depicted by the envelope icon. Queued messages are GlobalGrams that have been sent to the *MAILBOX* to be transmitted during the next available ORBCOMM satellite pass. They are depicted by the mailbox with the flag in the up position icon. You may also access the *MAIN MENU* from anywhere in the unit by pressing the **HOME** key.



Additional ORBCOMM satellite pass times can be found on the *ORBCOMM SAT STATUS* screen. To access this screen please refer to “VIEWING ORBCOMM SAT STATUS SCREEN” located in the **ADDITIONAL FEATURES** section of this manual.

## System (SYS) Modes

This section outlines the different modes of operation used in the GSC 100. There are three system, or operating, modes: AUTO MODE, GPS MODE and ORBCOMM MODE.

### ***GPS Mode***

The GPS mode should be engaged when the NMEA port is in use, for external marine products or an autopilot, where a constantly updated position fix is necessary. All other GPS functions can be utilized while in the AUTO mode. The unit will not transmit or receive messages while in this mode. In GPS mode, if your receiver is not communicating with a GPS satellite and your time and position coordinates are incorrect, your ORBCOMM satellite pass schedule will be inaccurate.

### ***ORBCOMM Mode***

When in the ORBCOMM mode, your receiver will continuously listen for ORBCOMM satellites regardless of the satellite schedule. ORBCOMM mode should be used when it is imperative that you are able to send or receive GlobalGrams. If there is a scheduled pass at a certain time and you have a GlobalGram you need to send, or a GlobalGram you are expecting to receive, you would engage the ORBCOMM mode to ensure delivery or receipt of these messages. While in ORBCOMM mode, position information and satellite schedule are based on the last calculated satellite fix. GPS or AUTO modes need to be engaged to continuously update the position of your receiver.

### ***AUTO Mode***

The AUTO mode is the default operational mode as well as the recommended mode of operation. In AUTO mode, if you do not have any GlobalGrams queued or are not requesting messages, the unit will operate in GPS mode. If an ORBCOMM satellite comes into view and you have a GlobalGram queued, or have

activated the request messages function, the GSC 100 will automatically switch to ORBCOMM mode, perform the necessary transmit/receive functions, then switch back to the GPS mode after complete or when the ORBCOMM satellite is no longer in view. The mode icon will change between current operational modes as operation dictates. You will be able to use the ORBCOMM functions and still allow the unit to update important position information needed to generate ORBCOMM satellite schedules. Conversely, in AUTO mode, if your receiver is not communicating with a GPS satellite and your time and position coordinates are incorrect, your ORBCOMM satellite pass schedule will be inaccurate.

## Messaging Operations

This section aids in the setup and operation of the Messaging portion of your GSC 100.

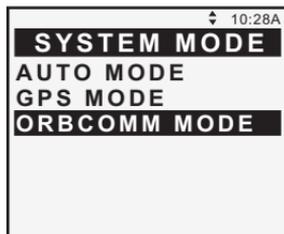
### *Selecting ORBCOMM Mode*

Although it is recommended that you operate your GSC 100 in AUTO mode, there are times when you will need to operate solely in ORBCOMM mode. To select ORBCOMM mode complete the following steps:

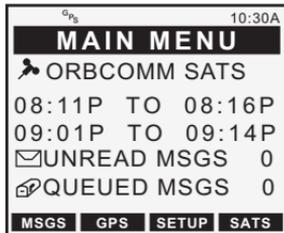
While in the *MAIN MENU*, press the **MNU** key. This brings up a pop-up menu with the options of **CONTRAST** and **SYS MODE**. Using the **UP/DOWN ARROWS**, highlight **SYS MODE** and press **ENTER**.



You are now at the *SYSTEM MODE* screen where you will use the **UP/DOWN ARROWS** to highlight **ORBCOMM MODE** and press **ENTER**.



This activates the **ORBCOMM Mode** and returns you to the *MAIN MENU* with the **ORBCOMM** identifier in the status bar. You can now transmit and receive **GlobalGrams** while outdoors, away from any obstructions, during an **ORBCOMM** satellite pass.



## ***Initialization***

If not already done in the activation process, the final step to begin using your **GSC 100** messaging functions is to choose your Preferred Gateway Control Center. The **GCC** will be responsible for routing your messages through **ORBCOMM**, as well as billing issues. Entering the **ID** of the **GCC** that you will be using ensures that your messages will automatically be routed through that **GCC** then forwarded through **ORBCOMM**. The **GSC 100** will default to the **US GCC**, which is **001**. It is recommended that you complete the following procedures to make sure that **001** is the **GCC** chosen. For users registering outside the **US**, check with your service provider to obtain the correct **GCC ID**.

Additional information is contained in the **Activation Instructions**.

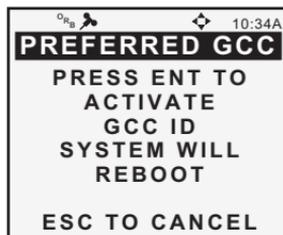
## Preferred Gateway Control Center (GCC)

This function allows you to input the Primary GCC that you will be registered with, to send and receive GlobalGrams.

From the *MAIN MENU*, proceed to the *SETUP MENU* by pressing the **SETUP** softkey. Using the **UP/DOWN ARROWS**, highlight **ORBCOMM SETUP** and press **ENTER**. This will bring you to the *ORBCOMM SETUP MENU*, where you will highlight **GCC ID** and press **ENTER**.



You will now be at the *PREFERRED GCC screen* where you will enter the ID of the Gateway Control Center that you will be utilizing. The GCC ID for the US is 001. After inputting the ID of your choice, press **ENTER**, which brings up a screen alerting you that to update the unit with the GCC ID you have just entered the unit will reboot. Press **ENTER** to continue or **ESC** to cancel the action and return to the previous screen.

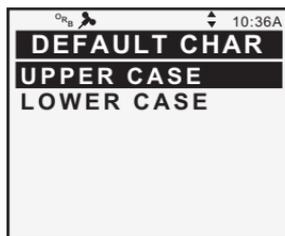


If you clear your GSC 100's memory, or perform a hardware reset, the unit will not be reset to a default GCC ID. The last ID you entered will remain as the PREFERRED GCC ID.

## Default Characters

This function allows you to choose the default character set that will be used when inputting information and creating GlobalGrams. You will have the choice of upper or lower case with the initial factory setting being upper case. When creating a GlobalGram, you can use the CAPS key to switch between UPPER and LOWER case letters.

Access the *ORBCOMM SETUP MENU*, by pressing the **SETUP** softkey from the *MAIN MENU*, and use the **UP/DOWN ARROWS** to highlight **DEFAULT CHAR** and press **ENTER**. You will now be at the *DEFAULT CHAR screen* where you will use the **UP/DOWN ARROWS** to highlight either **UPPER CASE** or **LOWER CASE**. When you have highlighted the setting of your choice, press **ENTER**, which will return you to the *ORBCOMM SETUP MENU*.



## Font Size

This option allows you to select the font size that will be used to display data on various messaging screens. The options available are small, medium and large.

Access the *ORBCOMM SETUP MENU*, by pressing the **SETUP** softkey from the *MAIN MENU*, use the **UP/DOWN ARROWS** to highlight **FONT SIZE** and press **ENTER**. This will bring you to the *FONT SIZE screen* where you will have the options of small, medium and large. Use the **UP/DOWN ARROWS** to highlight the size you prefer and press **ENTER**, returning you to the *ORBCOMM SETUP MENU*.

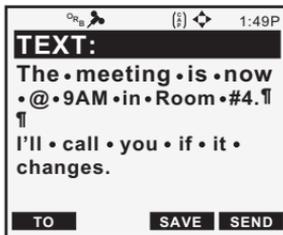
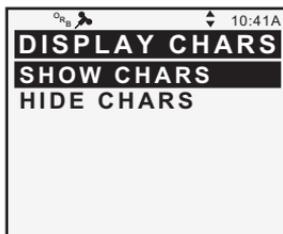


## Display Characters Setting

This setting allows you to view the spaces and carriage returns that are present in messages that you are sending or have received. Because messaging costs are based on the number of characters, this feature allows you to see exactly how many characters are being used in a message. Spaces are represented by dots in the middle of line, while carriage returns are represented by a paragraph symbol.

By accessing the DISPLAY CHARS feature you are able to SHOW CHARS or HIDE CHARS. By selecting HIDE CHARS, which is the default setting, your unit will not display the spaces or carriage returns while you are creating, editing or viewing a message. When you select SHOW CHARS your unit will show the spaces and carriage returns when you are creating, editing or viewing a message.

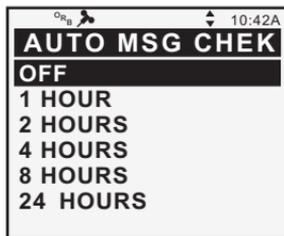
Access the *ORBCOMM SETUP MENU*, by pressing the **SETUP** softkey from the *MAIN MENU*, and use the **UP/DOWN ARROWS** to highlight **DISPLAY CHARS** and press **ENTER**. You will be brought to the **DISPLAY CHARS** screen where you will use the **UP/DOWN ARROWS** to highlight either **SHOW CHARS** or **HIDE CHARS**. When you have highlighted the desired setting, press **ENTER**. This will accept the setting you have chosen and return you to the *ORBCOMM SETUP MENU* with the next line highlighted.



## Auto Message Check

This feature allows you to set your GSC 100 to automatically check for GlobalGrams at specified intervals. You can access the *AUTO MSG CHEK* screen and choose from a menu of interval times to have the unit automatically check for received messages.

From the *MAIN MENU*, press the softkey corresponding to **SETUP**. Use the **UP/DOWN ARROWS** to highlight ORBCOMM SETUP and press **ENTER**. This brings you to the *ORBCOMM SETUP MENU* where you will highlight **AUTO MSG CHEK** and press **ENTER**. You will now be at the *AUTO MSG CHEK* screen where you will have the following message checking interval options: **OFF**, **1 HOUR**, **2 HOURS**, **4 HOURS**, **8 HOURS** and **24 HOURS**. Using the **UP/DOWN ARROWS**, highlight the interval of your choice and press **ENTER**. The unit will automatically check for messages during the ORBCOMM satellite pass closest to the frequency specified, regardless of the operation you are performing at that time, as long as you are in **AUTO** or **ORBCOMM** Mode.



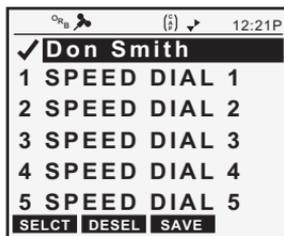
The GSC 100 must have a clear view of the sky in order to transmit/receive globalgrams from an ORBCOMM satellite.

## Address Book

The address book, accessed from the *MESSAGE LIST*, allows you to store frequently used addresses as well as speed dial addresses. It saves you time when creating a GlobalGram by allowing you to choose an address from a preset list that you have already created. You are able to save up to one-hundred and fifty (150) addresses in the unit and eight speed dial addresses at the GCC (during activation). You are able to view, edit, create and delete addresses while working in the address book. Addresses that are preceded by a number alert you that they are speed dial addresses stored at the Gateway Control Center and cannot be edited from your unit. To access the *ADDRESS BOOK* you will press the **MSGs** softkey from the *MAIN MENU*. You will then press the **ADBK** softkey.

Addresses are listed alphabetically by the nickname you have given them. You will be able to locate a nickname very quickly by pressing the alphanumeric key of the first letter of the nickname desired. In the event that there are no nicknames associated with the letter chosen, the nickname beginning with the next alphabetic character will be displayed.

The **UP/DOWN ARROWS** allow you to move through the list one address at a time while the **LEFT/RIGHT ARROWS** allow you to page through the list until the final address is highlighted. Pressing the **ESC** key from the address list will return you to the *MESSAGE LIST*.



### Viewing an Address

This allows you to view the address and name associated with the nickname listed in the address book.

To view an address, proceed from the *MESSAGE LIST* to the *ADDRESS BOOK*, by pressing the **ADBK** softkey. Use the **UP/DOWN ARROWS** to highlight the address to view and press **ENTER**. This will bring up a screen showing all the information associated with that particular address. If the address is too long for the screen, use the **UP/DOWN ARROWS** to scroll down and view the whole address.

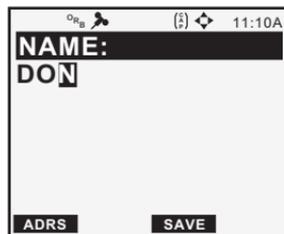
You will have the softkey options of **NEW**, **EDIT** or **DEL**. Press the softkey corresponding to the option you wish to choose. If you want to exit without using these options, press the **ESC** key and you will be returned to the address book with the address you just viewed highlighted.



## Creating a New Address

This function allows you to input a new address into your address book, using a nickname as the identifier.

Access the *ADDRESS BOOK*, by pressing the **ADBK** softkey from the *MESSAGE LIST*, and press the **NEW** softkey. You will be prompted for a nickname for the address you are about to enter. This nickname can be a maximum of twenty (20) characters in length although only fourteen (14) characters will be visible in the *ADDRESS LIST*. Use the **ALPHANUMERIC KEYS** to enter the nickname and then press the **ADRS** softkey to enter the address for this nickname, using the **ALPHANUMERIC KEYS**.



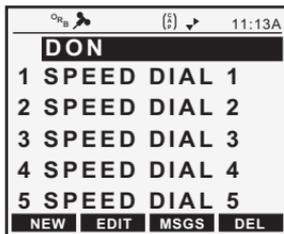
Once the address has been entered press the **SAVE** softkey. This will save that address under the nickname you specified. You are then brought back to the *ADDRESS BOOK* with the address you just entered highlighted.

When a GlobalGram is created using an address from the *ADDRESS BOOK*, the nickname is displayed, not the actual address. However, when transmitted to the satellite, the message is sent to the nickname's actual e-mail address. The nickname is provided to help you quickly recognize addresses that you use more frequently than others.

## Editing an Address

This allows you to edit an existing address you have stored in the unit.

To **EDIT** an existing address, access the *ADDRESS BOOK*, by pressing the **ADBK** softkey from the *MESSAGE LIST*. Use the **UP/DOWN ARROWS** to highlight the address to edit and press the **EDIT** softkey. Use the **ALPHANUMERIC KEYS** to change the address. If you begin to edit an address but need to exit during the operation, press the **ESC** key. Selecting **YES** will save the new address changes. Selecting **NO** will undo the changes and retain the original address.



## Deleting an Address

This function allows you to delete an existing address from the *ADDRESS BOOK*. You cannot delete a speed dial address because it is stored at the GCC.

From the *ADDRESS BOOK*, use the **UP/DOWN ARROWS** to highlight the address you wish to delete. Press the **DEL** softkey, at which time you will be prompted to confirm your wish to delete this address.



If you press the **YES** softkey, the address will be deleted and you will be brought back to the *ADDRESS BOOK* with the next address in the list highlighted. Pressing the **NO** softkey returns you to the *ADDRESS BOOK* with the address you were going to delete, highlighted.

## Capturing an Address

The CAPAD feature allows you to retain addresses, from received GlobalGrams, for storage in your *ADDRESS BOOK*. It is available as a softkey option when you are reading incoming GlobalGrams. When you select this function the receiver will compare the addresses contained in the received message to those contained in the *ADDRESS BOOK*. If there are no matches, then the receiver will list those addresses as new to your *ADDRESS BOOK*. You then have the option to save them to your *ADDRESS BOOK*.

When reading an incoming e-mail address, press the **CAPAD** softkey. This brings up the *CAPTURE ADRS screen*, showing the address, or addresses, to be captured. You will have the softkey option to **SELCT** the address.

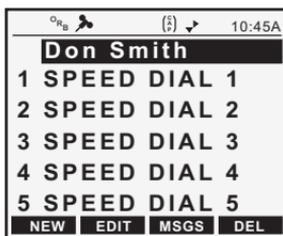


When you press the **SELECT** softkey, you are brought to the *NAME* screen, where you will enter the nickname for this new address. You will have the softkey options of **ADRS** and **SAVE**, allowing you to see the address again or save the nickname. If there is more than one address contained in an incoming e-mail, carbon copy as well as sender, you will be brought back to *CAPTURE ADRS* screen to view the additional address. If you do not wish to save the additional address, press the **ESC** key, which will bring you back to the message.



### ***GCC Addresses (Speed Dial)***

Addresses that are used most frequently, can be stored at the Gateway Control Center. They are listed in your unit as Speed Dial addresses and identified by nicknames that you give them. During the activation process, you can assign a list of addresses to be store at the GCC for use in *STORE & FWD* GlobalGrams. **You can only send a *STORE & FWD* GlobalGram to a speed dial address.** Sending to a speed dial address saves you on the number of characters transmitted with the message. Since the speed dial address is only one character, you will only be charged for that one character instead of the whole address. When you send the list to your GCC, you must remember that the order in which they are listed is important. If your wife is listed at the GCC as being the #1 speed dial address, then your unit should reflect your wife's name, or nickname, in the #1 speed dial position. The reason for this is that when you choose a speed dial address as the recipient, only the number is sent to the GCC. When the GCC receives the GlobalGram, they route it to the address associated with the speed dial number you used.



## Messages

This section outlines the various functions associated with sending and receiving GlobalGrams with your GSC 100.

### *Requesting Message Check*

Since your incoming GlobalGrams are stored at ORBCOMM until you request them, you must first request your unit to CHECK MESSAGES. **Your GSC 100 will send all queued messages prior to checking for any incoming messages.** You must have a clear view of the sky, with the unit held away from your body and the ORBCOMM antenna fully extended. Your unit must be in either AUTO or ORBCOMM mode to transmit GlobalGrams.

From the *MAIN MENU*, press the **MSGs** softkey. This brings you to the *MESSAGE LIST* where you will press the **MNU** key. A pop-up menu appears with the options of CHECK MSGS, MAILBOX, CONTRAST and SYS MODE.

Use the **UP/DOWN ARROWS** to highlight CHECK MSGS and press **ENTER**. A check icon is now present at the top left corner of the screen, alerting you that a request to CHECK MSGS was sent. That check icon remains present until the satellite sends a message to your unit either confirming, by sending the messages, or denying, by sending a “NO MESSAGES” message, the presence of messages. When an ORBCOMM satellite comes into view, your GSC 100 sends a request to the satellite for any messages that are waiting for you.



When you are receiving a GlobalGram from a satellite, a double arrow icon will be displayed at the top of your screen. This alerts you that your GSC 100 is communicating with a satellite.

## ***Messaging Icons***

While sending and receiving GlobalGrams there are icons that will be displayed in the status bar at the top of your GSC 100's screen. For a complete description of all icons that are available refer to the **ICONS** appendix located at the back of this manual.

-  **CAPS.** Appears when the keypad is active and capital letters are being used.
-  **ALT.** The keypad is active and the ALT function is engaged. This signifies that the alternate (secondary) character mode is active and the characters listed in the upper right corner of the alphanumeric keys are now active.
-  **Page.** Appears next to messages that have been saved but not sent.
-  **Envelope.** Appears when you have an unread GlobalGram in the *MESSAGE LIST*. This icon is also shown next to the actual GlobalGram in the *MESSAGE LIST* alerting you that this message is unread.
-  **Open Envelope.** Appears next to GlobalGrams that you have already opened and read.
-  **Envelope and Check.** Appears after you execute the check message function and there are unread GlobalGrams in the unit.
-  **Check.** Appears after you have executed the check messages function. It disappears after the unit has checked for messages.
-  **Mailbox with Flag Up.** Appears when there are GlobalGrams present in the mailbox to be sent at the next satellite pass. The flag on the side of the mailbox is in the UP position alerting you that mail is present.



**Mailbox with Flag Down.** Appears next to GlobalGrams that have been sent.



**ORBCOMM Mode.** Displayed when the unit is operating in the ORBCOMM mode.



**GPS Mode.** Appears when the unit is operating in the GPS mode.



**Satellite.** Appears in the status bar when ORBCOMM satellites are in view. It appears during the times listed on the ORBCOMM satellite schedule.



**Double Arrow.** When you are outdoors transmitting to an ORBCOMM satellite, you will see this icon appear in the status bar. It alerts you that the unit is in communication with a satellite and your available message option is STANDARD.



**Broken Double Arrow.** This icon appears in the status bar when your unit is transmitting to an ORBCOMM satellite but that satellite is not transmitting to a Ground Earth Station. It alerts you that your only available message option is STORE & FWD.



**Down Arrow.** Displayed while the unit is “listening” to an ORBCOMM satellite but not yet transmitting.



**Broken Down Arrow.** Displayed while the unit is “listening” to an ORBCOMM satellite, but not transmitting, and the only available GlobalGram type is STORE & FWD.

## ***Viewing Received GlobalGrams***

When GlobalGrams are received you will have the ability to view them from the *MESSAGE LIST*. GlobalGrams appear in the order in which they were received with newer messages appearing at the top of the list. After the icon for the message, the first fourteen (14) characters of the subject will be listed. When there is a received message, that hasn't been read, an envelope will appear in the icon bar at the top of the screen. This alerts you that there is an unread message in the *MESSAGE LIST*.

Any attachments to incoming GlobalGrams will be stripped out prior to receipt.

On the *MESSAGE LIST*, unread messages will be designated by a closed envelope icon. GlobalGrams that have already been read, but not deleted, will be designated by an open envelope icon. Received GlobalGrams will display the sender, carbon copy (cc) recipients, subject and text.

To view a GlobalGram, access the *MESSAGE LIST* from the *MAIN MENU*, by pressing the **MSGS** softkey. Use the **UP/DOWN ARROWS** to highlight the message to be viewed and press **ENTER**. When the message appears on the screen, the subject and text fields are shown with the arrow keypad icon in the icon bar. This alerts you that you can use the keypad to scroll through the message to see the sender, the cc recipients and any portion of the message that isn't visible. Within the message, you will have the softkey options for the following functions: **REPLY**, to reply to this GlobalGram, **FWD**, to forward the GlobalGram, **CAPAD**, to capture the address of the sender, and **DEL**, to delete the GlobalGram. If you press the **ESC** key from this screen you will be returned to the *MESSAGE LIST* with the message highlighted and an open envelope icon next to it. Also, the envelope icon, at the top of the screen, has now disappeared reflecting that there are no unread GlobalGrams. When there are no GlobalGrams in the *MESSAGE LIST* the unit will read, "NO MESSAGES PRESS NEW TO CREATE A MESSAGE."



## Creating a GlobalGram

There are several instances when a GlobalGram will be created, such as when the **NEW** softkey is pressed from the *MESSAGE LIST*, when you forward a GlobalGram or when you reply to a received GlobalGram. GlobalGrams are divided into two types: **STANDARD** and **STORE & FWD**.

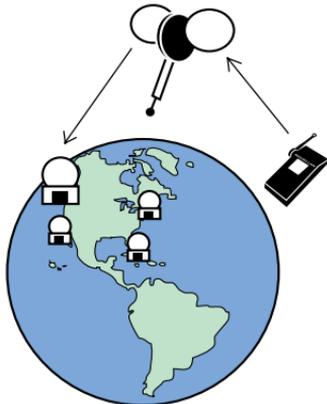
Message Type	No. of Recipients	Subject Field	Text Field	Icon Displayed
<b>STORE &amp; FWD</b>	1 (Speed Dial Address Only)	None (SF: Timestamp)	229 Characters Maximum	
<b>STANDARD</b>	7 (Primary & CC Combined)	79 Characters Maximum	2000 Characters Maximum	

**STANDARD GlobalGrams** will consist of recipients, a subject and text. The recipients will be divided into primary and carbon copy recipients with a total number of seven recipients allowed, primary and carbon copy combined. Each message must have at least one primary recipient. The subject of the message will have a maximum length of 79 characters and the text message will have a maximum length of 2000 characters. A **STANDARD GlobalGram** can only be transmitted when you are in communication with an ORBCOMM satellite and that satellite is in communication with an ORBCOMM Ground Earth Station (GES). When the double arrow icon is present in the status bar, on the top of the screen, it alerts you that you are in communication with both an ORBCOMM satellite and a GES, making it possible to transmit a **STANDARD GlobalGram**.

**STORE & FWD GlobalGrams** consist of only one recipient and text, where the recipient **must** be one of the speed dial addresses pre-registered at the GCC. The **STORE & FWD** text is restricted to 229 characters. If you create a **STORE & FWD**, but don't have any addresses stored at the GCC, the message will not be delivered. Conversely, when the broken double arrow icon is displayed, it alerts you that you are in communication with an ORBCOMM satellite but the satellite is not in contact with a GES and your message option is **STORE & FWD** only.

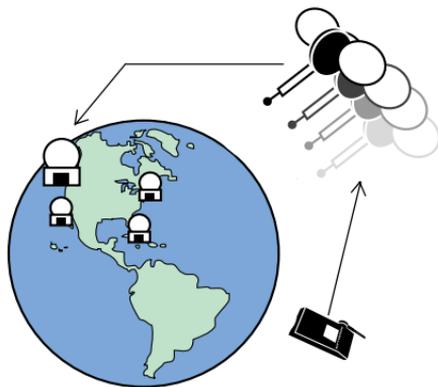
Any time a GlobalGram is created, the unit will prompt you for the type of GlobalGram to create. The picture below depicts the transmission states associated with each type of globalgram. The procedures for creating GlobalGrams are contained in the next two sections.

ORBCOMM satellite in contact with a GES



### **STANDARD GlobalGram**

ORBCOMM satellite stores GlobalGram until it is in contact with a GES



### **STORE & FWD GlobalGram**

## Sending Standard GlobalGrams

STANDARD GlobalGrams are the most commonly used GlobalGrams. These are sent when the ORBCOMM satellite you are currently in communication with is also in contact with an ORBCOMM Ground Earth Station. If this condition is not true, indicated by the broken double arrow icon, then you need to send a STORE & FWD GlobalGram. If you know that you will not be in contact with a GES, then send a STORE & FWD. Refer to [www.orbcomm.com](http://www.orbcomm.com) for an updated list of coverage areas.

To send a STANDARD GlobalGram, press the **MSG** softkey from the *MAIN MENU*. This brings up the *MESSAGE LIST* where you press the **NEW** softkey. At this point you will be prompted to select the type of GlobalGram to send. Use the **UP/DOWN ARROWS** to highlight **STANDARD** and press **ENTER**. You are now at the *TO screen* where you will enter the primary recipients of this message. As was stated earlier, you may only have a total of seven recipients for any message, primary and carbon copy recipients combined. Use the *ADDRESS BOOK*, for stored addresses or speed dial addresses, or manually enter the address of the recipients of this message, using the **ALPHANUMERIC KEYS**, and press the **SAVE** softkey. When you have completed this, press the **CC** softkey and enter the carbon copy recipients the same way as was done with the primary recipients.



When you are done entering the CC address, press the **SUBJ** softkey which will bring you to the *SUBJECT screen*, where you will enter the subject of the message. Use the **ALPHANUMERIC KEYS** to enter the subject. You will have the ability to enter up to **seventy-nine (79)** characters in the SUBJECT field. You can use this as the text field if your message is within the limit. You will have the softkey options to **SAVE**, **SEND** or **TEXT** to continue to the text portion of the message. Pressing the **SEND** softkey will accept the current entries and send the message to the *MESSAGE LIST*, with the mailbox icon next to it. The message is also sent to the *MAILBOX* for delivery. Pressing the **TEXT** softkey, brings you to the *TEXT screen* where you will use the **ALPHANUMERIC KEYS** to enter the text, or body, of the message. You will have the ability to enter up to **two-thousand (2000)** characters in the text field.



The softkey options available are **TO**, **SAVE** and **SEND**. Pressing the softkey corresponding to **TO** will bring you back to the *TO screen* allowing you to amend the primary recipients of the message. When you press the **SAVE** softkey, the message will be saved and you will be brought to the *MESSAGE LIST* with that message highlighted and the page icon next to it.

When you press the **SEND** softkey you will be brought to the *MESSAGE LIST* with this message highlighted and a mailbox icon next to it. This signifies that the message has been saved and sent to the *MAILBOX* where, at the next transmission, will be sent to the *GES* and then on to the addresses listed.

## Sending STORE & FWD Globalgrams

STORE & FWD GlobalGrams are used when you are in communication with a satellite but that satellite is not in contact with the *GES*. When a STORE & FWD GlobalGram is sent, it is stored in that satellites memory until it is again in contact with a *GES*. To alert you that the satellite is not in contact with a *GES*, a broken double arrow icon is displayed in the status bar. When this is present, the only available GlobalGram type will be a STORE & FWD. **STORE & FWD GlobalGrams can only be sent to recipients who you registered, during activation, as speed dial addresses at your preferred GCC. If you send a STORE & FWD to a speed dial address that you have not registered, the GlobalGram will be sent but will never be delivered since there is no associated address on file at the GCC.** You will not be able to enter a STORE & FWD recipient by way of the alphanumeric keys.

From the *MAIN MENU*, press the **MSGs** softkey. This brings up the *MESSAGE LIST* where you press the **NEW** softkey. You will be prompted to select the type of GlobalGram to send. If your GSC 100 is in communication with an ORBCOMM satellite, but not in communication with your a *GES*, the broken double arrow icon will be displayed, alerting you that you will only be able to transmit a STORE & FWD GlobalGram. Highlight STORE & FWD and press **ENTER**.



At this point you will be prompted, in the *TO screen*, to **PRESS ADBK TO SELECT RECIPIENT**. After pressing the **ADBK** softkey, use the **UP/DOWN ARROWS** to highlight the speed dial address desired and press the **DONE** softkey. This returns you to the *TO screen*. Since you can only have one recipient and text in a **STORE & FWD GlobalGram**, press the **TEXT** softkey.



You will now be at the *TEXT screen*, where you will use the **ALPHANUMERIC KEYS** to enter your message. The unit will not allow you to enter more than the available limit of **229**. The softkey options of **TO**, **SAVE** or **SEND** are now available.



When you press the **TO** softkey, you are brought back to the *TO screen* where you will be able to change the primary recipient of this message. If you wish to change the recipient, press the **ADBK** softkey. You are brought back to the *ADDRESS BOOK*, where you will be able to choose a new recipient. Press the **SAVE** softkey to be returned to the *TO screen* with the new recipient listed. If you need to edit the message, press the **TEXT** softkey. If everything is correct and you are ready to send the message, press the **SEND** softkey. If you are done with the message but do not wish to send it yet, you can press the **SAVE** softkey to save it to the *MESSAGE LIST* to send at a later time. You will be brought back to the *MESSAGE LIST* with the message highlighted and a page icon to the left. The subject of the message, shown on the *MESSAGE LIST*, will have the subject being **SF**, for **STORE &**

FWD, plus the time the message was created. When you are ready to send, access the *MESSAGE LIST*, highlight the **STORE & FWD GlobalGram** and press **ENTER**. This opens up the message and gives you the softkey options of **EDIT**, **COPY**, **SEND** and **DEL**. Press the **SEND** softkey. You will be brought back to the *MESSAGE LIST* with the **STORE & FWD GlobalGram** highlighted and a mailbox icon, with the flag in the up position, to the left of the message. This icon alerts you that the message has been sent to the message queue, or *MAILBOX*, and will be sent during the next satellite pass while you are transmitting. The maximum number of **STORE & FWD GlobalGrams** that can be transmitted during one satellite pass is sixteen (16).

### ***Sending a GlobalGram to a GSC 100***

When sending a message to a GSC 100, the sender will have to adhere to the character limits specified for sending either a **STANDARD** or **STORE & FWD GlobalGram**. For a **STANDARD GlobalGram** the subject will have a maximum length of 79 characters and the text message will have a maximum length of 2000 characters. All other entries will be the same as if you were sending to any other internet address. Your message will be transmitted to the GSC 100 when it is next in communication with an **ORBCOMM** satellite.



For additional assistance on sending **STORE & FWD GlobalGrams** see the following website: [www.orbcomm.com/globalgram](http://www.orbcomm.com/globalgram).

When the pc-user knows that the GSC 100 user will not be in communication with a Ground Earth Station then they will send a **STORE & FWD GlobalGram**. When sending a **STORE & FWD** from a pc, the subject field must contain the following phrase: (GlobalGram: SAT=XX). The “XX” represents the satellite identification number that the pc-user will send this **STORE & FWD** to for transmission. As more satellites become available,

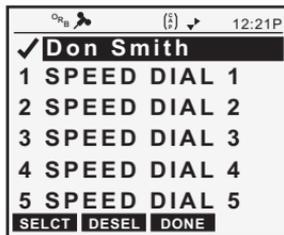
there will be more id's to choose from. For the satellite id, the user will insert a number from 1 to 12 in place of the "XX." The character limits for the text of the message will be 182.

### ***Selecting Recipients from the Address Book***

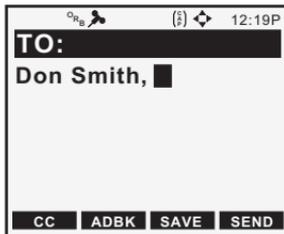
This allows you to choose an address, stored or speed dial, from the list in the *ADDRESS BOOK*, which saves you time when composing a GlobalGram.

When composing a GlobalGram, in the *TO screen*, press the **ADBK** softkey. This will bring up the *ADDRESS BOOK*, listing all of the addresses that you have saved in the unit. Either enter the first letter of the nickname or use the **UP/DOWN ARROWS** to scroll or

page down to the address you wish to use. You may also send to a speed dial address to save time and character spaces. When you have highlighted the address to be inserted into the GlobalGram, either press **ENTER** or the **SELECT** softkey. This will put a check mark next to that address letting you know that it has been selected.



To return to the message while keeping the address you have selected, press the **DONE** softkey, returning you to the *TO screen*. If you have made an error and need to deselect the address, you can either press the **ENTER** key again or press the **DESEL** softkey. Pressing **ESCAPE** brings you out of the *ADDRESS BOOK* screen and back to the message without saving the address to the message.



## Inserting Symbols & Characters into GlobalGrams

When creating a GlobalGram it is sometimes necessary to include symbols. Many symbols can be accessed through the **ALPHANUMERIC KEYS**, using the **ALT** mode and pressing the desired key, while an extended list can be found in the **SYMBOLS MENU**. There are two ways to insert a symbol:

While in the message, press the **ALT** key and then press the **ALPHANUMERIC KEY** that has the symbol you need **ENTER**. This will insert the symbol at the cursor point.

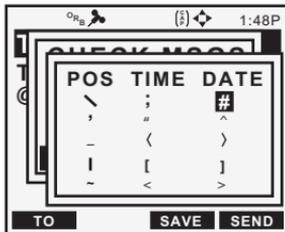


If the symbol you need is not located on the alphanumeric keys, you may access an extended list of symbols in the **SYMBOLS MENU**.

While in the message, press the **MNU** key to bring up a pop-up menu listing additional options. Use the **UP/DOWN ARROWS** to highlight **INSERT SYM** and press **ENTER**. This brings you to the **SYMBOLS MENU** where you will use the **UP/DOWN ARROWS** to highlight the symbol needed and then press **ENTER**. This inserts



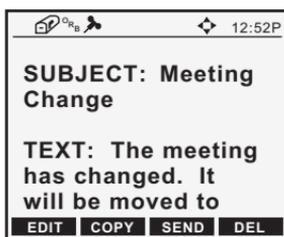
the symbol at the cursor point. You may also access the **SYMBOLS MENU** by pressing the **ALT** key and then the **SYM** key which will bring up the pop-up **SYMBOLS MENU**, where you will use the same keystrokes as were just discussed. Within the **SYMBOLS MENU** there is also an option to include the **TIME**, **DATE** or **POS** into your GlobalGram. The **POS** information is your GPS calculated coordinates.



## Viewing Created GlobalGrams

You have the ability to view GlobalGrams that you have created and sent from your GSC 100. When you create a GlobalGram and save it without sending, the message is stored in the *MESSAGE LIST* with the page icon next to it. When you send the message, the icon changes to the mailbox icon with the flag in the up position. After the message is sent, it appears in the *MESSAGE LIST* with the mailbox icon with the flag in the down position. The message is also sent to the *MAILBOX*, where it is listed, by subject, without any icons next to it.

To view any of the above created messages, access the *MESSAGE LIST*, by pressing the **MSG** softkey from the *MAIN MENU*. Use the **UP/DOWN ARROWS** to highlight the message you wish to view and press **ENTER**. You are brought to the *MESSAGE VIEW screen* where you can use the **UP/DOWN ARROWS** to scroll through the message, seeing all of the information it contains. You will also have the softkey options of **EDIT**, **COPY**, **SEND** and **DEL**. To escape and return to the *MESSAGE LIST*, press the **ESCAPE** key. You will be returned to the *MESSAGE LIST* with the message highlighted.



## Accessing the Mailbox

When a GlobalGram is sent, it not only is listed on the *MESSAGE LIST*, but is sent to the *MAILBOX* to be transmitted at the next available ORBCOMM satellite pass. This screen allows you to view the messages that have been sent to the *MAILBOX*.

From the *MAIN MENU*, press the **MNU** key. A pop-up menu appears with the options of CHECK MSGS, MAILBOX, CONTRAST and SYS MODE. Use the **UP/DOWN ARROWS** to highlight *MAILBOX* and press **ENTER**.



You are now at the *MAILBOX*, where you can view the messages that are ready to be sent. There are no icons listed next to the messages in this screen since they are all awaiting transmission. Within the *MAILBOX* you have the softkey option to DEL the highlighted message. If you choose to delete the message, it isn't deleted from the unit, it is just removed from the *MAILBOX*. The message will still be listed on the *MESSAGE LIST*, but it will now have the page icon next to it instead of the mailbox with the flag in the up position icon. To exit out of the *MAILBOX*, without deleting, press the **ESC** key, to back out one level at a time, or the **HOME** key to return to the *MAIN MENU*.



## Editing a GlobalGram

This feature enables you to edit a GlobalGram, you created, prior to sending it to the specified recipients. Since GlobalGrams may be stored in the *MAILBOX* until the next ORBCOMM satellite transmission, they may change or need to be edited. A GlobalGram can only be edited when it is taken out of the *MAILBOX* first. If you try to edit the message while it is in the mailbox you will be prompted to take it out of the *MAILBOX* first. Your response should be YES.

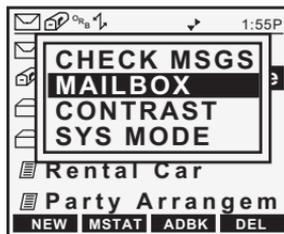
Access the *MESSAGE LIST*, use the **UP/DOWN ARROWS** to highlight the message to be edited and press **ENTER**. This brings up all the information relating to that message; CC, TO, SUBJ and TEXT. You have four softkey options while in this screen; **EDIT**, **COPY**, **SEND** and **DEL**. Press the softkey corresponding to **EDIT**.

If you have not removed the GlobalGram from the *MAILBOX* then you will be prompted to remove the message before editing. Pressing the **YES** softkey brings you to the *TEXT SCREEN* with the first character of the message highlighted. At this point, the procedures to edit are the same as creating a GlobalGram. When finished editing press the **SEND** softkey. You will be brought back to the *MESSAGE LIST* with the message highlighted and the mailbox icon next to it.



To remove the message from the *MESSAGE LIST*, prior to editing, highlight the message and press the **MNU** key, which will bring up a pop-up menu. Use the **UP/DOWN ARROWS** to highlight **MAILBOX** and press **ENTER**.

You are now at the *MAILBOX screen* where you will be able to **DELETE** the message from the mailbox. Press the softkey corresponding to **DEL**.



Pressing the **DEL** key, from the *MAILBOX screen*, will not delete the GlobalGram from the unit, it will remove it from the mailbox and change the icon from a mailbox icon to a page icon. Your message is now ready for editing.



## ***Copying a GlobalGram***

Since there is a limit of seven (7) recipients for any STANDARD GlobalGram, primary and carbon-copy combined, this feature allows you to **COPY** GlobalGrams you have created, omitting the recipients, to additional groups of recipients without having to re-enter the message. This function will be the same as creating a GlobalGram, although the subject and text fields will contain the information you had copied from the previous message. STANDARD GlobalGrams will be copied to STANDARD GlobalGrams while STORE & FWD's will be copied to STORE & FWD's.

To COPY a GlobalGram, access the *MESSAGE LIST*, by pressing the **MSGs** softkey from the *MAIN MENU*. Use the **UP/DOWN ARROWS** to highlight the message to be copied and press **ENTER**. This allows you to view the message, with the a softkey option to **COPY**. Press the **COPY** softkey. You are immediately brought to the *TO screen* where you will be able to enter the additional recipients, using the **ALPHANUMERIC KEYS** or by pressing the **ADBK** softkey. At this point you will use the same procedures as were used when “CREATING A GLOBALGRAM.”

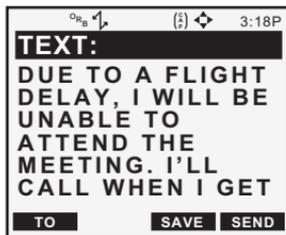
### ***Replying to a GlobalGram***

The **REPLY** feature allows you to respond to a received GlobalGram without having to enter either the *TO* or the *SUBJ* field. You still have the ability to edit these fields as well as input carbon copy recipients. When replying to a GlobalGram, you are given the option of replying with a **STORE & FWD** when the recipient matches one of the addresses stored at the *GCC*. If this is the case, the subject will be left out of the message and is replaced by **SF: (time)** in the *MESSAGE LIST*. When replying to a **STANDARD** GlobalGram, with a **STANDARD** GlobalGram, the subject field will contain the title “*Re: subject*”, where *subject* is the subject that was contained in the received message. If the subject field on the received message was blank the reply will read “*Re: <none>*”. If the subject is greater than 76 characters, the “*Re:*” will appear at the beginning and the original subject will be shortened to fit the seventy-nine (79) character limit. You can edit the subject of your reply message and, if desired, the response can appear in the subject field.

Pressing the **REPLY** softkey, while viewing the message, brings you to the *TO screen*. The address of the recipient, or previous sender, will already be present. Press the **CC** softkey and enter a carbon-copy recipient, if needed.



After entering a carbon-copy recipient, press the **SUBJ** softkey. This will bring you to the *SUBJECT screen*, with the subject from the previous message already inserted. There will be a “Re:” before the subject alerting the recipient that it is a reply to the message they had sent you. Press the **TEXT** softkey which will bring you to the *TEXT screen*, where you will type in your reply. After typing in your reply, press the **SEND** softkey. You are returned to the *MESSAGE LIST* with your new message highlighted and a mailbox icon next to it.



### ***Forwarding a GlobalGram***

The FWD feature allows you to forward a GlobalGram you receive to additional recipients. The procedure for forwarding a GlobalGram is the same as when “CREATING A GLOBALGRAM” although the subject and text fields will contain the information contained in the original received message. If the message is less than 229 characters and the forward recipient is pre-listed, as a speed-dial address, at the GCC, then you will be able to send the message as a STORE & FWD. If you choose to send the message as a STORE & FWD then the subject will be ignored and only the text will appear in the STORE & FWD to be forwarded.

When you are reading a received GlobalGram you will have a softkey option to **FWD** the GlobalGram. Press the **FWD** softkey. This brings you to the *MESSAGE TYPE* screen where you will have the options of **STORE & FWD** or **STANDARD**. If the recipient(s) is listed as a speed-dial address at the GCC and you are not in contact with your preferred GCC, then you will be able to send a **STORE & FWD**. Otherwise you will use the **UP/DOWN ARROWS** to highlight **STANDARD** and press **ENTER**. You will then be brought to the *TO* screen where you will enter the address of the person, or people, to receive this forwarded message. Press the **CC** softkey, enter any carbon copy recipients. Continue to the *SUBJECT* screen, by pressing the **SUBJ** softkey. There will be a “FWD:” before the subject alerting the recipient that it is a forwarded message. You will then press the **SEND** softkey, unless you wish to edit the message, to send this message to the specified recipient. The forwarded GlobalGram is now sent to the *MESSAGE LIST*, to be sent at the next transmission, with a mailbox icon next to it and the subject field reflecting that the message is a FWD GlobalGram.



## Deleting a Message

The DEL function allows you to delete any GlobalGrams from the unit, created or received. Once the message has been deleted you will not be able to retrieve it at any time.

To DELETE a GlobalGram, access the *MESSAGE LIST* and highlight the message to be deleted, using the **UP/DOWN ARROWS**. Press **ENTER** to access the message to be deleted and press the **DEL** softkey. Any time you attempt to delete a GlobalGram you will be prompted to confirm this request. This gives you the last minute option of not deleting the message. Press the **YES** softkey to confirm the deletion.

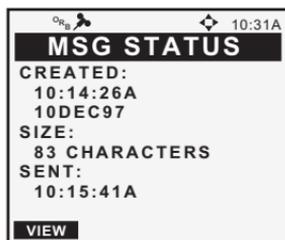
If the message to be deleted has been SENT to the mailbox, or is awaiting acknowledgment, then you will also be alerted to this and prompted to continue.



## Message Status

The MSTAT feature allows you to view information regarding GlobalGrams you have created and received, such as time and date created, its size, the time it was sent, the time of transmission to an ORBCOMM satellite and the last acknowledgment received.

To access the status information for a given GlobalGram you need to access the *MESSAGE LIST*, use the **UP/DOWN ARROWS** to highlight the desired message and press the **MSTAT** softkey. You are now brought to the *MSG STATUS screen*, where the information



regarding this GlobalGram is logged. Since there is too much data to fit on one screen, you will need to use the **UP/DOWN ARROWS** to scroll through data not shown on the initial screen. You will also have the softkey option to **VIEW** the message. The time a message is sent is defined as the time that it was put in the mailbox to be transmitted on the next available satellite pass, or the time you pressed the **SEND** softkey after creating the message. Time of transmission is defined as the time at which the GlobalGram was transmitted to an ORBCOMM satellite from your receiver. The time and date created is recorded when the message is saved and the file size is recorded in bytes and represents the total number of characters to be transmitted including the text, subject and recipients. Also, the time and date the message was sent will be the time and date of the unit clock when the message is sent to the mailbox. If you re-send a GlobalGram, then the previous status information will be updated with the current information.

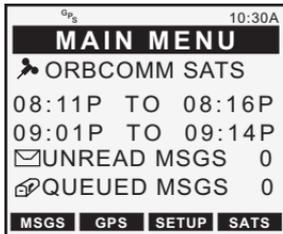
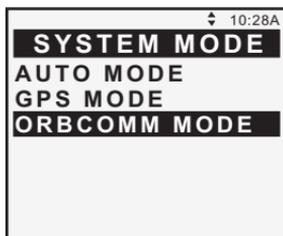
## GPS Operations

This section aids in the setup and operation of the GPS portion of your GSC 100.

### *Selecting GPS Mode*

Although it is recommended that you operate your GSC 100 in the AUTO mode, there are times when you will need to operate solely in the GPS mode. To select GPS mode complete the following steps:

While in the *MAIN MENU*, press the **MNU** key to bring up a pop-up menu. You will have the options of **CONTRAST** and **SYS MODE**. Use the **UP/DOWN ARROWS** to highlight **SYS MODE** and press **ENTER**. This brings you to the *SYS MODE* screen where you will use the **UP/DOWN ARROWS** to highlight **GPS MODE** and then press **ENTER**. This activates the GPS Mode and returns you to the *MAIN MENU* with the GPS icon shown in the icon bar. You can now operate your GPS functions without interference from ORBCOMM messaging. From many of the subsequent screens, both in GPS and ORBCOMM modes, you will be able to change modes by pressing the **MNU** key and following the above instructions.



## GPS Icons

During GPS operations the following icons will be displayed in the status bar. For a complete list of icons refer to the ICONS appendix located at the back of this manual.

 **Arrow Key.** Provides a visual indication as to which arrow keys are active for the displayed screen. There are different combinations of keys, as shown.

 **Poor GQ Alert.** The geometric quality (GQ) of the satellite is poor. Try to move away from any large obstructions that may be blocking reception of satellite signals.

<sup>2</sup><sub>d</sub> **2D.** Displayed when the unit is calculating a two-dimensional position fix using three satellites (e.g. latitude and longitude).

<sup>3</sup><sub>d</sub> **3D.** Displayed when the unit is calculating a three-dimensional position fix using four satellites (e.g. latitude, longitude and elevation).

**D Differential.** Indicates that the receiver is utilizing DGPS to compute position fixes. Requires an additional Differential Beacon receiver to utilize DGPS.

 **Old Data.** The receiver has not updated position fixes for more than 15 seconds.

**S Simulator.** Indicates that the receiver is in GPS simulation mode. The simulator will stay active until the unit is turned off.

<sup>O</sup><sub>R</sub><sub>B</sub> **ORBCOMM Mode.** Displayed when the unit is operating in the ORBCOMM mode.

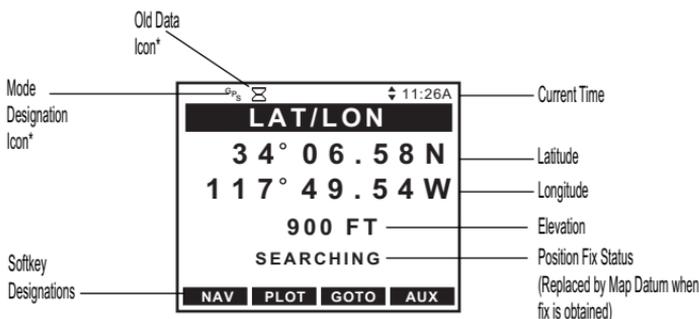
<sup>G</sup><sub>P</sub><sub>S</sub> **GPS Mode.** Displayed when the unit is operating in the GPS mode.

## NAV Screens

The three *NAV* screens accessible from pressing the **NAV** softkey are the *POSITION*, *NAV 1* and *NAV 2* screens. You may scroll through these screens using the **NAV** softkey or the **UP/DOWN ARROWS**. Press **NAV** until the *POSITION* screen is displayed.

### Viewing the POSITION Screen

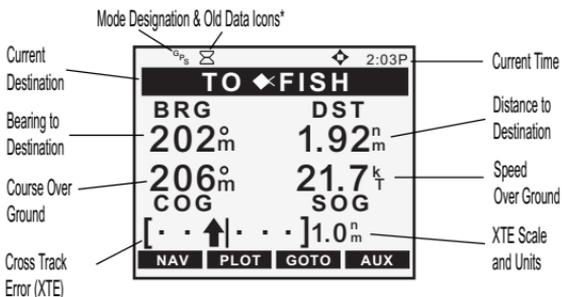
The *POSITION* screen displays the coordinates and elevation of the current position in a larger format so that they may be easily viewed from a distance. Once the unit calculates a position fix, the word “SEARCHING” will be replaced by “WGS-84”. WGS-84 represents the map datum that the unit has as its default.



\* For a complete description of the GPS Icons, refer to the chapter on *ICONS* located at the end of this manual.

## Viewing the NAV 1 Screen

Press the **NAV** softkey, or the **UP/DOWN ARROWS**, until the *NAV 1 screen* appears, showing BRG, DST, COG and SOG. This screen provides you with information about your speed and direction of movement. If a route is active, the *NAV 1 screen* also tells you where you are in relation to the destination and courseline, and displays the name of the destination waypoint of the active leg in the title bar.

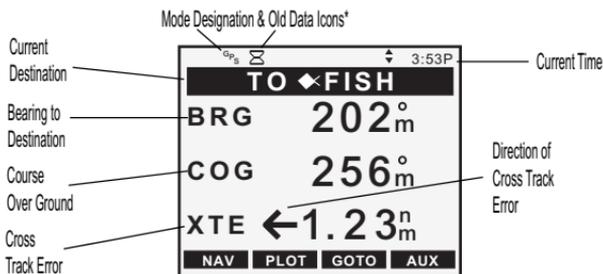


\* For a complete description of the GPS icons, refer to the chapter on *ICONS* located at the end of this manual.

The default fields include bearing (BRG) to the active waypoint, distance (DST), course over ground (COG) and speed over ground (SOG). By using customize, refer to *Customizing the NAV Screens*, you may select VMG (velocity made good), SOA (speed of approach), STR (steering), CTS (course to steer) or a blank line. (See *Customizing the Navigation Screens*).

## Viewing the NAV 2 Screen

Press the **NAV** softkey or use the **UP/DOWN ARROWS** to scroll to the *NAV 2 screen*. The *NAV 2 screen* displays three additional information fields which can also be customized.



\* For a complete description of the GPS Icons, refer to the chapter on ICONS located at the end of this manual.

Information is displayed in a large format so that it may be easily viewed from a distance. All of the fields can be customized. Default fields include bearing (BRG) to the active waypoint, course over ground (COG) and cross track error (XTE). By customizing, you may select VMG (velocity made good), SOA (speed of approach), SOG (speed over ground), ETA (estimated time of arrival), TTG (time to go), DST (distance), XTE (cross track error), STR (steering), CTS (course to steer) or a blank line. Cross track error (XTE) is displayed as a numeric value. The arrow next to XTE indicates the direction of the error, left or right of the course line.

## Customizing the NAV Screens

As previously mentioned, *NAV 1* and *NAV 2 screens* can be customized to display the data fields you find most convenient for navigation.

When you access these two screens for the first time, the fields shown are the default choices. The *NAV 1 screen* displays BRG, DST, COG and SOG fields, while the *NAV 2 screen* displays BRG, COG and XTE fields.

Available options include:

- BRG    Bearing to active waypoint
- DST    Distance to the active waypoint
- SOG    Speed Over Ground

COG	Course Over Ground
ETA	Estimated time of arrival to the active waypoint
TTG	Time To Go
VMG	Velocity made good toward active waypoint
XTE	Cross track error
SOA	Speed of Approach toward active waypoint
CTS	Course to steer
STR	Steering

Press the **NAV** softkey from any screen to view a *NAV screen*. Press the **NAV** softkey again, as necessary, to display either the *NAV 1* or *NAV 2 screen*.

Pressing **MNU** displays the pop-up menu. Use the **UP/DOWN ARROWS** to highlight **CUSTOMIZE** and press **ENTER**. The pop-up menu disappears and the display returns to the previously viewed *NAV screen*.



## NAV 1 Screen

When the pop-up menu disappears and the display returns to the *NAV 1 screen*, the first field is highlighted. The first default is BRG, but another option may appear if you have previously customized the fields.

Use the **UP/DOWN ARROWS** to select the field to edit, and the **LEFT/RIGHT ARROWS** to scroll through the various options. After you have selected an option, press the **UP/DOWN ARROWS** to move to the next field, where you scroll through the list of options again using the **LEFT/RIGHT ARROWS**. When you have finished selecting all of the options you wish to include in the *NAV 1 screen* display, press **ENTER** to exit and save the selections.

## NAV 2 Screen

When the pop-up menu disappears and the display returns to the *NAV 2 screen*, the first default field heading “BRG” is highlighted.

Use the **UP/DOWN ARROWS** to select the field to edit, and the **LEFT/RIGHT ARROWS** to scroll through the various options.

After you have selected an option, press the **UP/DOWN ARROWS** to move to the next field, where you scroll through the list of options again using the **LEFT/RIGHT ARROWS**.

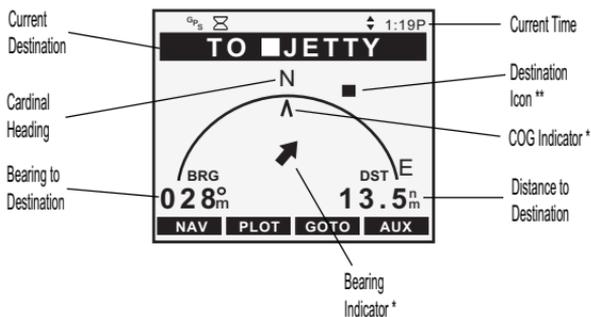
When you have finished selecting all of the options you wish to include in the *NAV 2 screen*, press **ENTER** to exit and save the selections.

## *PLOT Screens*

Three graphical screens can be accessed from the softkey corresponding to **PLOT**: the *PLOT screen*, the *ROAD screen* and the *POINTER screen*. You may scroll through these three screens by pressing the **PLOT** softkey repeatedly, once you have accessed one of the *PLOT screens*, or by using the **UP/DOWN ARROWS**.

## Viewing the **POINTER** Screen

Access the *POINTER screen* by pressing the **PLOT** softkey (two or three times, if necessary). This screen graphically displays the TO destination waypoint of the current leg if there is an active route or GOTO and the bearing and distance to that waypoint. An arrow inside the arc points toward the destination of the active leg, shown as a waypoint icon.



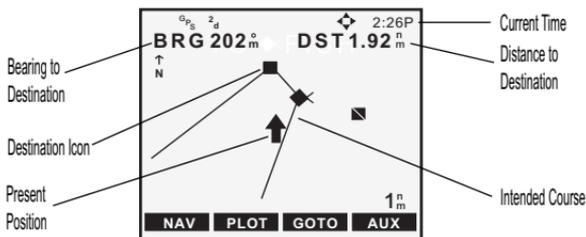
\* Displayed only if receiver is moving.

\*\* The destination icon disappears if it extends past the displayed arc (is behind you).

## Viewing the PLOT Screen

This screen plots your route on the display using the arrow icon to display your relative position on the route. Your track is also displayed, allowing you to follow your movement in relation to the course.

Press the **PLOT** softkey, as necessary, to access the *PLOT screen*. If many of the waypoints you have created are contained in the current display range, the screen may take several seconds to redraw.



The *PLOT screen* displays the bearing and distance to a destination waypoint if there is an active route or GOTO.

## Changing the Plotter Scale

While in the *PLOT screen*, press the **LEFT/RIGHT ARROWS** to adjust the scale. The plot scale is shown at the bottom right corner of the screen.

## Using PAN N SCAN

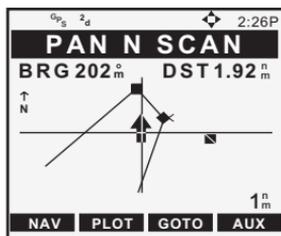
The *PLOT screen* is equipped with a PAN N SCAN feature that allows you to access waypoint information by positioning the cursor over the waypoint.

From the *PLOT screen*, press **MNU** to access the pop-up menu. You will notice that this menu is different from the pop-up menu accessed from other screens in that it has an additional feature, PAN N SCAN.

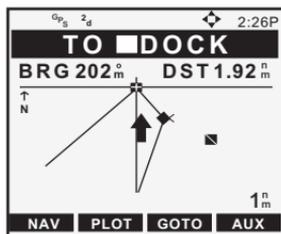


Using the **UP/DOWN ARROWS**, highlight PAN N SCAN and press **ENTER**.

The *PAN N SCAN screen* is similar to the *PLOT screen*, however a vertical and horizontal line cross to form a cursor. The bearing (BRG) and distance (DST) from your present position to the cursor are displayed at the top of the screen.



Use the **UP/DOWN** and **LEFT/RIGHT ARROWS** to move the cursor anywhere on the screen or to scroll off the screen to view portions of the active route not currently shown on the screen.

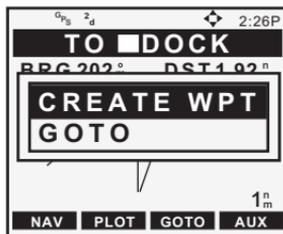


When the cursor covers a waypoint icon on the screen, the title bar displays the name of that waypoint and the bearing and distance to the waypoint from your present position.

## Setting a GOTO Using PAN N SCAN

When the cursor is on an icon and the waypoint information is displayed, press **ENTER**.

A pop-up menu will appear with the options GOTO or ESCAPE. Use the **UP/DOWN ARROWS** to highlight GOTO and press **ENTER**. This will activate an immediate GOTO route to the specified destination.



To exit the *PAN N SCAN screen*, press **ENTER** when no waypoint is covered by the cursor. The display returns to the *PLOT screen*.

## Clearing Plotter Track

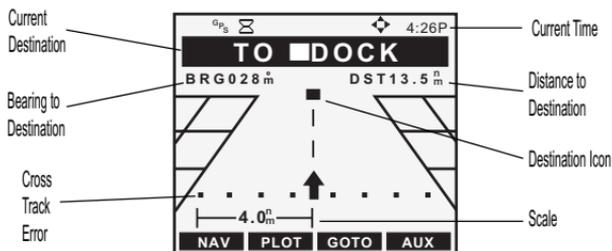
As you use your receiver more, you may soon notice the *PLOT screen* becoming cluttered with the graphic display of your past movement (track). You can erase the track display with the CLEAR MENU option in the *AUXILIARY MENU*.

Press the **AUX** softkey and use the **UP/DOWN ARROWS** to highlight CLEAR MENU. Press **ENTER** and use the **UP/DOWN ARROWS** to highlight TRACK and press **ENTER**. You will be asked to confirm that you want to erase the track history. If you change your mind, press any other key to leave the track as it is. To erase track history press the **YES** softkey.

## Viewing the ROAD Screen

Access the *ROAD* screen by pressing the **PLOT** softkey (two or three times, if necessary). This is the navigation CDI screen. As with the preceding screen, the bearing and distance to the leg destination are displayed.

This screen depicts the course you should be on as the center line and position relative to the course (the arrow icon). Any waypoints that would appear on or near this courseline are displayed as they come into range.



When a route is active, you can adjust the CDI scale by pressing the **LEFT/RIGHT ARROWS** shown in the bottom left corner of the screen.

## Waypoints

### Saving a Position Fix as a Waypoint

During normal operation your receiver continuously computes your position and displays that information on the *POSITION* screen. Quite often you will want to store the position data for later use. This stored fix is referred to as a waypoint. An obvious use would be to store the position where you are now with a unique name. That way if you were to go to a new location you could use your receiver to guide you back to your current location.

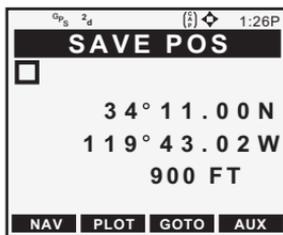
From any *NAV* or *PLOT screen*, press the **MNU** key. Using the **UP/DOWN ARROWS**, highlight **SAVE POS** and press **ENTER**. Using either the **UP/DOWN ARROWS** or the **ALPHANUMERIC KEYS**, assign an icon and name to your position and press **ENTER**.

## Receiver Generated Waypoint Name

From any *NAV* or *PLOT screen*, press the **MNU** key. Using the **UP/DOWN ARROWS**, highlight **SAVE POS** and press **ENTER**. You will then press the **ENTER** key again to confirm your entry.

## User Defined Waypoint Name

From any *NAV* or *PLOT screen*, press **MNU**, highlight **SAVE POS** and press **ENTER**. This tells the receiver that you want to store the current position as a waypoint. The cursor is in the upper left corner of the display and the arrow icons, at the top of the screen, indicate that it is in the edit mode. What you will do next is assign a name to this position.

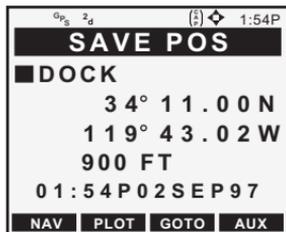
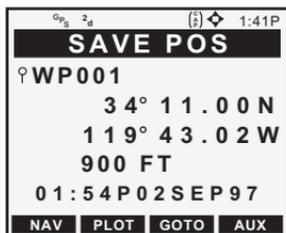


The waypoint name can be created by the receiver or you can input a name that means something to you. If you press **ENTER** without creating a name the receiver assigns a waypoint name. Waypoint names assigned by the receiver appear in the format **WPxxx**, where the **xxx** is a sequential number (001, 002, etc.) with a pin icon in front, alerting you that the waypoint is receiver-generated.

To allow the receiver to name the waypoint, press **ENTER**. The following screen will appear briefly and then the receiver returns to the *POSITION* screen.

or

Use the **ARROW KEYS**, or **ALPHANUMERIC KEYS**, to type in a waypoint name that describes the position being saved. A waypoint name always starts with an identifier icon and 1 to 5 characters. After assigning a name, press **ENTER**. This screen, shown at right, will appear briefly and then the receiver returns to the last viewed *NAV* or *PLOT* screen.

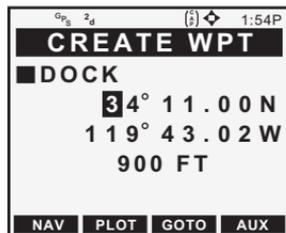


## Creating a Waypoint

This allows you to create and store a waypoint with a receiver-generated name or user-assigned name and allows you to assign the position coordinates.

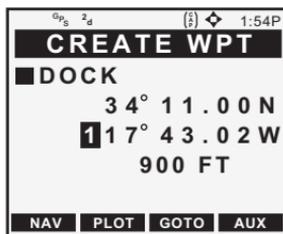
From any *NAV* or *PLOT* screen, press **MNU**, highlight **CREATE WPT** and press **ENTER**. The *CREATE WPT* screen appears. Press **ENTER** to accept a receiver-generated name or use the **ARROW KEYS**, or **ALPHANUMERIC KEYS**, to assign a name of your choice and press **ENTER**.

The cursor moves to the first line of the position. You can either use the **ALPHANUMERIC KEYS** to type in the coordinates or use the **UP/DOWN ARROWS** to scroll through the number list. Use the **LEFT/RIGHT ARROWS** to move



the cursor. If using LAT/LON coordinate system, the **UP/DOWN ARROWS** toggle between N and S. Press **ENTER** to confirm and continue.

Using the **ALPHANUMERIC KEYS** or **LEFT/RIGHT** and **UP/DOWN ARROWS** you can change the second line of the position. If using LAT/LON coordinate system, the **UP/DOWN ARROWS** toggle between E and W. Press **ENTER** to save the changes.

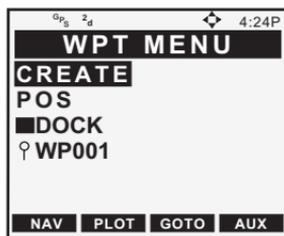


You may now assign the elevation. If you do not know the elevation, press **ENTER** to accept the displayed value. In a few seconds the new waypoint is saved and the receiver returns to the *NAV* screen from which you started.

## Accessing the Waypoint Menu

The *WAYPOINT MENU* contains up to 200 named waypoints, displayed in two columns of four waypoints each and extending several pages.

To access the *WAYPOINT MENU*, press the **AUX** softkey from any *NAV* or *PLOT* screen. This brings you to the *AUXILIARY MENU* where you will use the **UP/DOWN ARROWS** to highlight **WAYPOINTS** and press **ENTER**. This will take you to the *WPT MENU* screen. This is a listing of all the waypoints you have stored in your receiver.

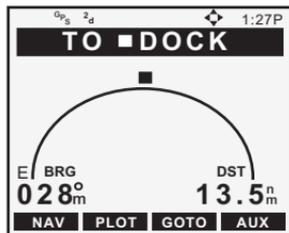
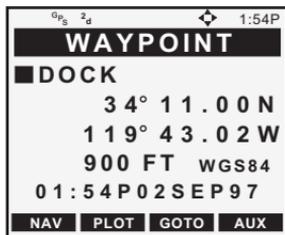
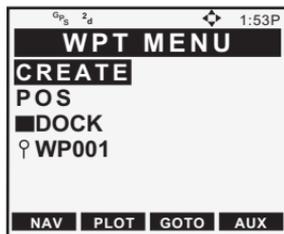


As the number of waypoints in the library increases, the *WPT MENU* screen will add a second column of four waypoint names to the right of the ones you have now, and will continue to another “page.” Use the **LEFT/RIGHT ARROWS** to move from column to column and the **UP/DOWN ARROWS** to move up and down through the list. When you reach the end of the page, the cursor will automatically scroll to the next page.

## Viewing a Waypoint

While in any *NAV* or *PLOT* screen, press the **AUX** softkey. Using the **UP/DOWN ARROWS**, highlight **WAYPOINTS** and press **ENTER**. Use the **UP/DOWN** and **LEFT/RIGHT ARROWS** to highlight the waypoint you wish to view and press **ENTER** to display the *WAYPOINT* screen. This screen closely resembles the *POSITION* screen with the notable addition of the time and date the waypoint was saved. Use the **LEFT** or **RIGHT ARROW** to display the *WAYPOINT* screen for adjacent waypoints in the list. Continue pressing the **LEFT** or **RIGHT ARROW** to scroll through the entire list.

The **UP/DOWN ARROWS** give the bearing (BRG) and distance (DST) for the selected waypoint on the *POINTER* screen.



## Accessing the Waypoint Function Menu

From any *NAV* or *PLOT* screen, press the **AUX** softkey. Use the **UP/DOWN ARROWS** to select **WAYPOINTS** and press **ENTER**. Select a waypoint from the list and press **ENTER** to access the *WAYPOINT* screen, then press **MNU** to access a menu of functions.



## Editing a Waypoint

This enables you to rename a waypoint (optional) and to change the coordinate values for the waypoint.

From any *NAV* or *PLOT* screen, press the **AUX** softkey. Use the **UP/DOWN ARROWS** to select **WAYPOINTS** and press **ENTER**. Select a waypoint from the list and press **ENTER** to access the *WAYPOINT* screen. Press **MNU** to access the function menu, highlight **EDIT** and press **ENTER**.

Changing the name of the waypoint is the first option. Use the **LEFT/RIGHT ARROWS** to move the cursor and the **UP/DOWN ARROWS** to select the characters. After changing the waypoint name or, if there are no changes to the waypoint name, press **ENTER**.

Make changes to the position, using the **UP/DOWN ARROWS** to scroll through the number list, and the **LEFT/RIGHT ARROWS** to move left and right. Press **ENTER** to accept the changes. After all changes are made to the position and elevation, press **ENTER**. In a few seconds the changes will be saved and the receiver returns you to the *WAYPOINT* screen of the edited waypoint. Any name, or coordinate, changes that you made while editing, have been saved, replacing the former name and/or coordinates.



If you attempt to edit a waypoint contained in a route, a warning message will appear: “WARNING - WPT USED IN A ROUTE ENTER TO CONTINUE.” You must first delete the waypoint from the route, or delete the route, before modifying the waypoint.

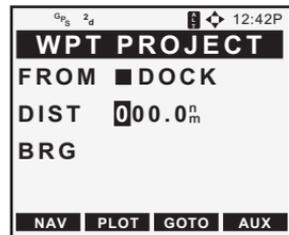
## Projecting a Waypoint

This function allows you to project a waypoint, which means to create a waypoint at a certain distance and bearing from an existing waypoint.

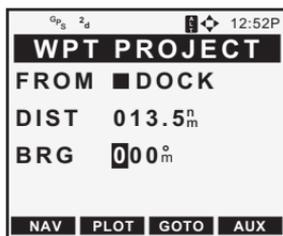
From any *NAV* or *PLOT* screen, press the **AUX** softkey. Use the **UP/DOWN ARROWS** to select **WAYPOINTS** and press **ENTER**. Select the waypoint in the list from which you wish to project a new waypoint, then press **ENTER** to access the *WAYPOINT* screen.

Press **MNU** to access the function menu, highlight **WPT PROJEC** and press **ENTER**. The *WPT PROJECT* screen appears with the “FROM” waypoint highlighted, allowing you to choose which waypoint you will be projecting from. Use the **LEFT/RIGHT ARROWS** to scroll through the list of available “stored” waypoints from which to choose. Press **ENTER**.

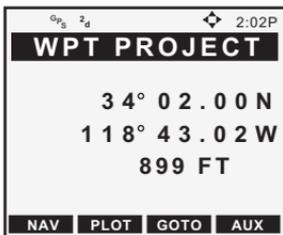
Use the **UP/DOWN** and **LEFT/RIGHT ARROWS** to key in the distance at which you wish to project the new waypoint. When you have finished, press **ENTER** to confirm and continue.



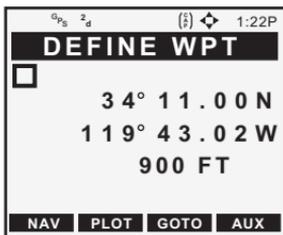
The cursor appears in the bearing field (BRG). Use the **UP/DOWN** and **LEFT/RIGHT ARROWS** to key in the bearing at which you wish to project the new waypoint. When you have finished, press **ENTER** to confirm.



The coordinates of the projected waypoint you have just created appear on the *WPT PROJECT* screen.



To save these coordinates as a waypoint, press **ENTER** to access the *DEFINE WPT* screen. Assign a name using the **UP/DOWN** and **LEFT/RIGHT ARROWS**, then press **ENTER**.



The projected waypoint is saved as a new waypoint and the display returns to the *WAYPOINT* screen from which you projected the new waypoint.

## Deleting a Waypoint

The **DELETE** function is used to permanently remove a waypoint from your receiver's memory.

From any *NAV* or *PLOT* screen, press the **AUX** softkey. Use the **UP/DOWN ARROWS** to select **WAYPOINTS** and press **ENTER**. Select the waypoint in the list you wish to delete, then press **ENTER** to access the *WAYPOINT* screen. Now press **MNU** to access the function menu, highlight **DELETE** and press **ENTER**.

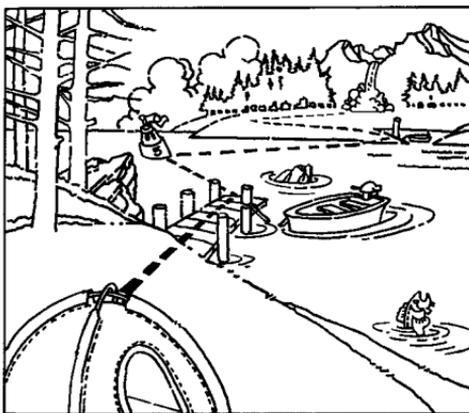
The receiver will now give you one last chance to change your mind. If you are sure, press the **YES** softkey. The waypoint is now erased and you are returned to the next waypoint in the list.



Waypoints that are currently used in a route cannot be deleted (discussed in the next section). The receiver will warn you if you attempt to do so.

## ***Routes***

A route is a planned course of travel defined by a series of waypoints.



To create a route, you must already have waypoints stored in the receiver's memory. These waypoints are then connected to form the segments, or "legs", of the route. A route may contain from one to fifteen legs.

## Activating a GOTO Route

The GOTO function enables you to create a simple one-leg route from your present position to a defined waypoint. When a GOTO is active, the title bar of the *NAVI*, *NAV2*, *POINTER* and *ROAD screens* displays “TO Destination Waypoint” and the screens display the corresponding navigation information.

From the *MAIN MENU*, press the **GPS** softkey. Press the **GOTO** softkey, use the **UP/DOWN ARROWS** to highlight the desired destination waypoint and press **ENTER**. The first four selections in the *GOTO MENU* allow you to activate a Man OverBoard (MOB), Backtrack (BCKTRK), to access the route menu to activate an existing route (ROUTE) or to activate a GOTO route with user defined coordinates. MOB, BCKTRK and COORD functions are discussed at the end of this section.



It is also possible to activate a GOTO from the PAN N SCAN feature on the *PLOT screen* as described earlier.

The receiver has now activated a route from your present position to the destination waypoint you have just selected. The last viewed *NAV screen* is now displayed.



If the receiver has not yet computed a position fix, then the start of the GOTO may not represent your current position. It will, however, correct the navigation information after a fix is acquired.



If a route, GOTO or MOB is already active, the new GOTO automatically replaces it and becomes the active route.

## Accessing the Route Menu

The *ROUTE MENU* is used to create and view up to five single or multi-leg routes. A pop-up menu allows you to activate, deactivate or reverse a selected route, edit or view the legs of the route or clear the route.

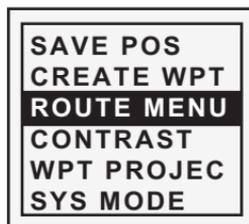
The *ROUTE MENU* can be accessed in three ways:

From any *NAV* or *PLOT screen*, press the **AUX** softkey. Use the **UP/DOWN ARROWS** to select **ROUTE MENU** and press **ENTER**.



or

From any *NAV* or *PLOT screen*, press **MNU** to access the pop-up menu. Use the **UP/DOWN ARROWS** to select **ROUTE MENU** and press **ENTER**.



or

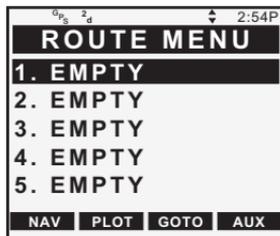
Press the **GOTO** softkey, highlight **ROUTE** and press **ENTER**.



## Creating a Multi-Leg Route

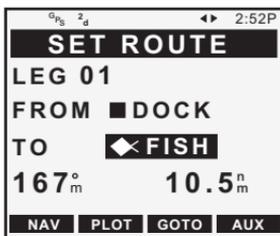
This creates a route of 1 to 15 legs. Each leg has a start and end waypoint. Each end waypoint is the start waypoint for the following leg.

From any *NAV* or *PLOT* screen, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight **ROUTE MENU** and press **ENTER** to access the *ROUTE MENU*. Use the **UP/DOWN ARROWS** to select an **EMPTY** route and press **ENTER**.



If there are no **EMPTY** routes in the **ROUTE MENU**, you must clear a route before you can create a new one.

Use the **LEFT/RIGHT ARROWS** to select the **FROM** waypoint. This is the starting position for this leg of your route. The default waypoint in the **FROM** field is the current position, labeled as **STRT1**, with a block icon in front. The “1” indicates that it is the **START** waypoint of Route 1. Press **ENTER**. The highlight bar moves down to the **TO** line. Use the **LEFT/RIGHT ARROWS** to change the **TO** waypoint to be the destination for this leg. Note that the screen displays the bearing and distance for this leg of the route.



Press **ENTER** to confirm the **TO** waypoint.

The receiver automatically used the TO waypoint from the previous leg as the FROM waypoint for the next leg. Continue to add legs to this route by using the **LEFT/RIGHT ARROWS** changing the TO waypoint and **ENTER** to confirm.



The bearing and distance are updated as you scroll through the various TO waypoints. When you have created as many legs of the route as desired, simply press **ENTER** with the TO highlight blank.



The receiver will not accept a destination waypoint that is 0.1 distance units from the previous waypoint.

The display returns to the *ROUTE MENU*. The new route is now the active route and can be viewed on the *NAV* and *PLOT* screens.

## Activating and Deactivating a Route

Only one MOB, BACKTRACK, COORD route or GOTO can be active (in use) at any time. When you set an MOB, GOTO or BACKTRACK route, any multi-leg route that you were using is automatically deactivated and replaced with the route you just set. Likewise, creating a multi-leg route makes that route the current active route, deactivating any other route.

From any *NAV* or *PLOT screen*, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight *ROUTE MENU* and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight the route you wish to activate or deactivate and press **ENTER**.

Use the **UP/DOWN ARROWS** to highlight *ACTIVATE* or *DEACTIVATE* and press **ENTER**.

If the route you selected is currently active, **DEACTIVATE** will appear on the menu, and pressing **ENTER**, after highlighting that option, will deactivate the route. To return to the *ROUTE MENU* you will press the **ESCAPE (ESC)** key. If the route is not active, **ACTIVATE** will appear on the menu, and pressing **ENTER** will activate the route and return you to the *ROUTE MENU*.

## Reversing a Route

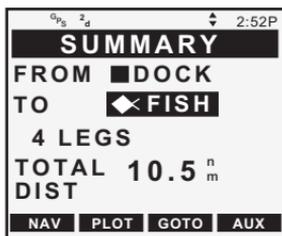
The **REVERSE** function allows you to take an existing route and reverse the order of waypoints in the route. For example, if you were to set a route that went from point A to point B and ended at point C, **REVERSE** would change the route to go from point C to point B and ending at point A.

From any *NAV* or *PLOT screen*, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight **ROUTE MENU** and press **ENTER**. Highlight the route you want to reverse and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight **REVERSE** and press **ENTER**. The route is reversed and the display returns to the *ROUTE MENU*.

## Viewing the Route Summary (Edit Option)

The edit option displays a summary of the selected route, including starting and ending waypoints, number of legs and total distance. It allows you to view, insert, delete and replace individual legs of a route, as well as choose the leg on which you want to navigate by making this the current active leg.

From any *NAV* or *PLOT screen*, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight **ROUTE MENU** and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight the route you want to view and press **ENTER**. Use the **UP/DOWN**

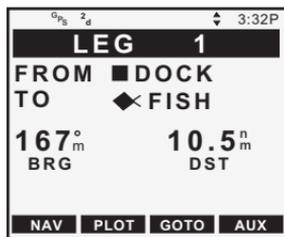


**ARROWS** to highlight EDIT and press **ENTER**. The *SUMMARY* screen for the selected route is displayed.

## Viewing the Legs of a Route

This allows the legs of a route to be viewed. It is also the entry point from which legs can be added, removed or replaced.

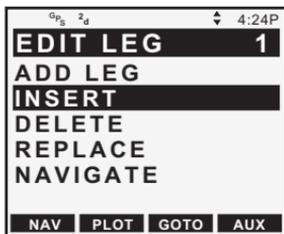
To review the route by viewing each of the legs individually, starting from the *SUMMARY* screen, shown above, press the **UP/DOWN ARROWS** stepping through each leg of the route and back to the route summary.



## Inserting a Leg in a Route

You can insert a leg in a route by inserting a waypoint between the starting and ending waypoints of an existing leg, thereby dividing it into two legs.

From any *NAV* or *PLOT* screen, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight ROUTE MENU and press **ENTER**. Highlight the route to be edited and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight EDIT and press **ENTER**. Use the **UP/DOWN ARROWS** to select the leg you want to edit and press **ENTER**. In the *EDIT LEG* menu, highlight INSERT and press **ENTER**. A highlight bar appears for you to select the new TO waypoint for this leg.



Use the **LEFT/RIGHT ARROWS** to scroll through the waypoint list to the waypoint you wish to use as the destination for this new intermediate leg and press **ENTER**.

The new leg has now been added. The **FROM** waypoint did not change but the **TO** waypoint is now the one you just entered. The receiver has updated the bearing and distance for this leg and displays it on the screen.

Press the **DOWN ARROW**. The following leg has also been changed. The following leg now starts from the waypoint you designated as the **TO** waypoint for the previous leg.



The new **TO** waypoint must have a distance greater than 0.1 distance units from the “**FROM**” waypoint; the receiver will not insert a leg within 0.1 distance units but will return to the leg screen you were viewing.

## Deleting a Leg

Another feature of editing a route is the ability to delete one of the legs.

From any *NAV* or *PLOT screen*, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight **ROUTE MENU** and press **ENTER**. Highlight the route to be edited and press **ENTER**. Highlight **EDIT** and press **ENTER**. Use the **UP/DOWN ARROWS** to view the route leg to be deleted. Press **ENTER** to access the *EDIT LEG* menu, highlight **DELETE** and press **ENTER**. The receiver gives you one last chance to change your mind. Press **ENTER** to confirm. The leg is removed from the route. Press any function key to abort the process.



The new **TO** waypoint must be different from the old (must have a distance greater than 0.1 distance units from the “**FROM**” waypoint); the receiver will not insert a leg within 0.1 distance units but will return to the leg screen you were viewing.

## Adding a Leg

You can add a leg to the end of the route in much the same way as you would insert a leg, only this time you add a waypoint to extend the end of the route beyond the original destination.

From any *NAV* or *PLOT screen*, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight ROUTE MENU and press **ENTER**. Highlight the route to be edited, press **ENTER**. Use the **UP/DOWN ARROWS** to highlight EDIT and press **ENTER**. Use the **UP/DOWN ARROWS** to view the last leg in the route. Press **ENTER** to access the *EDIT LEG* menu, select **ADD LEG** and press **ENTER**.



If **ADD LEG** does not appear as an option of the LEG EDIT menu, you were not viewing the final leg of the route. To add a leg to the end of a route, you must be viewing the final leg when you access the LEG EDIT menu. (To add a leg to a route, see Inserting a Leg in a Route).

The *ADD LEG screen* appears with the destination waypoint of the route in the FROM field. It is used as the starting point of the final leg you wish to create. A highlight bar appears for you to select the new TO waypoint for this leg.



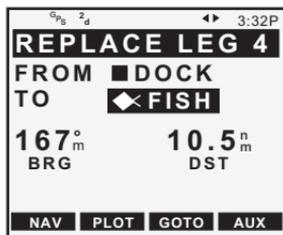
Use the **LEFT/RIGHT ARROWS** to scroll through the waypoint list to the waypoint you wish to use as the destination for this new final leg and press **ENTER**.

The new leg has now been added. The receiver displays the bearing and distance for this new final leg.

## Replacing a Waypoint

This allows the destination (TO) waypoint of a leg to be changed to a different waypoint.

From any *NAV* or *PLOT* screen, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight **ROUTE MENU** and press **ENTER**. Highlight the route to be edited and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight **EDIT** and press **ENTER**. Use the **UP/DOWN ARROWS** to view the leg to be modified. Press **ENTER** to access the *EDIT LEG* menu, select **REPLACE** and press **ENTER**.



A highlight bar appears for you to select the new **TO** waypoint for this leg, replacing the existing one.

Use the **LEFT/RIGHT ARROWS** to scroll to the waypoint you wish to use as the new destination for this leg of the route and press **ENTER**.



The new **TO** waypoint must have a distance greater than 0.1 distance units from the “**FROM**” waypoint; the receiver will not insert a leg within 0.1 distance units but will return to the leg screen you were viewing.

The destination has now been changed. The receiver has updated the bearing and distance for this leg and displays it on the screen. Press the **DOWN ARROW**. The following leg has also been changed and now starts from the waypoint you designated as the **TO** waypoint for the previous leg.

## Navigating (Activating) a Leg

While navigating using the multi-leg route, one leg of the route is said to be active. This is the leg that is currently being used to provide navigational information. It is sometimes desirable to activate a different leg, thereby changing the destination that you are navigating towards.

From any *NAV* or *PLOT screen*, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight **ROUTE MENU** and press **ENTER**. Highlight the route to be edited and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight **EDIT** and press **ENTER**. Use the **UP/DOWN ARROWS** to view the leg to be activated. Press **ENTER** to access the *EDIT LEG* menu, select **NAVIGATE** and press **ENTER**. The last viewed *NAV* or *PLOT screen* will appear, displaying the new active leg.



If a route, *GOTO* or *MOB* is already active, the leg you choose to navigate automatically replaces it as the active leg.

## Deleting a Route

This operation permanently removes a route from the *ROUTE MENU* returning the route to the “EMPTY” status.

From any *NAV* or *PLOT screen*, press the **MNU** key. Use the **UP/DOWN ARROWS** to highlight **ROUTE MENU** and press **ENTER**. Highlight the route to be cleared and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight **DELETE** and press **ENTER**. You will be prompted to confirm the deletion of the route by either pressing **ENTER** or the softkey corresponding to **YES**. The route is now cleared from memory and you are brought back to the *ROUTE MENU*.

## Creating an MOB (Man OverBoard) Route

The MOB, or Man OverBoard, function causes the receiver to save the position that is current when the feature is accessed and creates a one-leg route back to that position.

From the *MAIN MENU*, press the **GPS** softkey. Press the **GOTO** softkey. Use the **UP/DOWN ARROWS** to highlight MOB and press **ENTER**. The receiver has now accepted that position as the MOB designation and returns you to the last viewed *NAV screen*.



If you have already saved an MOB position, the receiver will prompt you to replace the MOB position. Press the softkey corresponding to YES to accept the new MOB.



The MOB position and MOB route information will be lost when the receiver is turned off.

## Creating a Backtrack Route

This creates a route using fixes in the Last Fix Buffer (up to 16 of the most recent last fixes) to create a route that “backtracks” the course you last took. This way you could leave point A, travel for some time, set a backtrack route and the receiver would guide you back to point A following the same course you just took.

From the *MAIN MENU*, press the **GPS** softkey. Press the **GOTO** softkey, use the **UP/DOWN ARROWS** to highlight BCKTRK and press **ENTER**. A backtrack is created in the first available route.

### *Last Fix Buffer*

While you are taking position fixes your receiver can automatically save them. The receiver will store position fixes in the last fix buffer at a rate you defined in *SETUP* under **LAST FIX INTERVAL**.

## Viewing a LAST FIX

From any *NAV* or *PLOT* screen, press the **AUX** softkey. Use the **UP/DOWN ARROWS** to highlight **LAST FIXES** and press **ENTER**. The *LAST FIX* screen that appears exactly duplicates the screen you have already seen when viewing a waypoint.

Notice that the receiver has assigned a name that begins with a plus (+) and is followed by a two-digit number. This number will increase as the Last Fixes are being taken with the higher the number, the older the fix. The receiver will store a total of 16 Last Fixes.

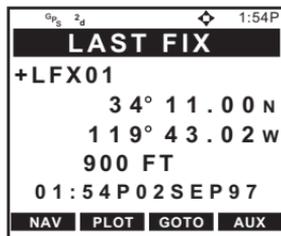
Use the **LEFT/RIGHT ARROWS** to scroll through the other last fixes in the buffer.

## Viewing the LAST FIX Trip Summary Screen

This screen informs you that the summary you are about to view will cover the trip you made from the time the selected last fix was recorded to your present position (POS) or a different last fix.

From any *NAV* or *PLOT* screen, press the softkey corresponding to **AUX**. Use the **UP/DOWN ARROWS** to highlight **LAST FIXES** and press **ENTER**. Use the **LEFT/RIGHT ARROWS** to select any Last Fix except +LFX01.

Press the **UP ARROW** to view the *TRIP SUMMARY* screen. Use the **LEFT/RIGHT ARROWS** to select any of the other fixes present in the last fix buffer that were taken after the one chosen as the “FROM” waypoint. After scrolling to the fix desired, press **UP ARROW** for the Trip Summary for that route.





If you select +LFX01 as the FROM waypoint you will not be given the opportunity to change the “TO” waypoint since there have been no other fixes saved since +LFX01 was recorded. A message “SELECT OLDER STARTING FIX FOR TRIP” appears.

## Setup Options

Setup options allow you to customize your receiver to display information in the format that best suits your needs.

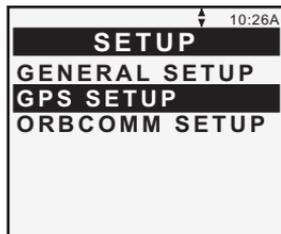
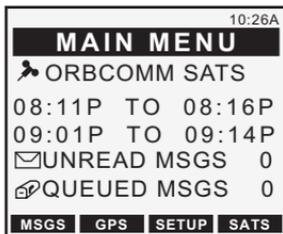
### GPS Setup

#### Initializing the Receiver

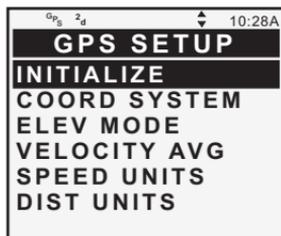
This option was discussed in more detail earlier, but, in general, INITIALIZE allows you to input the approximate coordinates, time and date for your present position if the unit has computed a position fix or if it has had its memory cleared. This function should also be used any time the unit is moved more than 300 miles while turned OFF, to help the unit acquire a fix faster.

To initialize your GSC 100 proceed from the *MAIN MENU*, using the softkey options listed along the bottom of the screen, to the *SETUP MENU* by pressing the **SETUP** softkey.

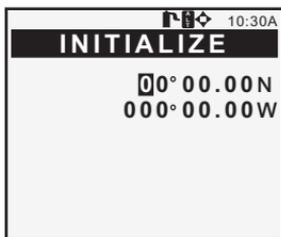
Once in the *SETUP MENU* you will use the **UP/DOWN ARROW** to highlight GPS SETUP and press **ENTER**.



The *GPS SETUP MENU* is now displayed with the menu option **INITIALIZE** highlighted. Press **ENTER**. Within the *GPS SETUP MENU* there is an additional page of options that the user can access by using the **UP/DOWN ARROWS** to scroll.



You are now at the *INITIALIZATION screen*. All four arrow directions will be utilized as depicted by the four way arrow icon at the top of the screen. Also, this screen becomes active in the ALT mode as the only entries to be made are numerical. Use the same procedure as was used earlier in the GPS Initialization section.



After that has been completed, continue to the next section.

## Setting the Coordinate System

The coordinate system you select will depend on the maps or charts that you are using with your receiver. The default coordinate system is LAT/LON, DEG/MIN.00.

From the *MAIN MENU*, press the **SETUP** softkey. Using the **UP/DOWN ARROWS**, highlight **GPS SETUP** and press **ENTER**. Highlight **COORD SYSTEM**, using the **UP/DOWN ARROWS**, and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight coordinate system desired and press **ENTER**.



If you select LAT/LON, you will be asked to select one of three formats for displaying position coordinates: DEG/MIN.00, DEG/MIN.000 or DEG/MIN/SEC. If you choose one of the first two options, the display is in decimal format, while the third option is based on 60 seconds in a minute.

Available Coordinate Systems:

LAT/LON

IRISH GRID

UTM

SWISS GRID

OSGB

SWEDISH GRID

## Setting the Elevation Mode

In addition to position, your receiver can compute your elevation when it is receiving signals from at least four satellites. This is referred to as “3D” Elevation Mode.

From the *MAIN MENU*, press the **SETUP** softkey. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight ELEV MODE, using the **UP/DOWN ARROWS**, and press **ENTER**. Using the **UP/DOWN ARROWS**, highlight the mode desired and press **ENTER**.

When there are only three satellites in view, the receiver can only compute a two-dimensional fix. In this case the receiver will display the last computed elevation or the elevation that you manually entered in INITIALIZE. This elevation mode is referred to as “2D” (the default setting). You may select either elevation mode in this SETUP feature.

If you select the 2D elevation mode you will be prompted to input the elevation. If you are unsure of the elevation you can press **ENTER** to accept the previously used elevation.

If you select the 3D elevation mode, the receiver will calculate elevation whenever signals are being received from at least four satellites. When fewer satellites are being tracked, the receiver will default to 2D and display the 2D icon at the top of the screen.

## Setting Velocity Averaging

As you are traveling with your unit on, you may notice fluctuations in the velocity displayed. Velocity is susceptible to Selective Availability and velocity averaging will minimize this effect by displaying an averaged speed measurement. You have three options to choose from: OFF (no averaging) would be used where you require rapid updates of velocity; 20 SECONDS would be selected where rapid updates of velocity are not essential, generally at fairly low velocities; or 60 SECONDS where immediate velocity information is relatively unimportant, such as a long journey at a constant speed. The default is OFF.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight VELOCITY AVG, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Setting Speed Units

SPEED UNITS allows you to select the unit of measure for speed measurements. You may choose from KNOTS, MILES/HR or KM/HR. The default is KNOTS.

Press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight SPEED UNITS, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Setting Distance Units

DIST UNITS (Distance Units) allows you to select the unit of measure that distances will be displayed in. You may choose from NM (nautical miles), ST MILES (statute miles), or KM (kilometers). The default setting is NM.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight DIST UNITS, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Setting Elevation Units

ELEV UNITS (Elevation Units) is the same as DIST UNITS but this time you will select the unit of measure that will be used to display your elevation in. You may choose from METERS or FEET. The default setting is FEET.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight ELEV UNITS, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Setting North Reference

This sets the north reference of the displays to TRUE or MAGNETIC. The default North reference is MAGNETIC.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight NORTH REF, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Selecting Map Datum

Depending upon which map or chart you are using you may need to change the Map Datum that the receiver will use. The datum required will be printed on the map or chart. The most common is WGS84, which is also the default Map Datum.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight MAP DATUM, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Selecting Waypoint Sort

WPT SORT allows you to classify the waypoints stored in the user waypoint catalog in alphabetical order or according to their proximity to the present position with the closest listed first. You may choose from ALPHABETICAL, NEAREST or ICON. The default setting is ALPHABETICAL.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight WPT SORT, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Selecting the Last Fix Interval

This function allows you to set the rate that positions are automatically saved to the last fix buffer. The default is 10 minutes.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight LFIX INTERVAL, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.

## Plot Setup

PLOT SETUP allows you to adjust the track orientation and track history on the PLOT screen. For TRACK you may select OFF, 0.1, 0.5, 1.0 or 5.0. The default track setting is 1.0. For ORIENTATION, you may select HEADING UP or NORTH UP. The default setting is HEADING UP.

From the *MAIN MENU*, press the **SETUP** softkey. Using the **UP/DOWN ARROWS**, highlight GPS SETUP and press **ENTER**. Highlight PLOT SETUP, using the **UP/DOWN ARROWS**, and press **ENTER**. Use the **UP/DOWN ARROWS** to select the ORIENTATION desired and then use the **LEFT/RIGHT ARROWS** to select the TRACK setting desired. Press **ENTER** to accept your selections.

## *General Setup*

### **Selecting Time Format**

Your Magellan receiver can display time in one of three formats: local 24-hour (military), local 12-hour (AM/PM), or UT (Universal Time or Zulu). The default Time Display is LOCAL AM/PM.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GENERAL SETUP and press **ENTER**. Highlight TIME FORMAT, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**.



If the receiver does not have a computed position fix the receiver displays a warning to alert you that an initial time has not been set to INITIALIZE. After inputting an initial time you may change the format that time is displayed in.

### **Setting the Light Timer**

Since using the light in the unit uses up power at a quicker pace, this feature allows you to set the light timer to turn the units light off at a certain time to help conserve power. There are six settings for the light timer; OFF, 15 SECONDS, 30 SECONDS, 1 MINUTE, 2 MINUTES and 3 MINUTES.

To set the light timer, press the **LIGHT** key. From the *MAIN MENU*, press the **SETUP** softkey. Using the **UP/DOWN ARROWS**, highlight GENERAL SETUP and press **ENTER**. Highlight LIGHT TIMER, using the **UP/DOWN ARROWS**, and press **ENTER**. Using the **UP/DOWN ARROWS**, highlight the setting desired and press **ENTER**.

## Sampling

Sampling causes the receiver to turn itself ON at user-specified intervals, compute a position fix, store the fix in the last fix buffer and then turn itself OFF. Sampling is also used to send/receive GlobalGrams at user-specified intervals and then turn itself OFF. The default setting is OFF.

To access sampling, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight GENERAL SETUP and press **ENTER**. Highlight SAMPLING, using the **UP/DOWN ARROWS**, and press **ENTER**. Using the **UP/DOWN ARROWS**, highlight OFF, GPS ONLY or GPS AND MSGS and press **ENTER**. If you choose GPS ONLY, or GPS AND MSGS, use the **UP/DOWN ARROWS** to highlight the setting desired and press **ENTER**.

To use the sampling feature to compute position fixes only, you would choose the setting GPS ONLY. To use it to compute position fixes and to send/receive GlobalGrams, you would choose GPS AND MSGS.

In order to use Sampling, the receiver's antenna must remain fully visible to the sky. If the antenna is blocked, so that the receiver cannot acquire sufficient satellites, the receiver will be unable to compute a position fix or send/receive GlobalGrams and the receiver will remain ON until the obstruction is removed.

When Sampling is ON, a warning message appears on the *POWER DOWN* screen to remind you that you have Sampling ON. Sampling will continue until it is turned OFF or until the battery warning is displayed.

When the unit is turned ON again, a message will appear requiring you to confirm whether you want **SAMPLING ON** or **OFF**. Select **ON** or **OFF** using the **UP/DOWN ARROWS** and press **ENTER**.

## Setting NMEA Port and Baud Rate

NMEA is the communication **STANDARD** for electronic marine navigation equipment. Your receiver outputs position and navigation information in the NMEA 0183 format to support navigation aids such as autopilots. To use NMEA your receiver must be connected to the NMEA device with the Power/Data Cable and the device you are using must accept the proper 0183 format. Your GPS receiver must be on and computing fixes before NMEA information will be output through the data port.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight **GENERAL SETUP** and press **ENTER**. Highlight **NMEA PORT**, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight the setting desired and press **ENTER**. Using the **UP/DOWN ARROWS**, highlight baud rate desired and press **ENTER**.



NMEA does not work while the unit is in **ORBCOMM MODE**. Therefore, if you are using NMEA to control an autopilot it is recommended that the **GPS MODE** be selected.



Keep in mind that in order to support the NMEA device, your receiver must be operating continuously and Sampling should be disengaged. To prevent outages due to low batteries, external power is recommended.

## Selecting RS-232 Port and Baud Rate

BAUD RATE allows you to select the appropriate baud rate for your external equipment. (Check the documentation of your external equipment.) You may choose from 9600, 19200, 57600 or 115200. The default setting is 9600.

To access this feature, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight **GENERAL SETUP** and press **ENTER**. Highlight **RS232 PORT**, using the **UP/DOWN ARROWS**, and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight **ON** and press **ENTER**. Using the **UP/DOWN ARROWS**, highlight baud rate desired and press **ENTER**.

## Selecting Clear Menu

The **CLEAR MENU** option allows you to clear selected portions of memory while keeping all other pertinent data intact.

To clear the menu, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight **GENERAL SETUP** and press **ENTER**. Highlight **CLEAR MENU**, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight **MESSAGES, ADDRESSES, LAST FIXES, TRACK, WPTS/RTS or ALL** and press **ENTER**. You are now given the chance to confirm your entry. If you wish to continue, press the **YES** softkey or **ENTER**. If you do not wish to **CLEAR** press the **NO** softkey.

## Contrast

**CONTRAST** allows you to adjust the contrast level of the display to allow you to select the best contrast level for the particular lighting condition you are in. Following are the three ways to alter the contrast level of the display on the GSC 100:

To set the contrast, press the **SETUP** softkey from *MAIN MENU*. Using the **UP/DOWN ARROWS**, highlight **GENERAL SETUP** and press **ENTER**. Highlight **CONTRAST**, using the **UP/DOWN ARROWS**, and press **ENTER**. Use the **LEFT/RIGHT ARROWS** to adjust the contrast and press **ENTER**.

From any *NAV* or *PLOT screen*, press the **MNU** key. Using the **UP/DOWN ARROWS**, highlight **CONTRAST** and press **ENTER**. Use the **LEFT/RIGHT ARROWS** to adjust the contrast and press **ENTER**.

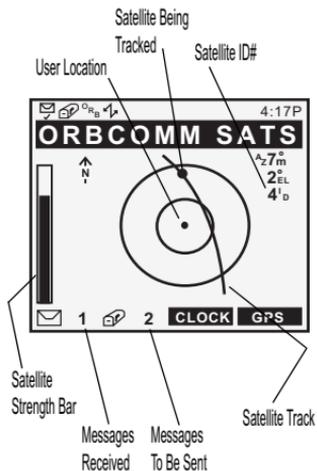
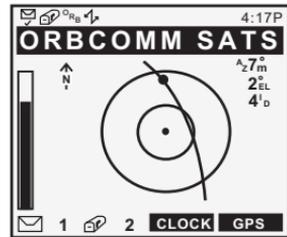
From the *MAIN MENU*, press the **MNU** key. Using the **UP/DOWN ARROWS**, highlight **CONTRAST** and press **ENTER**. Use the **LEFT/RIGHT ARROWS** to adjust the contrast and press **ENTER**.

## Additional Features

### Viewing *ORBCOMM SAT STATUS* Screen

This screen displays the ORBCOMM satellites by their location, using azimuth and elevation data, and showing their signal strength using an energy bar located on the left side of the screen. The dot moving within the circles represents the satellite being tracked with your location designated by the dot in the center of the two circles.

From the *MAIN MENU*, press the **SATS** softkey. You are now at the *ORBCOMM SATS* screen, showing the location of the ORBCOMM satellite being utilized as well as its azimuth and elevation. On the left side of the screen is a signal strength bar showing that satellite's strength. The more the bar is filled, the better transmission you are getting. Also, below the satellite strength bar is both the closed envelope and mailbox with the icon in the up position icons. Next to these icons will be a number showing how many unread GlobalGrams you have and how many GlobalGrams have been sent to the *MAILBOX* for transmission. As you receive and send GlobalGrams these numbers will change. When there is no ORBCOMM satellite in view, this screen lists the time of the next pass.



There is an additional screen accessed from the *ORBCOMM SATS* screen. By pressing the **DOWN ARROW** on your keypad, you are brought to the *ORBCOMM SATELLITE SCHEDULE* screen, showing the schedule of the next several satellite passes, including elevation, azimuth data and the satellite id and elevation. Within this screen you can use the **UP/ DOWN ARROWS** to scroll through the available schedule.

ORBCOMM SATS		
RISE	SET	ID
01:05P-01:15P		1
$\wedge_z 29^\circ_m$	$\wedge_z 86^\circ_m$	$9^\circ_{EL}$
04:25P-04:40P		2
$\wedge_z 26^\circ_m$	$\wedge_z 92^\circ_m$	$7^\circ_{EL}$
		<b>CLOCK</b> <b>GPS</b>

Azimuth at the beginning of satellite pass

Azimuth at the end of satellite pass

Maximum elevation during satellite pass

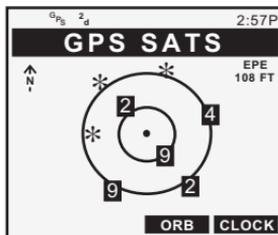


Abrupt changes of greater than 10 minutes or 100 km cause the unit to recompute the ORBCOMM satellite schedule.

## Viewing GPS SAT STATUS Screen

This screen displays the satellites by their signal strength and their position in the sky relative to your location. An asterisk (\*) indicates that the unit is not locked on to that particular satellite. When lock is achieved the \* will be replaced by the signal strength of the satellite. Signal strength will range from 0 to 9, with 9 representing better signal strength.

From the *MAIN MENU*, press the **SATS** softkey, which brings you to the *ORBCOMM SATS* screen, and then press the **GPS** softkey. You will then be at the *GPS SATS* screen. The center dot on the bull's-eye is your present position. The center ring is approximately  $45^\circ$  above the horizon and the outer ring is the horizon.



## Viewing the Odometer

The Odometer feature displays the *ODOMETER* screen, which keeps track of total distance traveled as well as trip distance, similar to the odometer in an automobile.

To view the odometer, press the **GPS** softkey from the *MAIN MENU*, and then press the **AUX** softkey. Use the **UP/DOWN ARROWS** to highlight **ODOMETER** and press **ENTER**. You are now at the *ODOMETER* screen.



## Resetting the Odometer and/or Trip Odometer

From the *ODOMETER* screen, press **MNU**. A pop-up menu will appear with the options to **RESET TRIP**, **RESET ODOM** or **SYS MODE**. Use the **UP/DOWN ARROWS** to highlight which odometer you wish to reset and press **ENTER**. This will reset the odometer of choice and bring you back to the *ODOMETER* screen.



## Viewing the Clock

The Clock option will display the current date and time in the time format selected during setup.

From the *MAIN MENU*, press the **SATS** softkey and then press the **CLOCK** softkey. You are now at the *CLOCK* screen.

## Viewing the SUN/MOON Screen

This screen will display the time of sunrise and sunset for the chosen waypoint. It also graphically displays the lunar cycle of the moon.

After accessing the *GPS screens*, by pressing the **GPS** softkey from the *MAIN MENU*, press the **AUX** softkey. Using the **UP/DOWN ARROWS**, highlight **WAYPOINTS** and press **ENTER**. Highlight the waypoint in the list which you wish to view sunrise information and press **ENTER**. Press the **MNU** key and use the **UP/DOWN ARROWS** to highlight **SUNRISE** and press **ENTER**.

The first step in viewing the solar and lunar information is to enter the date for which you want the information. Use the **UP/DOWN** and **LEFT/RIGHT ARROWS** to set the date and press **ENTER**.



The receiver will compute the sunrise, sunset and lunar cycle for the waypoint chosen on the date you entered.

## GPS Simulator

The simulator mode causes the receiver to create a fictitious route from your location to two newly created waypoints. You will find the Simulator very handy when you want to review or practice using your receiver at home. In the simulate mode you can watch the receiver simulate movement and observe how the different navigational screens respond.

To activate the GPS Simulator press the **SETUP** softkey, from the *MAIN MENU*, and, using the **UP/DOWN ARROWS**, highlight **GENERAL SETUP** and press **ENTER**. Within the *GENERAL SETUP MENU* use the **UP/DOWN ARROWS** to highlight **GPS SIMULATOR** and press **ENTER**. You will

then be prompted to press **ENTER** to continue. This will return you to the *GENERAL SETUP MENU*. To view the *NAV screens* showing the simulation, access the *MAIN MENU* and press the **GPS** softkey.



Using the simulator changes the current position. When the simulator is turned off, the unit will need to compute a new fix.

## ***ORBCOMM Demo***

This feature allows you to run a demonstration of the capabilities associated with the messaging functions available. As with the GPS simulator, this option simulates the functionality of ORBCOMM operations and allows you to see what an incoming and outgoing GlobalGram will look like in the units *MESSAGE LIST*. Using this feature will aid you in sending and receiving messages using your GSC 100.

From the *MAIN MENU*, press the **SETUP** softkey. Using the **UP/DOWN ARROWS**, highlight **GENERAL SETUP** and press **ENTER**. From the *GENERAL SETUP MENU* highlight **ORBCOMM DEMO**, using the **UP/DOWN ARROWS**, and press **ENTER**. You will then press the **ENTER** key again to confirm your desire to run the **ORBCOMM DEMO**.

## ***Erasing Last Fixes***

**ERASE LFIX** will erase all of the waypoints in your Last Fix Buffer. By doing this you will free up those fixes for future use.

From the *MAIN MENU*, press the **SETUP** softkey. Using the **UP/DOWN ARROWS**, highlight **GENERAL SETUP** and press **ENTER**. From the *GENERAL SETUP MENU* highlight **CLEAR MENU**, using the **UP/DOWN ARROWS**, and press **ENTER**. Highlight **LAST FIXES** and press **ENTER**. You will then be given an opportunity to confirm this action so press either the **ENTER** key or the **YES** softkey. If you change your mind then press the **NO** softkey or any other key to exit without erasing.

## ***Accessing the ABOUT Screen***

At various times you will need to know the software version number your GSC 100 is using as well as the serial number for your unit. Use the following steps to access this information in the *ABOUT screen*.

From the *MAIN MENU*, press the **SETUP** softkey. Use the **UP/DOWN ARROWS** to highlight GENERAL SETUP and press **ENTER**. Highlight ABOUT, using the **UP/DOWN ARROWS**, and press **ENTER** to access the *ABOUT screen*.

## ***Erasing Track from the Plotter Screen***

As you use your receiver more, you may soon notice the *PLOT* screen becoming cluttered with the graphic display of your past movement (track). You can erase the track display with the CLEAR TRACK option.

From the *MAIN MENU*, press the **SETUP** softkey. Use the **UP/DOWN ARROWS** to highlight GENERAL SETUP and press **ENTER**. Highlight CLEAR MENU and press **ENTER**. Using the **UP/DOWN ARROWS**, highlight TRACK and press **ENTER**. You will then be asked to either press **ENTER**, or the **YES** softkey, to confirm that you want to erase the track history. If you change your mind, press the **NO** softkey or any other function key to leave the track unchanged.

## ***Erase All Waypoints from Waypoint List***

CLEAR WAYPOINTS will erase all of the waypoints in your waypoint list. If routes currently exist, clearing waypoints requires that all routes be cleared and a message will be displayed. See Clearing Routes.

From the *MAIN MENU*, press the **SETUP** softkey. Using the **UP/DOWN ARROWS** to highlight GENERAL SETUP and press **ENTER**. Highlight CLEAR MENU and press **ENTER**. Highlight WPTS/RTS, using the **UP/DOWN ARROWS**, and

press **ENTER**. You will be instructed to press either the **ENTER** key, or the **YES** softkey, to erase the waypoints. If you change your mind, press the **NO** softkey or any other function key to leave the waypoints intact.

### ***Clearing Receiver Memory***

Clear Memory will erase all of your receiver's memory including resetting all of the Setup features to their default values.

To clear memory, access the *MAIN MENU* and press the **SETUP** softkey. Use the **UP/DOWN ARROWS** to highlight **GENERAL SETUP** and press **ENTER**. Highlight **CLEAR MENU**, using the **UP/DOWN ARROWS**, and press **ENTER**. Use the **UP/DOWN ARROWS** to highlight **ALL** and press **ENTER**. Either press the softkey corresponding to **YES** or **ENTER** to confirm the **CLEAR MENU** command. If you change your mind press the **NO** softkey or any function key to escape.

### ***Performing a Hardware Reset***

If your GSC 100 unit locks up, will not respond to any key presses, you may need to perform a hardware reset. A hardware reset clears the units memory and resets all of the setup parameters to their default values.



When conducting a hardware reset, all data in the unit will be lost with the exception of your speed dial addresses which are kept on file at the GCC you designated. This includes all addresses and messages stored in the unit.

To perform a hardware reset, simultaneously press the **CAPS**, **ALT** and **POWER** keys.

# ICONS

The top row of the display has been reserved for displaying icons that assist you in determining the operating status of the GSC 100.

-  **Arrow Key.** Provides a visual indication as to which arrow keys are active for the displayed screen. There are different combinations of keys, as shown.
-  **Battery Charging.** Alerts the user that the receiver is connected to external power and the battery is charging.
-  **Battery Warning.** The battery is low and needs to be re-charged or replaced.
-  **Poor GQ Alert.** The geometric quality (GQ) of the satellite is poor. Try to move away from any large obstructions that may be blocking reception of satellite signals.
-  **2D.** Displayed when the unit is calculating a two-dimensional position fix using three satellites (e.g. latitude and longitude).
-  **3D.** Displayed when the unit is calculating a three-dimensional position fix using four satellites (e.g. latitude, longitude and elevation).
-  **Differential.** Indicates that the receiver is utilizing DGPS to compute position fixes. Requires an additional Differential Beacon receiver to utilize DGPS.
-  **Light.** Displayed when the LCD backlight has been turned on with the **LIGHT** key. The backlight will cause the batteries to deplete much quicker and should be used only when needed.
-  **Old Data.** The receiver has not updated position fixes for more than 15 seconds.

-  **CAPS.** Appears when the keypad is active and capital letters are being used.
-  **ALT .** Appears when the keypad is active and the ALT function is being used. This signifies that the alternate character mode is active and the characters listed in the upper right corner of the alphanumeric keys are now being utilized.
- S Simulator.** Indicates that the receiver is in GPS simulation mode. The simulator will stay active until the unit is turned off.
-  **Envelope.** Appears in the status bar, along the top of the screen, when you have unread messages in the *MESSAGE LIST*. This icon is also shown next to the actual messages in the *MESSAGE LIST* alerting you that this message is unread.
-  **Open Envelope.** This icon appears next to messages that you have already opened and read.
-  **Satellite.** Appears in the status bar when ORBCOMM satellites are in view. It appears during the times that the satellites are visible, as listed on the ORBCOMM satellite schedule.
-  **Double Arrow.** When you are outdoors transmitting to an ORBCOMM satellite, you will see this icon appear in the status bar. It alerts you that the unit is in communication with a satellite and your available message option is STANDARD.
-  **Broken Double Arrow.** Appears in the status bar when your unit is transmitting to an ORBCOMM satellite but that satellite is not transmitting to a Ground Earth Station. It alerts you that your only available message option is STORE & FWD.
-  **Down Arrow.** Displayed while the unit is “listening” to an ORBCOMM satellite but not yet transmitting.

 **Broken Down Arrow.** Displayed while the unit is “listening” to an ORBCOMM satellite, but not transmitting, and the only available GlobalGram type is STORE & FWD.

 **Envelope and Check.** Appears after you execute the check message function and there are unread messages in the unit.

✓ **Check.** Appears after you have executed the check messages function. It will disappear after the unit has checked for messages.

 **Mailbox with Flag Up.** Appears when there are messages present in the mailbox to be sent at the next satellite pass. The flag on the side of the mailbox is in the UP position alerting you that mail is present.

 **Mailbox with Flag Down.** Appears next to e-mail messages that have been sent.

 **Page.** Represents globalgrams that have been saved but have not been sent.

<sup>O<sub>R</sub>B</sup> **ORBCOMM Mode.** Displayed when the unit is operating in the ORBCOMM mode.

<sup>G<sub>P</sub>S</sup> **GPS Mode.** Displayed when the unit is operating in the GPS mode.

# Warnings and Other Messages

Following are various screens that will be displayed alerting you to the operating condition of your GSC 100.

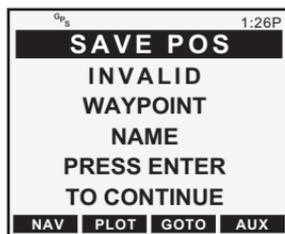
You have turned the unit ON, after resetting it or after just purchasing it, and the GPS mode has been uninitialized.

*Press the ENTER key and enter your coordinates. Refer to the section on GPS Initialization. Without initializing the unit will not be able to receive accurate positioning data used both in Navigation and ORBCOMM Satellite Scheduling.*



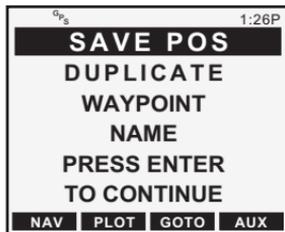
You have attempted to Save your position, using a waypoint identifier, but haven't assigned a name.

*Press ENTER, assign a symbol and enter a name for that waypoint and press ENTER.*



You have attempted to assign a waypoint name that has already been used. Every waypoint must have a unique name.

*Press ENTER and assign a different name to the waypoint.*



You have attempted to view the Last Fix List without having any fixes in the Last Fix Buffer.

*Press the NAV softkey and position the receiver to collect satellite signals to compute a position fix. The receiver will create a last fix after a position fix is computed and will continue to create a last fix every 10 minutes thereafter.*



You have attempted to set a GOTO Backtrack without a sufficient number of last fixes to create a Backtrack.

*Position the receiver to collect satellite signals to compute fixes. The receiver will create a last fix after a position fix is computed and will continue to create a last fix every 10 minutes thereafter.*



You have attempted to set a route without having saved any waypoints.

*Enter one or more waypoints before attempting to set a route.*



You have tried to set a GOTO or Backtrack route without enough empty spaces in the waypoint list to create the temporary waypoints that GOTO and Backtracks require.

*Access the WAYPOINT MENU, by pressing the AUX softkey from any GPS screen, select waypoints you no longer need and clear them from memory. If you were trying to set a GOTO route, you will need to clear only one waypoint, for a Backtrack, you may have to clear several waypoints to create enough space for the Backtrack temporary waypoints.*



You have pressed the GOTO softkey before the unit has been initialized.

*Initialize the receiver to continue.*



You have attempted to send a message without entering any recipients in the TO screen.

*Press the YES softkey, then the TO softkey. Enter the recipients of this message and then press the SEND softkey.*



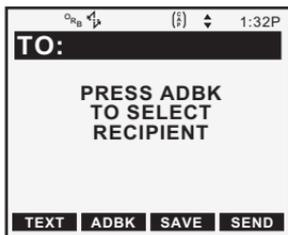
You have attempted to exit a message without saving it.

*Press the YES softkey to save the message to the MESSAGE LIST, or press the NO softkey to exit without saving.*



You are attempting to create a STORE & FWD message.

*Since you can only send these types of messages to speed dial addresses, you must access the ADDRESS BOOK and choose the speed dial address desired.*



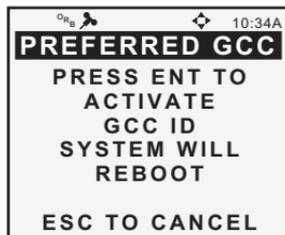
You have accessed the messaging functions without having any messages, inbound or outbound.

*Press the NEW softkey to create a message.*



You have changed the PREFERRED GCC ID designation.

*Press ENTER to accept the new ID and your unit will reboot. Pressing ESC will cancel the action and return you to the previously viewed screen.*



# Troubleshooting

The following is a brief guide to some of the problems that might be encountered while using a GPS satellite receiver or ORBCOMM receiver/transceiver and what you can do to correct them.

## **GPS**

### ***Receiver will not turn ON***

- 1** Check to see if the battery pack is installed correctly.
- 2** Replace the battery pack.
- 3** If using external power, make sure the connector is fastened tightly.

### ***Receiver will not compute a position fix or is losing lock***

- 1** Make sure that you have a clear and unobstructed view of the sky with the unit held away from your body and that your hand or other items are not blocking the antenna.
- 2** Have you moved over 300 miles with the receiver off since your last position fix? If so, the receiver may need to be reinitialized.
- 3** Check Sat Status to see where the satellites are and if the receiver is acquiring data.
- 4** Check date and time on the POSITION screen.

### ***Elevation jumps up and down***

- 1** Errors induced by the Department of Defense called Selective Availability (SA) can cause the elevation values to fluctuate.

### ***Old Data Icon is displayed and stays ON***

- 1** Make sure that you have a clear and unobstructed view of the sky with the unit held away from your body and that your hand or other items are not blocking the antenna.

- 2 Check Sat Status to see where the satellites are and if the receiver is acquiring data.

### ***Battery life seems shorter than it should be***

- 1 Make sure that you are using the Magellan NiCad battery pack that was shipped with the unit.
- 2 Shorter life span of the batteries can be due to excessive use of the backlight. *Turn the backlight off when not needed.*

### ***Position coordinates on your receiver do not match the location on your map***

- 1 Make sure that your receiver is set up to use the same datum as your map. The map datum is generally shown in the map legend. See Setting the Map Datum in the Setup Options section of this manual for instructions on selecting the map datum in your receiver.

## **ORBCOMM**

### ***The unit will not acquire any ORBCOMM satellites even though the unit shows they're in view***

- 1 Make sure that you have a clear and unobstructed view of the sky with the unit held away from your body and the antenna fully extended.
- 2 Make sure that the unit is operating in either the AUTO mode or the ORBCOMM mode.
- 3 Make sure that the unit has calculated a position fix and that the local time is displayed correctly. If the unit has been initialized with the wrong local time offset, then the unit will not reflect the correct ORBCOMM satellite schedule which will prompt the unit to search for satellites at the wrong times.
- 4 If none of the above suggestions clear the problem, put the unit in ORBCOMM mode to make sure that it operates all of the messaging functions first.

### ***The GlobalGram I sent did not get delivered to the specified recipient***

- 1** Make sure that you are sending the correct type of message. If you see the double arrow icon at the top of the screen then you send a **STANDARD** message but if you see a broken double arrow icon your message should be a **STORE & FWD**.
- 2** Make sure that the address you are sending your message to is the correct address for the intended recipient.
- 3** It may take longer to deliver your GlobalGram if there is a lot of system traffic slowing down the network.

### ***When entering data in the SUBJ or TEXT fields, the cursor stops and won't allow any more entries***

- 1** Keep in mind the limit on the number of recipients for each message as well as the limit on characters you can enter in the **SUBJ** and **TEXT** fields. For a **STANDARD** message you can have seven (7) recipients, primary and carbon copy combined, a 229 character limit for the **SUBJECT** field and a 2000 character limit for the **TEXT** field. A **STORE & FWD** message has one recipient, has to be a speed dial address, with no **SUBJECT** and a 229 character limit in the **TEXT** field.
- 2** Make sure that you have typed all your information in the correct fields. Sometimes users start typing information in the wrong field without noticing the softkey prompts for each field.

### ***The message I created was sent to the MAILBOX when I just wanted to SAVE it for editing at a later time***

- 1** Make sure that the message was **SAVED** and not **SENT** when you were done with it. To **SAVE** a message for later editing, press the **SAVE** softkey when complete. To **SEND** the message to the **MAILBOX** for transmission, press the **SEND** softkey when complete.

### *Not all of the messages that I had queued were sent*

- 1** The number of globalgrams you can send per ORBCOMM satellite pass may vary. Inbound messages are received before your outgoing GlobalGrams can be sent, so if you have incoming messages there is a possibility that some of your outgoing messages might not get transmitted during this satellite pass. The angle of elevation of the ORBCOMM satellite could create a shorter pass, limiting the number of GlobalGrams transmitted. If there are objects obstructing the view of the sky, your messages might not get transmitted. Make sure your GSC 100 has a clear view of the sky. If the ORBCOMM network is busy handling a lot of messages then there could be a chance that your message doesn't get transmitted during the current pass.
- 2** When your unit is checking for messages, it may take longer to send messages that you have already queued. If there are queued messages to be sent, the number can vary.
- 3** Make sure to check the icon next to the queued message. If the flag on the mailbox is in the down position, the message was sent. If the flag is in the up position, the message has not been sent.

### *None of the messages that I had queued were transmitted to the ORBCOMM satellite*

- 1** Make sure the unit is operating in either the AUTO or ORBCOMM mode. If the unit is operating in the GPS mode, then the receiver is not listening for ORBCOMM satellites.
- 2** Make sure that your unit has a clear view of the sky. If there are obstructions blocking the view of the sky your unit may not transmit to ORBCOMM satellites.
- 3** If your position coordinates are inaccurate, off by more than 300 miles, then the satellite pass schedule may be incorrect.
- 4** If the time is incorrect, by more than 15 minutes, than the satellite pass schedule may be incorrect.

- If this problem persists contact customer service.

## Contacting Customer Service

The previous list should allow you to solve most of the operating problems you are likely to encounter, if the receiver still appears to be operating improperly there is one last resort. Try clearing the receiver's memory in the CLEAR MENU and reinitializing your receiver. Be cautious before doing this as this will clear all the waypoints, routes, addresses and messages that you have input into the receiver.

If you are unable to solve your operation problems, please call Magellan's Customer Service at (800) 707-9971. Representatives are available Monday through Friday, from 7 A.M. to 5 P.M., U.S.A. Pacific Standard Time. Faxes can be sent to Customer Service at (909) 394-7050. You can e-mail Magellan Technical Support at: [wireless@mgl.n.com](mailto:wireless@mgl.n.com)

To contact ORBCOMM Customer Service you can call (800) ORBCOMM (672-2666). To contact ORBCOMM via e-mail use the following internet address:  
[customer\\_service@orbcomm.com](mailto:customer_service@orbcomm.com).

If necessary, you can also return your unit to Magellan for repair. (Please call for assistance first.) You must notify us before shipping the unit by Parcel Post or UPS, and include with the unit a description of the problem and your name and address. If your return shipping address is different, please include it.

It is necessary to return the enclosed registration card in order to activate the warranty.

With all correspondence, please be sure to state the model of the receiver you have and, if calling, please be sure to have your unit with you.

Packages should be sent to the following address:

Magellan Systems Corporation  
960 Overland Court  
San Dimas, CA 91773  
Attn.: Warranty/Repair

# NMEA Data Messages

## Data Transfer

Your GPS receiver can be set to output GPS data in the NMEA 0183 format to interface with other marine devices.

To output NMEA data the dataport must be turned on by selecting an output message format (0183A, 0183B, or 0183C) from the NMEA Setup function.

**NMEA Data Messages.** NMEA data is output at 4800 baud, 8, N, 1, checksum off. These settings are acceptable to most equipment and software applications.

There are several NMEA output message sets, each with a slightly different application. Check the documentation for your external equipment to select the appropriate message set.

### SET OUTPUT/USAGE

0183A	BWC, APA, GLL, VTG Remote displays, version 1.x marine autopilots
0183B	RMC, RMB NMEA-recommended navigation data for remote map, etc.
0183C	APB, GGA, BWC, GLL, VTG Version 2.0 marine autopilot data and satellite data

### NMEA Message Definitions

APA	Autopilot cross track error, direction to steer, status of GPS, route status, destination landmark name, and bearing from origin to destination (old format).
-----	---

APB	Revised autopilot message contains all of the above plus: heading to steer toward destination, bearing from the present position to the destination (magnetic or true).
BWC	Range and bearing to a landmark
GGA	GPS position, time, fix quality, number of satellites used, HDOP (Horizontal Dilution of Precision), differential reference information, and age.
GLL	GPS-derived latitude, longitude, and time of fix.
RMB	Data status, cross track error, direction to steer, origin, destination landmark, landmark location, bearing to destination, and velocity toward the destination.
RMC	Time, latitude, longitude, speed over ground, course over ground, and date.
VTG	Track (magnetic and true) and groundspeed (knots and KPH).

## OUTPUT DATA FORMAT

### APA Autopilot Format A

```

1 2 3      4 5 6 7 8      9 10
APA,A,A,A,X.XX,L,N,A,A,XXX.,M,CCC

```

- 1 OR'ed Blink and SNR (A = valid, V = invalid)
- 2 Cycle Lock (A = valid, V = invalid)
- 3-5 Cross Track, Sense (L = steer left, R = steer Right), N.Mi. Units
- 6-7 Arrival Circle, Arrival Perpendicular (crossing of the line which is perpendicular to the course line and which passes through the destination landmark.

8-9 Bearing dest. LMK. from origin LMK.,  
Magnetic

10 Dest LMK. identifier

## APB Autopilot Sentence "B"

1 2 3 4 5 6 7 8 9 10 11 12 13 14  
APB,A,A,x.x,a,N,A,A,x.x,a,c-c,x.x,a,x.x,a\*hh

1 Status: V = Loran-C Blink or SNR  
warning

A = general warning flag for  
other  
navigation systems when a  
reliable fix is not  
available.

2 Status: V = Loran-C cycle lock warning  
flag

A = OK or not used

3 Magnitude of XTE

4 Direction to steer (L, R)

5 XTE units, nautical miles

6 Status: A = arrival circle entered

7 Status: A = perpendicular passed at  
landmark

8-9 Bearing origin to destination, M/T

10 Destination landmark ID

11-12 Bearing, present position to  
destination, Magnetic or True

13-14 Heading to steer to destination  
landmark, Magnetic or True

## BWC To Selected Landmark, Great Circle

1 2 3 4 5 6 7 8 9 10 11 12  
BWC,XXXXXX,XXXX.XX,N,XXXXX.XX,W,XXX.,T,XXX.,M,XXX.X,N,CCCC

- 1 UTC of Bearing
- 2-3 Lat, N or S of landmark
- 4-5 Long, E or W of landmark
- 6-7 Bearing, True
- 8-9 Bearing, Magnetic
- 10-11 Distance, naut. miles
- 12 Landmark identifier

## GGA Global Positioning System Fix Data

1 2 3 4 5 6 7 8 9 10 11  
GGA,hhmmss.ss,111.11,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,

12 13 14  
M,x.x,xxxx\*hh

- 1 UTC of Position
- 2-3 Latitude - N/S
- 4-5 Longitude - E/W
- 6 GPS Quality Indicator
  - 0 = fix not available or invalid
  - 1 = GPS Fix
  - 2 = Differential GPS Fix
- 7 Number of satellites in use
- 8 Horizontal dilution of precision
- 9 Antenna altitude above/below mean sea level
- 10 Units of antenna altitude
- 11 Geoidal separation - difference between the WGS-84 earth ellipsoid and

- mean sea level (geoid), "-" = mean sea level below ellipsoid
- 12 Units of geoidal separation, meters.
  - 13 Age of Differential GPS data - Time in seconds since last SC104 Type 1 or 9 update, null field when DGPS is not used
  - 14 Differential reference station ID, 0000-1023

### GLL Geographic Position — Latitude/Longitude

1            2 3            4 5            6  
 GLL,1111.11,a,yyyyy.yy,a,hmmss.ss,A\*hh

- 1-2 Latitude, N/S
- 2-3 Longitude, E/W
- 4 UTC of position
- 6 Status A = Data valid

### RMB Generic Navigation Information (immediately follows RMC)

1 2    3 4    5    6            7 8            9 10    11 12  
 RMB,A,X.XX,L,CCCC,CCCC,SSS.SS,N,XXXXX.XX,W,XXX.X,XXX.,XX.X,

13 14  
 A \*XX

- 1 Status (A = valid, V = invalid)
- 2-3 XTE, naut. miles and direction to steer (L or R) [If XTE exceeds 9.99 NM, display 9.99 in field 2.]
- 4 Origin landmark ID
- 5 Destination landmark ID
- 6-7 Destination Landmark Latitude (N or S)

- 8-9 Destination Landmark Longitude (E or W)
- 10 Range naut. miles, present fix to destination landmark Great Circle. [If range exceeds 999.9 nm, display 999.9.]
- 11 Bearing, True, Great Circle, Present fix to dest. landmark
- 12 Closing velocity to destination, knots
- 13 Arrival (OR'ed arrival circle and crossing of line which is perpendicular to the course line and which passes through the destination landmark.)
- 14 CHECKSUM (Mandatory in this sentence.)

### RMC Transit Specific (to be followed by RMB)

```

1      2 3      4 5      6 7      8      9      10
RMC,XXXXXX,A,XXXX.XX,N,XXXX.XX,W,XX.X,XXX.,XXXXXX,XX.,E
*XX

```

- 1 Time, UTC
- 2 Status (A = valid, V = invalid)
- 3-4 Latitude at UTC time, N or S
- 5-6 Longitude at UTC time, E or W
- 7 Speed over ground, knots
- 8 COG (track), degrees
- 9 Date (DDMMYY)
- 10 Variation, degrees
- 11 Variation, sense (E or W)
- 12 CHECKSUM (Mandatory in this sentence)

## VTG Actual Track and Ground Speed (SOG)

	1	2	3	4	5	6	7	8
	VTG,XXX.,T,XXX.,M,XX.X,N,XX.X,K							
1-2	Track degrees, True							
3-4	Track degrees, Magnetic							
5-6	Speed, knots							
7-8	Speed, kilometers/hour							

The formats listed are NMEA formats and Magellan receivers may not output all of the information listed for a particular format.

A complete copy of the NMEA specifications can be obtained from:

NMEA  
P.O. Box 3435  
New Bern, NC 28564-3435  
(919) 638-2626

# Available Datums

<u>Datum</u>	<u>Full Name</u>	<u>Datum</u>	<u>Full Name</u>
WGS84	World Geodetic System	IRELA	Ireland 1965
NAD27	North American 1927	KAUAI	Kauai
NAD83	North American 1983	KERTA	Kertau 1948
ADIND	Adinda	KKJ	KKJ (Finland)
ALASK	Alaska	LIBER	Liberia 1964
ARC50	Arc 1950	LUZON	Luzon
ARC60	Arc 1960	MASSA	Massawa
ASTRO	Camp Area Astro	MAUI	Maui
AUS66	Australian Geodetic 1966	MERCH	Merchich
AUS84	Australian Geodetic 1984	MINNA	Minna
BOGOT	Bogota Observatory	MONTJ	
BUKIT	Bukit Rimpah	NAHRW	Nahrwan, Saudi Arabia
CAMPO	Campo Inchauspe	OAHU	Oahu
CANAD	Canada	OEGYP	Old Egyptian
CAPE	Cape	OHAWA	Old Hawaiiin
CARTH	Carthage	OMAN	Oman
CENAM	Central America	PITCA	Pitcairn Astro 1967
CHATH	Chatham 1971	QATAR	Qatar National
CHUAA	Chua Astro	QORNO	Qornoq
CORRE	Corrego Alegre	RT90	Rt90 (Sweden)
CYPRU	Cyprus	SAM56	Provisional So. Am 1956
DJAKA	Djakarta (Batavia)	SAM69	South American 1969
EGYPT	Egypt	SCHWA	Schwarzeck
EUROP	European 1950 (All Europe)	SICIL	Sicily
EUR50	European 1950 (W. Europe)	SIERR	
EUR79	European 1979	SWISS	
GANDA	Gandajika Base	TANAN	Tananarive Observatory 1925
GEO49	Geodetic Datum 1949	THAI	Indian (Thailand, Vietnam)
GHANA		TIMBA	Timbalai
GRB36	Ordinance Survey of GB, 1936	TOKYO	Tokyo
GUAM	Guam		
GUNSG	G. Segara	VOIRO	
GUNSR		WGS72	World Geodetic System 1972
HAWAI	Hawaii	YACAR	Yacare
HERAT	Herat North	ZANDE	Zanderij
HJORS	Hjorsey 1955		
HUTZU	Hu-tzu-shan		
INDIA	Indian (India, Nepal)		
IRAN	Iran		

# Specifications

## CHARACTERISTICS

### GPS Performance

Acquisition Times (under optimal conditions):

Warm Start            Approximately 20 seconds

Cold Start            Approximately 55 seconds

Update Rate          1 second (2D) typical

Accuracy:

Position              49 feet\* (15 meters) RMS (with Selective Availability turned off).

Velocity              0.15 knots (0.14 mph)

\* Accuracy subject to degradation of 100m 2D RMS under the United States Department of Defense imposed Selective Availability.

Limits:

Speed                 0 to 825 knots

### ORBCOMM Performance

Data Rate            2400 bps Inbound  
4800 bps Outbound

Addressing          X.400 (Internet)  
Message Size        Standard Globalgram 2000 Bytes Max  
Store & Fwd 229 Bytes Max

Frequencies:

Uplink                148.00 - 150.05 MHz

Downlink            137.00 - 138.00 MHz

## Physical Characteristics

Size	8" x 3.5" x 1.75"
Weight	32 ounces
Housing	Splashproof construction

### Temp. Range:

Operating	14°F to 140°F (-10°C to 60°C)
Storage	-40°F to 167°F (-40°C to 75°C)

### Antennas:

GPS	Internal Patch
ORBCOMM	Telescoping

## Power

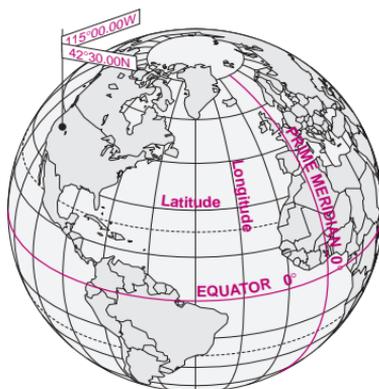
Source	9.6 VDC Rechargeable NiCad Battery Pack 10-30 VDC External Power
Battery Life	Up to 10 hours
Current Drain	300-350 mA @ 12V - GPS 400+ mA @ 12V - ORBCOMM

# Coordinate Systems

Positions are locations that are described in a unique way so that one location cannot be confused with another. This is done by using a coordinate system to describe locations. Your Magellan receiver has the ability to use any one of six different coordinate systems; LAT/LON (latitude and longitude), UTM (Universal Transverse Mercator), OSGB, Irish Grid, Swiss Grid or Swedish Grid. The one you select (in SETUP) will be determined by the maps and charts you use; you would generally want the receiver to display position coordinates in the same system that is used by your maps.

## LAT/LON Coordinate

**System.** LAT/LON is the most commonly used coordinate system today. It projects lines of latitude (parallels) and lines of longitude (meridians) onto the earth's surface. Lines of latitude are the equator and the horizontal lines that are parallel to it. Lines of longitude are the vertical lines that are perpendicular to the equator and pass through the poles. A position is described as being the intersection of a line of latitude and a line of longitude.



Specifically, a position is up to 90 degrees north or south of the equator (up to the poles, which are 90°N and 90°S; the equator is 0° latitude), and up to 180 degrees east or west of the Prime Meridian, which is 0° longitude. (The Prime Meridian passes through Greenwich, England.) Parts of a degree are minutes; there are 60 minutes (written as 60') to a degree. Minutes can also

be divided into smaller units. Fractions of a minute can be expressed as decimals or as seconds. (There are 60 seconds to one minute, written as 60"). So a Lat/Lon position coordinate can be expressed in two ways, which your Magellan GPS receiver displays as 25°47.50 or 25°47'30.

**UTM Coordinate System.** Another commonly used coordinate system is UTM (Universal Transverse Mercator), which is generally found on land-based maps and quad sheets that are produced by government map providers. On land, you may find that UTM coordinates are easier to use than Lat/Lon.

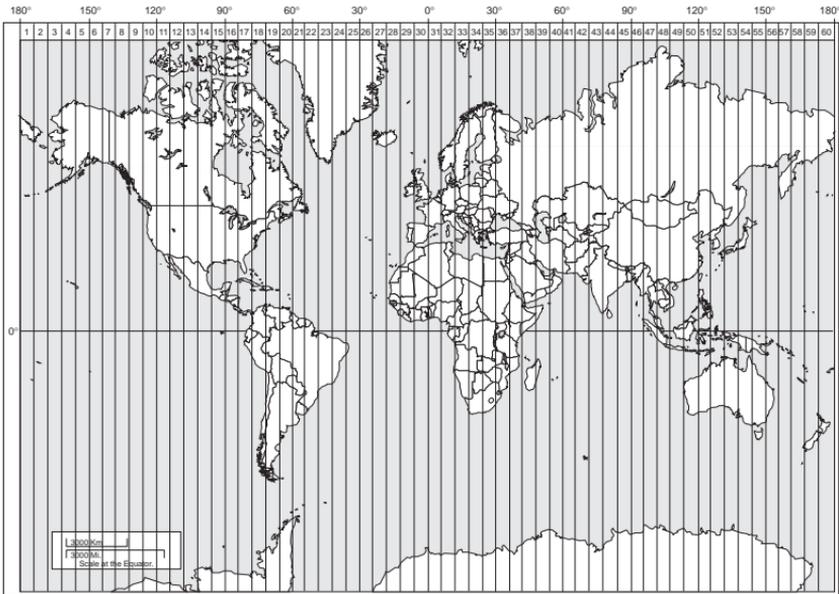
UTM coordinates are easy to use, but since the model it is based on is somewhat abstract, this section is a very simplified introduction to UTM.

Instead of projecting an imaginary grid of intersecting lines onto the globe, UTM projects sections of the globe onto a flat surface. Each of these sections is called a "zone." There are 60 zones to cover the entire earth between 84°N and 80°S (polar areas are not described by UTM). Each zone is 6° wide as projected from the earth's center.

A UTM position is described by three elements; the zone it is in, the easting, and the northing. Eastings and northings measure how far into a zone a position is in meters. Eastings are an east/west measurement, and correspond roughly to longitude. Northings are a north/south measurement, and correspond to latitude.

This chart shows the position of Magellan Systems described in both Lat/Lon and UTM coordinates.

LAT/LON		UTM
DEG/MIN.MM	DEG/MIN/SEC	
34°06.58N	34°06'35"N	11 4 23 818 E
117°49.56W	117°49'34"W	37 74 624 N



NOTE: The area described by the UTM coordinate system extends to 84°N and to 80°S.

**Other Coordinate Systems.** OSGB coordinates are similar to UTM's, but describe only Great Britain. They must be used with the GBR36 datum. This coordinate system cannot be used in any other part of the world. The GSC 100 automatically selects the GBR36 datum when the OSGB coordinate system is selected in Setup. (While OSGB coordinates must be used with the GBR36 datum, the GBR36 datum can be used with LAT/LON coordinates; just be sure the map you are using uses both LAT/LON and GBR36.)



If you select OSGB in the COORD SYS portion of the SETUP MENU, be sure to change the map datum back to the one you will be using (WGS84 is the default) when changing to another coordinate system.

# What is GPS?

GPS is a constellation of navigation satellites that orbit the earth. The precise time and position information transmitted by these satellites is used by a GPS receiver to compute a position fix.

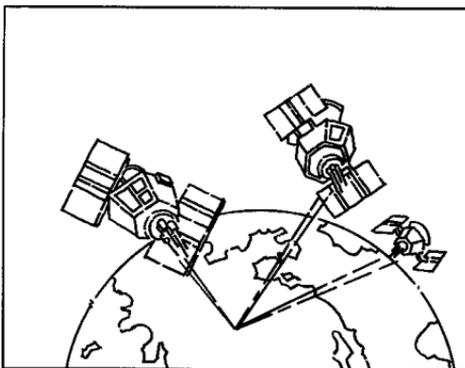
The system is now officially declared “operational,” and provides continuous, 24-hour 3D (position plus elevation) coverage anywhere on the earth.

GPS was developed by the United States Department of Defense to provide consistent, reliable navigation information that is unaffected by rough terrain and bad weather, and is highly resistant to multipath errors and interference. The DoD continues to administer and control the Global Positioning System.

Although GPS was developed as a military navigation system, its civilian and commercial uses were recognized. The satellites therefore transmit two codes, a military-only encrypted code (PPS) and a civilian-access, Standard Positioning Service (SPS) code. All commercial and consumer GPS receivers are SPS receivers.

## How Does GPS Work?

Each GPS satellite transmits its precise location (position and



elevation) and the start time of the transmission. A GPS receiver acquires the signal, then measures the interval between transmission and receipt of the signal to determine the distance between the receiver and the satellite: this is

ranging. Once the receiver has computed range for at least three satellites, its location on the surface of the earth can be determined.

Every satellite transmits two types of data, almanac and ephemeris. Almanac data is general information on the location and health of each satellite in the constellation. Since it contains general information, an almanac can be collected from any satellite. A receiver with a current almanac in its memory knows where in the sky to look for satellites, given its last known position and the time of day. Ephemeris data is the precise satellite positioning information that is used for ranging. Each satellite transmits its own ephemeris data.

Both almanac and ephemeris data are required for a GPS receiver to locate and acquire satellites quickly and compute a position fix. Your Magellan receiver copies these messages automatically.

### **Accuracy**

GPS positioning with an SPS receiver that is intended for general use will produce an accuracy of 25 meters or better.

In fact, SPS receivers have proven to be far more accurate than anyone anticipated. DoD has decided that 25-meter accuracy is a potential risk, and has introduced Selective Availability (SA) to maintain a military advantage. SA is a random error that is introduced to the SPS code ephemeris and timing data and reduces the accuracy of any SPS receiver. The size of the error changes, but rarely exceeds 100 meters.

The DoD civil GPS user policy is that GPS accuracy as affected by SA is sufficient for general navigation. In an open environment, it usually is. Even with SA, a GPS receiver will bring you within visual range of a destination or target, and GPS remains the best available source of accurate, reliable navigation and positioning information.

## **DGPS**

Differential GPS (DGPS) computes the size of the error and applies it to positioning information. There are several ways to perform DGPS, one of which is broadcast differential. Broadcast differential uses GPS receivers at control sites to measure the range errors for all visible satellites and determines a correction for each satellite. These corrections are broadcast in the RTCM SC-104 format by a radio beacon at the control site to any differential beacon receiver that is within range of the signal.

The differential beacon receiver receives and demodulates the signal, then relays it to the user's differential-ready GPS receiver. The user's GPS receiver applies the corrections to the positioning information it collects to compute differentially corrected position and navigation data.

This technique requires that your GPS receiver be connected to a compatible differential beacon receiver (such as the Magellan DBR™, which is compatible with all differential-ready Magellan receivers). You must also be within range of a differential radio beacon.

# What is ORBCOMM?

## System Description

The ORBCOMM System uses Low-Earth Orbit (LEO) satellites instead of terrestrial fixed site relay repeaters to provide complete worldwide coverage. The system is capable of sending and receiving two-way alphanumeric packets, similar to two-way paging or e-mail. The three main components of the ORBCOMM System are; the space segment - the constellation of satellites; the ground segment - gateways which include the Gateway Control Centers (GCCs) and Gateway Earth Stations (GESs), and the Network Control Center (NCC) located in the United States; and subscriber communicators (SCs) - hand-held devices for personal messaging or fixed units for remote monitoring and tracking applications.

## Frequency Allocation

The ORBCOMM System uses 137-138 MHz and 400 MHz frequencies for transmissions down to mobile or fixed data communications devices; and 148-150 MHz frequencies for transmissions up to the satellites. These frequencies, approved for use by LEO satellite systems at the World Administrative Radio Conference in February 1992, were allocated by the FCC to Little LEO mobile satellite services in January 1993. The FCC granted ORBCOMM a U.S. commercial license in October 1994.

## Space Segment

The space segment is an array of up to 36 small communication satellites in circular orbit 825 km above the Earth. Twenty-eight of the satellites are planned to be put in service by Q'3 1998 with the remaining eight serving essentially as ground spares to be put into orbit when the system nears capacity.

The main function of ORBCOMM's satellites is to complete the link between the GSC 100 and the switching capability at the U.S. NCC or a licensee's GCC. The satellites are "orbiting packet routers" ideally suited to "grab" small data packets from the GSC 100 and relay them through a tracking Earth station and then to a GCC.

### **Ground Segment**

The ground segment, which has most of the "intelligence" of the ORBCOMM System, is comprised of GCCs, GESs, and ORBCOMM's NCC which is located at ORBCOMM's headquarters in Dulles, VA. The NCC also serves as North America's GCC. Additionally, within the US, there are four GESs located in Arizona, Georgia, New York State and Washington State.

### **Gateway Control Center (GCC)**

Located in each country that is licensed to use the ORBCOMM System, the GCC provides switching capabilities to link mobile SCs with terrestrial-based customer systems via standard communications modes including X.400, X.25, leased line, dial-up modem, public or private data networks, and e-mail networks including the Internet. Interfaces to the GCC enable reliable, efficient and cost effective integration of the ORBCOMM System into existing or new customer MIS systems.

### **Gateway Earth Station (GES)**

ORBCOMM's GESs link the ground segment with the space segment and will be in multiple locations worldwide. The GESs provide the following functions:

- Acquire and track satellites based on orbital information from the GCC

- Transmit and receive transmissions from the satellites
- Transmit and receive transmissions from the GCC or NCC
- Monitor status of local GES hardware/software
- Monitor the system level performance of the satellite “connected” to the GCC or NCC

The GES is redundant and has two steerable high-gain VHF antennas that track the satellites as they cross the sky. The GES transmits to the satellite at a frequency centered at 149.61 MHz at 56.7 kbps with a nominal power of 200 watts. The GES receives 3 watt transmissions from the satellite at 137-138 MHz range. These up and downlink channels have a 50 KHz bandwidth.

### **Network Control Center (NCC)**

The NCC is responsible for managing the ORBCOMM network elements and the US gateways through telemetry monitoring, system commanding and mission system analysis. It provides network management of ORBCOMM’s satellite constellation and is staffed seven days a week, 24 hours a day by ORBCOMM-certified controllers.

### **What is the message process flow?**

A message sent from a remote unit in the US, either stationary or mobile, is received at the satellite and relayed down to one of four US GESs that connects the ORBCOMM ground system with the satellites. The GES then relays the message via satellite link or dedicated terrestrial line to the NCC. The NCC routes the message to the final addressee via e-mail, dedicated telephone line or facsimile. Messages originated outside the US are routed through GCCs in the same manner. The message types are: Outbound STANDARD, Outbound STORE & FWD, Inbound STANDARD and INBOUND STORE & FWD.

Messages and data sent to a remote SC can be initiated from any computer using common e-mail systems including the Internet, cc:Mail, and Microsoft Mail. The NCC or GCC then transmits the information using ORBCOMM's global telecommunications network.

# Where to Get More Information

There are many sources for more information on GPS and navigation. The sources listed here are just a few of the books, magazines, and Internet addresses that deal with GPS. Your local library is a good source for technical books on GPS and navigation.

## GPS Information Center

The GPS Information Center provides general information on the Global Positioning System and satellite status. This center is operated by U.S. Coast Guard for the Department of Transportation, and was established to provide information and to serve as a point of contact for civilian GPS users.

- Voice telephone recording for constellation status: (703) 313-5907
- Computer bulletin board: (703) 313-5910 (up to 14,400 bps) (8 data bits, 1 stop bit, no parity)
- 24 hour operator: (703) 313-5900; fax: (703) 313-5920



The GPS Information Center can NOT answer questions regarding the GSC 100. Please contact Magellan Customer Service at (909) 394-5000 for questions or assistance with using your receiver.

## A Comprehensive Guide to Land Navigation with GPS

An excellent book written by Noel J. Hotchkiss and published by Alexis Publishing. ISBN No: 0-9641273-2-6. This book uses the Magellan GPS 4000 to discuss and describe land navigation

with a GPS receiver. The book is very easy to read and gets into detail the art of navigating with GPS. (Available from Navtech Seminars.)

### **Newsgroups (Internet)**

Several USENET newsgroups have occasional postings related to GPS. Some of the more popular newsgroups for GPS are:

- sci.geo.satellite-nav
- rec.aviation.products
- rec.boats
- sci.space
- sci.space.news

### **GPS World Magazine**

Monthly magazine covering a wide variety of uses for GPS receivers.

Advanstar Communications  
859 Willamette Street  
Eugene, Oregon 97401  
U.S.A.  
Phone: (503) 343-1200  
Subscriptions: (800) 346-0085 x363

### **Other Books of Note:**

Hofmann-Wellenhof, B., H. Lichtenegger, and J. Collins (1994).  
Global Positioning System, Theory and Practice. 3rd Edition.  
Springer-Verlag,  
326 pp.

Institute of Navigation, The (1980). Global Positioning System.  
Vol. I.

The Institute of Navigation (U.S.), 246 pp.

Institute of Navigation, The (1984). Global Positioning System.  
Vol. II.

The Institute of Navigation (U.S.), 257 pp.

Institute of Navigation, The (1986). Global Positioning System. Vol. III.

The Institute of Navigation (U.S.), 293 pp.

Institute of Navigation, The (1986). Global Positioning System. Vol. IV.

The Institute of Navigation (U.S.), 378 pp.

Logsdon, T. (1992). Navstar Global Positioning System. Van Nostrand Reinhold, New York, 249 pp.

These books and others not mentioned can be purchased from Navtech Book and Software Store (a division of Navtech Seminars, Inc.). They can be reached at:

2775 S. Quincy St. #610

Arlington, VA 22206-2204 U.S.A.

Phone: (800) 628-0885

(703) 931-0500

Fax: (703) 931-0503

### **ORBCOMM Information**

Information regarding ORBCOMM can be found at the following internet location: [www.orbcomm.com](http://www.orbcomm.com).

# Abbreviations

°M	Degrees Magnetic north
°T	Degrees True north
2D	Two-dimensional
3D	Three-dimensional
BRG	Bearing
CDI	Course Deviation Indicator
CLR	CLEAR
CTS	Course To Steer
DEG	Degrees
DST	Distance
FT	Feet
GCC	Gateway Control Center
GES	Gateway Earth Station
GPS	Global Positioning System
GQ	Geometric Quality
HDG	Heading
KM	Kilometers
KH	Kilometers Per Hour
KPH	Kilometers Per Hour
KT	Knots
LAT	Latitude
LFIX	Last Fix
LON	Longitude
M	Meters
MI	Miles

MIN	Minutes
MNU	MENU
MPH	Miles Per Hour
NAV	NAVIGATE
NM	Nautical Mile
PC	Personal Computer
SEC	Seconds
SPD	Speed
TTG	Time To Go
UTM	Universal Transverse Mercator
UT	Universal Time
VMG	Velocity Made Good
WPT	Waypoint
WPT <sub>xx</sub>	Receiver-generated waypoint name
XTE	Cross Track Error

# City Reference Chart

## Australia & SW Pacific

Adelaide, Australia	34°56.00	S	138°36.00	E
Alice Springs, N. Terr., Australia	23°42.00	S	133°52.00	E
Apia, W. Samoa	13°48.00	S	171°45.00	W
Auckland, New Zealand	36°55.00	S	174°47.00	E
Bourail, New Caledonia	21°34.00	S	165°29.00	E
Brisbane, Queensland, Australia	27°30.00	S	153°00.00	E
Canberra, A.C.T., Australia	35°18.00	S	149°08.00	E
Cooper Pedy, S. Australia	28°56.00	S	134°45.00	E
Dampier, W. Australia	20°45.00	S	116°48.00	E
Darwin, N. Terr., Australia	12°23.00	S	130°44.00	E
Derby, W. Australia	17°19.00	S	123°38.00	E
Honiara, Guadalcanal Solomon Is.	9°28.00	S	159°57.00	E
Iron Range, Queensland, Australia	12°39.00	S	143°13.00	E
Mount Isa, Queensland, Australia	20°50.00	S	139°29.00	E
Nadi, Vitti Levu Fiji	17°47.00	S	177°29.00	E
Newman, Mt. W. Australia	23°20.00	S	119°34.00	E
Ooldea, S. Australia	30°30.00	S	131°45.00	E
Perth, W. Australia	31°58.00	S	115°49.00	E
Port Moresby, Papua New Guinea	9°30.00	S	147°07.00	E
Rawlinna, W. Australia	31°00.00	S	125°21.00	E
Timaru, New Zealand	44°23.00	S	171°14.00	E
Townsville, Queensland, Australia	19°13.00	S	146°48.00	E

## Asia

Bangalore, India	12°58.00	N	77°35.00	E
Bangkok, Thailand	13°44.00	N	100°30.00	E
Beijing, China	39°55.00	N	116°26.00	E
Bombay, India	18°56.00	N	72°51.00	E
Calcutta, India	22°30.00	N	88°20.00	E
Colombo, Sri Lanka	6°55.00	N	79°52.00	E
Delhi, India	28°40.00	N	77°14.00	E
Hanoi, Vietnam	21°01.00	N	105°52.00	E
Harbin, China	45°45.00	N	126°41.00	E
Ho Chi Minh City, Vietnam	10°46.00	N	106°43.00	E
Hong Kong	22°15.00	N	114°10.00	E
Islambad, Pakistan	33°40.00	N	73°08.00	E
Jakarta, Indonesia	6°08.00	S	106°45.00	E
Kagoshima, Japan	31°37.00	N	130°32.00	E
Kandla, India	23°03.00	N	70°11.00	E
Karachi, Pakistan	24°51.00	N	67°02.00	E
Kathmandu, Nepal	27°42.00	N	85°19.00	E
Kinabalu, Malaysia	6°03.00	S	116°32.00	E
Kota, Malaysia	2°33.00	N	102°10.00	E
Kuala Lumpur, Malaysia	3°08.00	N	101°42.00	E
Kunming, China	25°04.00	N	102°41.00	E

Malang, Indonesia	7°59.00	S	112°45.00	E
Mandalay, Burma	21°57.00	N	96°04.00	E
Nagpur, India	21°10.00	N	79°12.00	E
Padang, Indonesia	6°12.00	S	120°27.00	E
Palu, Indonesia	8°19.00	S	121°44.00	E
Pinang, Malaysia	5°30.00	N	100°28.00	E
Pontianak, Borneo	0°05.00	S	109°16.00	E
Rangoon, Burma	16°47.00	N	96°10.00	E
Sapporo, Japan	43°05.00	N	141°21.00	E
Seoul, S. Korea	37°30.00	N	127°00.00	E
Shanghai, China	31°06.00	N	121°22.00	E
Sorong, Indonesia	0°50.00	S	131°17.00	E
Surakarta, Indonesia	7°32.00	S	110°50.00	E
Tanahmerah, Indonesia	6°08.00	S	140°18.00	E
Taipei, Taiwan	25°05.00	N	121°32.00	E
Thimphu, Bhutan	27°32.00	N	89°43.00	E
Tokyo, Japan	35°40.00	N	139°45.00	E
Tonhil, Mongolia	46°19.00	N	93°54.00	E
Ulaanbaatar, Mongolia	47°54.00	N	106°52.00	E
Ürümqi, China	43°43.00	N	87°38.00	E
Wuhan, China	30°35.00	N	114°19.00	E
Xi'an, China	34°16.00	N	108°54.00	E
Yumen, China	39°54.00	N	97°43.00	E

## CIS

Anadyr, Russia	64°50.00	N	177°50.00	E
Arkhangel'sk, Russia	64°32.00	N	40°40.00	E
Ashkhabad, Turkmenistan	37°58.00	N	58°24.00	E
Baku, Azerbaijan	40°22.00	N	49°53.00	E
Balkhash, Kazakhstan	46°50.00	N	74°57.00	E
Barnaul, Russia	53°21.00	N	83°45.00	E
Chita, Russia	52°03.00	N	113°35.00	E
Gizhiga, Russia	62°00.00	N	160°34.00	E
Igarka, Russia	67°31.00	N	86°33.00	E
Inarigda, Russia	63°15.00	N	107°40.00	E
Kargasok, Russia	59°07.00	N	80°58.00	E
Khatanga, Russia	71°59.00	N	102°31.00	E
Kiev, Ukraine	50°25.00	N	30°30.00	E
Krasnodar, Ukraine	45°02.00	N	39°00.00	E
Magdagachi, Russia	53°27.00	N	125°44.00	E
Moscow, Russia	55°45.00	N	37°42.00	E
Okhotsk, Russia	59°20.00	N	143°15.00	E
Perm, Russia	58°01.00	N	56°10.00	E
Petropavlovsk, Russia	54°53.00	N	69°13.00	E
Riga, Latvia	56°40.00	N	106°10.00	E
Saratov, Russia	51°30.00	N	45°55.00	E
Tashkent, Uzbekistan	41°16.00	N	69°13.00	E
Tulun, Russia	54°32.00	N	100°35.00	E
Vanino, Russia	49°05.00	N	140°14.00	E
Vladivostok, Russia	43°09.00	N	131°53.00	E
Vorkuta, Russia	67°27.00	N	64°00.00	E
Yakutsk, Russia	62°10.00	N	129°50.00	E

## Middle East

Al Kuwayt, Kuwait	29°20.00	N	48°00.00	E
Ar Riyad, Saudi Arabia	24°39.00	N	46°46.00	E
Baghdad, Iraq	33°20.00	N	44°26.00	E
Bam, Iran	36°57.00	N	57°56.00	E
Halab, Syria	36°14.00	N	37°10.00	E
Herat, Afghanistan	34°20.00	N	62°12.00	E
Jerusalem, Israel	31°47.00	N	35°13.00	E
Kabul, Afghanistan	34°31.00	N	69°12.00	E
Mashhad, Iran	36°16.00	N	59°34.00	E
Nazwa, Oman	22°56.00	N	57°33.00	E
Salalah, Oman	17°00.00	N	54°04.00	E
San' a, Yemen	15°24.00	N	44°14.00	E
Shiraz, Iran	29°38.00	N	52°34.00	E
Tabriz, Iran	38°05.00	N	46°18.00	E
Tarim, S. Yemen	16°08.00	N	48°58.00	E
Tehran, Iran	35°40.00	N	51°26.00	E

## Africa

Abidjan, Ivory Coast	5°19.00	N	4°01.00	W
Ad Dakhla, W. Sahara	23°43.00	N	15°57.00	W
Adis Abeba, Ethiopia	9°03.00	N	38°42.00	E
Algiers, Algeria	36°50.00	N	3°00.00	E
Antananarivo, Madagascar	18°52.00	S	47°30.00	E
Asmera, Ethiopia	15°20.00	N	38°58.00	E
Aswân, Egypt	24°05.00	N	32°56.00	E
Bamako, Mali	12°40.00	N	7°59.00	W
Banghazi, Libya	32°07.00	N	20°04.00	E
Bangui, Central African Republic	4°23.00	N	18°37.00	E
Beira, Mozambique	19°49.00	S	34°52.00	E
Cairo, Egypt	30°03.00	N	31°15.00	E
Capetown, South Africa	33°56.00	S	18°28.00	E
Dakar, Senegal	14°40.00	N	17°27.00	W
Fés, Morocco	34°05.00	N	5°00.00	W
Freetown, Sierra Leone	8°30.00	N	13°17.00	W
Harare, Zimbabwe	17°50.00	S	31°03.00	E
Kabwe, Zambia	14°29.00	S	28°25.00	E
Kampala, Uganda	0°19.00	N	32°35.00	E
Kano, Nigeria	12°00.00	N	8°31.00	E
Khartoum, Sudan	15°33.00	N	32°32.00	E
Kinshasa, Zaire	4°18.00	S	15°18.00	E
Kisangani, Zaire	0°33.00	N	25°14.00	E
Lagos, Nigeria	6°27.00	N	3°28.00	E
Las Palmas, Canary Islands	28°08.00	N	15°27.00	W
Lindi, Tanzania	10°00.00	S	39°41.00	E
Lobito, Angola	12°20.00	S	13°34.00	E
Lomé, Togo	6°10.00	N	1°21.00	E
Lubumbashi, Zaire	11°41.00	S	27°29.00	E
Lüderitz, Namibia	26°38.00	S	15°10.00	E
Lusambo, Zaire	4°59.00	S	23°26.00	E
Maputo, Mozambique	25°58.00	S	32°35.00	E
Maseru, Lesotho	29°19.00	S	27°29.00	E
Mbale, Uganda	1°04.00	N	34°12.00	E

Mogadishu, Somalia	2°02.00	N	45°21.00	E
Monrovia, Liberia	6°20.00	N	10°46.00	W
Mwanza, Zaire	7°51.00	S	26°43.00	E
N° Djamena, Chad	12°10.00	N	14°59.00	E
Nairobi, Kenya	1°17.00	S	36°50.00	E
Namibe, Angola	15°10.00	S	12°09.00	E
Nouakchott, Mauritania	18°09.00	N	15°58.00	W
Ouagadougou, Burkina Faso	12°20.00	N	1°40.00	W
Pointe Noire, Congo	4°46.00	S	11°53.00	E
Port Elizabeth, South Africa	33°58.00	S	25°36.00	E
Sabha, Libya	27°02.00	N	14°26.00	E
Serowe, Botswana	22°25.00	S	26°44.00	E
Sidi Ifni, Morocco	29°24.00	N	10°12.00	W
Toliara, Madagascar	23°20.00	S	43°41.00	E
Tombouctou, Mali	16°49.00	N	2°59.00	W
Tripoli, Libya	32°54.00	N	13°11.00	E
Tsumeb, Namibia	19°13.00	S	17°42.00	E
Tunis, Tunisia	36°50.00	N	10°13.00	E
Windhoek, Namibia	22°34.00	S	17°06.00	E
Yaounde, Cameroon	3°51.00	N	11°31.00	E
Zanzibar, Zanzibar	6°10.00	S	39°12.00	E

## Europe

Athens, Greece	38°00.00	N	23°44.00	E
Barcelona, Spain	41°23.00	N	2°11.00	E
Bern, Switzerland	46°57.00	N	7°26.00	E
Bordeaux, France	44°50.00	N	0°34.00	W
Brno, Czechoslovakia	49°13.00	N	16°40.00	E
Bucuresti, Romania	44°25.00	N	26°07.00	E
Budapest, Hungary	47°30.00	N	19°03.00	E
Cork, Ireland	51°54.00	N	8°28.00	W
Gdansk, Poland	54°22.00	N	18°41.00	E
Glasgow, Scotland	55°53.00	N	4°15.00	W
Godthåb, Greenland	64°15.00	N	51°35.00	W
Hamburg, Germany	53°33.00	N	10°00.00	E
Istanbul, Turkey	41°02.00	N	28°57.00	E
London, England	51°30.00	N	0°10.00	W
Longyearbyen, Svalbard, Norway	78°12.00	N	15°40.00	E
Madrid, Spain	40°25.00	N	3°43.00	W
Napoli, Italy	40°50.00	N	14°16.00	E
Nice, France	43°42.00	N	7°16.00	E
Nuugaatsiaq, Greenland	71°30.00	N	53°00.00	W
Oslo, Norway	59°56.00	N	10°45.00	E
Paris, France	48°52.00	N	2°20.00	E
Reykjavik, Iceland	64°09.00	N	21°58.00	W
Scoresbysund, Greenland	70°30.00	N	22°00.00	W
Stensele, Sweden	65°05.00	N	17°10.00	E
Stockholm, Sweden	59°20.00	N	18°05.00	E
Thule, Greenland	76°35.00	N	68°30.00	W
Torshavn, Faeroes	62°02.00	N	6°47.00	W
Trabzon, Turkey	41°00.00	N	39°43.00	E
Vardo, Finland	60°16.00	N	20°20.00	E

## The Americas

Albany, NY, U.S.A.	42°40.00	N	73°49.00	W
Albuquerque, NM, U.S.A.	35°05.00	N	106°38.00	W
Amarillo, TX, U.S.A.	35°14.00	N	101°50.00	W
Anchorage, AK, U.S.A.	61°10.00	N	150°00.00	W
Antofagasta, Chile	23°40.00	S	70°23.00	W
Arequipa, Peru	16°25.00	S	71°32.00	W
Atlanta, GA, U.S.A.	33°45.00	N	84°23.00	W
Barrow, AK, U.S.A.	71°16.00	N	156°50.00	W
Baton Rouge, LA, U.S.A.	30°30.00	N	91°10.00	W
Belem, Brazil	1°27.00	S	48°29.00	W
Bethel, AK, U.S.A.	60°49.00	N	161°49.00	W
Billings, MT, U.S.A.	45°47.00	N	108°30.00	W
Birmingham, AL, U.S.A.	33°30.00	N	86°55.00	W
Bismarck, ND, U.S.A.	46°50.00	N	100°48.00	W
Bogotá, Colombia	4°38.00	N	74°05.00	W
Boise, ID, U.S.A.	43°38.00	N	116°12.00	W
Boston, MA, U.S.A.	42°20.00	N	71°05.00	W
Brasilia, Brazil	15°45.00	S	47°57.00	W
Buffalo, NY, U.S.A.	42°52.00	N	78°55.00	W
Caracas, Venezuela	10°35.00	N	66°56.00	W
Casper, WY, U.S.A.	42°50.00	N	106°18.00	W
Cayenne, French Guiana	4°55.00	N	52°20.00	W
Charlotte, NC, U.S.A.	35°03.00	N	80°50.00	W
Chicago, IL, U.S.A.	41°50.00	N	87°45.00	W
Chihuahua, Mexico	28°40.00	N	106°06.00	W
Churchill, Manitoba Canada	58°45.00	N	93°00.00	W
Cleveland, OH, U.S.A.	41°30.00	N	81°41.00	W
Comodoro R, Argentina	45°50.00	S	67°30.00	W
Coppermine, NW Terr., Canada	67°49.00	N	115°12.00	W
Córdoba, Veracruz Mexico	18°55.00	N	96°55.00	W
Cuiabá, Brazil	7°15.00	S	58°25.00	W
Dallas, TX, U.S.A.	32°47.00	N	96°48.00	W
Denver, CO, U.S.A.	39°45.00	N	105°00.00	W
Des Moines, Iowa, U.S.A.	41°35.00	N	93°35.00	W
Detroit, MI, U.S.A.	42°23.00	N	83°05.00	W
Duluth, MN, U.S.A.	46°45.00	N	92°10.00	W
Fairbanks, AL, U.S.A.	64°50.00	N	147°50.00	W
Fort McPherson, NW Terr., Canada	67°29.00	N	134°50.00	W
Fort Providence, NW Terr, Canada	61°03.00	N	117°40.00	W
Georgetown, Guyana	6°46.00	N	58°10.00	W
Grand Rapids, MI, U.S.A.	42°57.00	N	86°40.00	W
Guadalajara, Mexico	20°40.00	N	103°20.00	W
Guantánamo, Mexico	20°09.00	N	75°14.00	W
Guatemala, Guatemala	14°38.00	N	90°22.00	W
Guayaquil, Ecuador	2°13.00	S	79°54.00	W
Hazelton, BC Canada	55°15.00	N	127°38.00	W
Houston, TX, U.S.A.	29°45.00	N	95°25.00	W
Ilhéus, Brazil	14°50.00	S	39°06.00	W
Indianapolis, IN, U.S.A.	39°45.00	N	86°10.00	W
Iquitos, Peru	3°51.00	S	73°13.00	W
Juneau, AK, U.S.A.	58°20.00	N	134°20.00	W
Kansas City, MO, U.S.A.	39°02.00	N	94°33.00	W
La Habana, Cuba	23°08.00	N	82°22.00	W

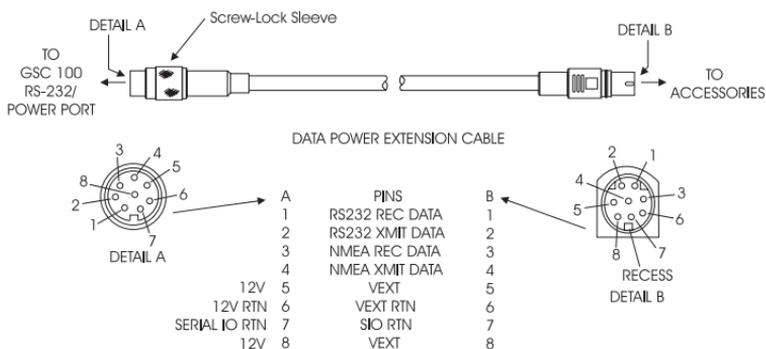
Labrador City, NFLD, Canada	52°56.00	N	66°52.00	W
Las Vegas, NV, U.S.A.	36°10.00	N	115°10.00	W
Lima, Peru	12°06.00	S	77°03.00	W
Little Rock, AR, U.S.A.	34°42.00	N	92°17.00	W
Los Angeles, CA, U.S.A.	34°00.00	N	118°15.00	W
Louisville, KY, U.S.A.	38°13.00	N	85°48.00	W
Managua, Nicaragua	12°06.00	N	86°18.00	W
Manaus, Brazil	3°06.00	S	60°00.00	W
Merida, Venezuela	8°24.00	N	71°08.00	W
Miami, FL, U.S.A.	25°45.00	N	80°15.00	W
Milwaukee, WI, U.S.A.	43°03.00	N	87°56.00	W
Minneapolis, MN, U.S.A.	45°00.00	N	93°15.00	W
Montevideo, Uruguay	34°55.00	S	56°10.00	W
Nakina, BC, Canada	59°12.00	N	132°48.00	W
Nashville, TN, U.S.A.	36°10.00	N	86°50.00	W
New York, NY, U.S.A.	40°43.00	N	74°01.00	W
Norfolk, VA, U.S.A.	36°54.00	N	76°18.00	W
Oklahoma City, OK, U.S.A.	35°28.00	N	97°33.00	W
Omaha, NE, U.S.A.	41°15.00	N	96°00.00	W
Panama City, Florida	30°10.00	N	85°41.00	W
Panama City, Panama	8°57.00	N	79°30.00	W
Peace River, Alberta Canada	56°15.00	N	117°18.00	W
Peoria, IL, U.S.A.	40°43.00	N	89°38.00	W
Phoenix, AZ, U.S.A.	33°30.00	N	112°03.00	W
Pittsburgh, PA, U.S.A.	40°26.00	N	80°00.00	W
Port-au-Prince, Haiti	18°33.00	N	72°20.00	W
Portland, OR, U.S.A.	45°32.00	N	122°40.00	W
Porto Velho, Brazil	8°45.00	S	63°54.00	W
Québec, Québec, Canada	46°50.00	N	71°15.00	W
Rapid City, SD, U.S.A.	44°06.00	N	103°14.00	W
Recife, Brazil	8°06.00	S	34°53.00	W
Reno, NV, U.S.A.	39°32.00	N	119°49.00	W
Rio de Janeiro, Brazil	22°53.00	S	43°17.00	W
Salt Lake City, UT, U.S.A.	40°45.00	N	111°55.00	W
San Antonio, TX, U.S.A.	29°25.00	N	98°30.00	W
San Francisco, CA, U.S.A.	37°45.00	N	122°27.00	W
San Juan, Puerto Rico	18°29.00	N	66°08.00	W
Santarém, Brazil	2°26.00	S	54°41.00	W
São Paulo, Brazil	23°33.00	S	46°39.00	W
Saskatoon, Saskatchewan, Canada	52°10.00	N	106°40.00	W
Seattle, WA, U.S.A.	47°35.00	N	122°20.00	W
Shreveport, LA, U.S.A.	32°30.00	N	93°46.00	W
Sioux Falls, SD, U.S.A.	43°34.00	N	96°42.00	W
Spokane, WA, U.S.A.	47°40.00	N	117°25.00	W
St Louis, MO, U.S.A.	38°40.00	N	90°15.00	W
Tampa, FL, U.S.A.	27°58.00	N	82°38.00	W
Tijuana, Mexico	32°29.00	N	117°10.00	W
Toronto, Ontario, Canada	43°42.00	N	79°25.00	W
Valparaiso, Brazil	21°16.00	S	50°54.00	W
Vancouver, BC, Canada	49°13.00	N	123°06.00	W
Veracruz, Mexico	19°11.00	N	96°10.00	W
Washington, D.C., U.S.A.	38°55.00	N	77°02.00	W
Whitehorse, Yukon Terr., Canada	60°41.00	N	135°08.00	W
Wichita, KS, U.S.A.	37°43.00	N	97°20.00	W

Winnipeg, Manitoba, Canada	49°53.00	N	97°10.00	W
<b>Pacific Ocean</b>				
American Samoa	14°20.00	S	170°00.00	W
Baker I.	0°12.00	N	176°28.00	W
Easter I.	27°05.00	S	109°20.00	W
Gambier I.	23°10.00	S	135°00.00	W
Honolulu, HA, U.S.A.	21°19.00	N	157°50.00	W
Howland I.	0°48.00	N	176°38.00	W
Jarvis I.	0°23.00	S	160°02.00	W
Kanton I.	2°50.00	S	171°40.00	W
Lihue	21°59.00	N	159°23.00	W
Palmyra I.	5°52.00	N	162°05.00	W
Pitcairn I.	25°04.00	S	130°06.00	W
Swains I.	59°30.00	S	100°00	W

# Connecting External Power/Devices

The GSC 100 comes with a data power extension cable, shown below, that connects your GSC 100 to the AC power cable for external power. It also connects the RS-232 software update cable for uploading software and connects to various accessories.

## Data Power Extension Cable

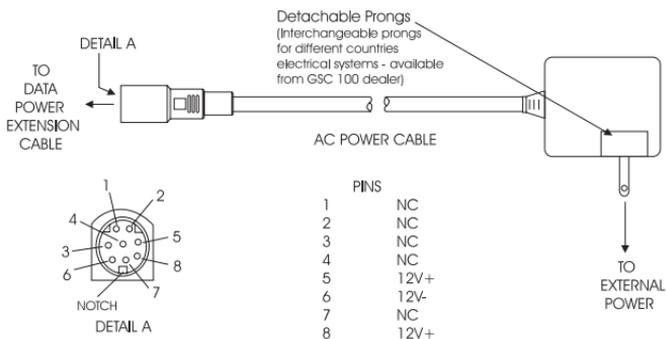


To connect to external power, connect the screw-lock sleeve, shown above, to the RS-232/Power port on the side of the GSC 100. Take the AC power adapter cable, shown on the following page, and snap it onto the available end of the data power extension cable. Make sure that the connections are snug so as not to disconnect during use. The AC power adapter cable is now ready to plug into external power.



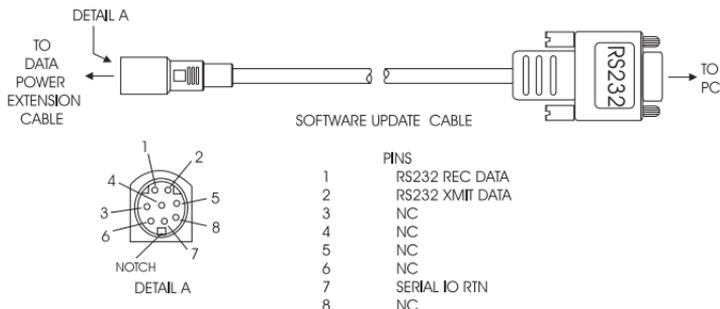
Use care when connecting the cables so as not to damage the connectors and contacts. Make sure the pins are correctly aligned before fastening.

## AC Power Cable



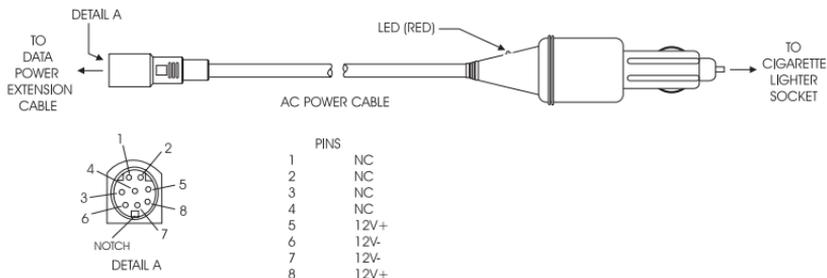
To connect the RS-232 software update cable, connect the screw-lock sleeve on the data power extension cable, shown on the previous page, to the RS-232/Power port on the side of the GSC 100. Take the RS-232 software update cable, shown below, and snap it onto the available end of the data power extension cable. Make sure that the connections are snug so as not to disconnect during use. The RS-232 software update cable is now ready to connect to the 9-pin serial port on your PC.

## RS-232 Software Update Cable

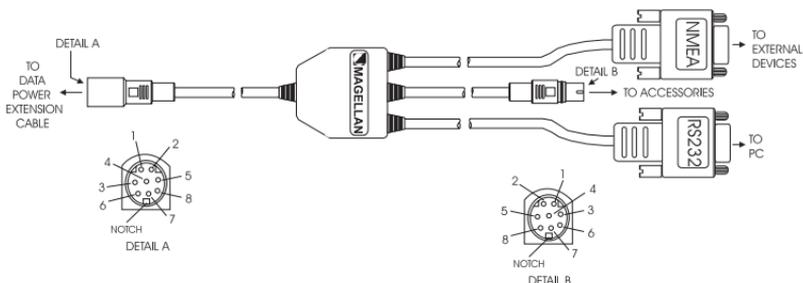


The following accessories can be obtained from Magellan Systems Corporation or any Magellan-authorized dealer. They connect to your GSC 100 through the data power extension cable:

**DC Power Cigarette Lighter Adapter** - allows you to connect the unit to power using a cigarette lighter.



**Power Data Adapter Cable** - allows access to serial port and NMEA interface for GPS operations and the RS-232 data download cable that ships with the unit.



**Additional Accessories** - The items listed below can be obtained from your local GSC 100 dealer:

Carrying Case

External Antennas (GPS & ORBCOMM)

Swivel Mounting Bracket

PC Software Kit

Data/Charger Module

# Glossary

- Active Leg** The segment of a route currently being travelled.
- Address** The logical or Internet address is used to facilitate moving data between physical networks. Identifier assigned to networks, stations and other devices so that each device can be separately designated to receive and reply to messages. Each host computer on the Internet has a unique address.
- Azimuth Angle** The angle of the line-of-site vector, projected on the horizontal plane, measured clockwise from true North.
- Backtrack** Retraces the position fixes (up to 21) stored automatically by the GSC 100 every 10 minutes.
- Baud** A measure of the speed of data transmission. Baud and bit rate are the same for direct equipment interconnections (e.g. via RS-232). Baud and bit rate are not the same for modulated data links, whether wire or radio.
- Baud Rate** Measure of data transmission speed, expressed in bits per second or bps.
- Bearing** The compass direction from your position to a destination, measured to the nearest degree.
- Bit** Binary Digit. The smallest unit of information into which digital data can be subdivided and which a computer can hold. Each bit has only two values, one or zero.
- Channel** Either a single frequency or a pair of radio frequencies used as a communication path.

<b>Configuration</b>	A set of conditions or parameters that define, track, maintain and audit the structure of an item. The term configuration can define the hardware components and/or the software code and files that comprise a subsystem or system.
<b>Coordinates</b>	A unique numeric or alphanumeric description of position.
<b>Course</b>	The direction in degrees from the start landmark of a course line to its destination.
<b>CTS</b>	Course to steer. The optimum direction the vessel should be steered in order to efficiently make headway back to the courseline while also proceeding toward the destination landmark. It is a “compromise” course bearing that projects from your current position to a point on the courseline midway between a point perpendicular to your position and the current leg destination landmark.
<b>Data Rate</b>	The maximum number of bits of information which can be transmitted per second, as in a data transmission link; typically expressed as megabits per second (Mb/s).
<b>Datum</b>	Refers to the theoretical mathematical model of the earth’s sea level surface. Map makers may use a different model from which to chart their maps, so position coordinates will differ from one datum to another. The datum for the map you are using can be found in the legend of the map.
<b>Default Setting</b>	A preset or initial value that is assumed to be the preferred or appropriate selection for most situations.
<b>Differential GPS</b>	A procedure of correction global positioning system (GPS) solutions to achieve improved position accuracy. Differential GPS provides 2 to 5 meter position accuracy.

<b>E-Mail</b>	Electronic Mail. A method of file transfer and message sending among workstations.
<b>Elevation</b>	Distance above or below mean sea level.
<b>Elevation Angle</b>	The angle between the line of sight vector and the horizontal plane.
<b>EPE</b>	Estimated Position Error is the approximate error (between 0 and X) introduced in the ephemeris signal by the U.S. Department of Defense for reasons of security. This random error, known as Selective Availability (SA) is <b>not</b> due to receiver error and is not significant enough to affect navigation for most purposes
<b>Frequency</b>	The number of vibrations per second of an audio or radio signal. Measured in hertz (Hz), kilohertz (kHz) or megahertz (MHz).
<b>Gateway</b>	1) Provides message processing and subscriber management for the defined service area. 2) A hardware/software package that runs on the open system interconnection (OSI) application layer and allows incompatible protocols to communicate; includes X.25 gateways. 3) A relay at any layer above the network layer.
<b>Gateway Control Center (GCC)</b>	The GCC acts as the Operations Center for all Gateway activities. All communications must pass through an ORBCOMM GCC.
<b>Gateway Data System</b>	Interacts with the Network Management System and Network Data Server to exchange network status and system performance information.
<b>Gateway Downlink Channels</b>	Used by the satellites to send traffic, telemetry and network management packets to the NCCs.

<b>Gateway Earth Station(GES)</b>	The GES provides interconnection between the OMS and the satellite constellation. The GES consists of medium gain tracking antennas, RF and modem equipment, and communications hardware to send and receive ORBCOMM data packets. A single GES can communicate with multiple satellites within its main beam.
<b>Gateway Management System(GMS)</b>	The GMS provide management functions, including; supervision of the health and status of various systems and equipment in the Gateway; monitoring physical facilities that house the Gateway elements; monitoring message processing flow and throughput; monitoring status of interconnecting links that connect the GES to GSS; providing the interface between the Gateway and ORBCOMM NCC.
<b>Gateway Uplink Channels</b>	Used by the NCCs to send traffic and commands to the satellites.
<b>Geometric Quality</b>	Measures the probable accuracy of a position fix, based on the position of the satellites relative to each other.
<b>Globalgram</b>	A single, self-contained packet sent or received by a subscriber communicator. Standard and Store & Fwd messages are considered globalgrams.
<b>GO TO</b>	A single leg route with the present position being the start of the route and a defined landmark as the destination. (If the unit has been moved while turned off and has not yet acquired a new position fix, the start of the GO TO will be the position fix last recorded.)

<b>Heading</b>	The direction in which the GSC 100 is moving, track or ground course. May be different from the course.
<b>Internet</b>	A concatenation of many individual TCP/IP networks into one single logical network all sharing a common addressing scheme.
<b>Last Fix</b>	Position coordinates computed and stored automatically every 10 minutes in the Last Fix Buffer.
<b>Last Fix Buffer</b>	The list of the most recent last fixes automatically stored by the GSC 100.
<b>Latitude</b>	The angular distance north or south of the equator measured by lines encircling the earth parallel to the equator in degrees from 0° to 90°.
<b>LAT/LON</b>	Coordinate system using latitude and longitude coordinates to define a position on the earth.
<b>Leg (Route)</b>	A segment of a route that has a starting (FROM) landmark and a destination (TO) landmark. A route may consist of 1 or more legs. A route that is from landmark A to landmark B to landmark C to landmark D has three legs with the first being from landmark A to landmark B.
<b>Longitude</b>	The angular distance east or west of the prime meridian (Greenwich meridian) as measured by lines perpendicular to the parallels and converging at the poles from 0° to 180°.
<b>Magnetic North</b>	The direction toward the north magnetic pole from the observer's position.
<b>Modem</b>	A modulator/demodulator that converts digital data into analog (waveform) signals for transmission along media that carry analog signals and converts received analog signals back into digital data for use by the computer.

<b>Network Control Center (NCC)</b>	The NCC houses the computer systems and personnel (Gateway Operators) responsible for managing the Satellites and the US ORBCOMM Gateway and for supporting Licensee's ORBCOMM Gateways.
<b>Network</b>	1) A system that sends and receives data and messages, typically over a cable. A network enables a group of computers to with each other, share peripherals (such as hard disks and printers), and access remote hosts or other networks. 2) A series of points interconnected by communication channels. The switched telephone network consists of public telephone lines normally used for dialed telephone calls; a private network is a configuration of communication channels reserved for the use of a sole customer. A series of nodes connected by communications channels.
<b>ORBCOMM</b>	The ORBCOMM mobile, wireless satellite communications system is a wide are, packet switched, two-way data system. Communications to and from a mobile ORBCOMM subscriber to the Gateway is accomplished by use of a constellation of low Earth orbit satellites.
<b>OSGB</b>	A coordinate system describing only Great Britain, similar to UTM's. Used with GBR36 datum.
<b>Pin Code</b>	The OMS maintains a 4-digit number Personal Identification Number (PIN) code for each SC.
<b>Position Fix</b>	Position coordinates as computed by the GSC 100.
<b>Queue</b>	A line or list formed by items waiting for service, such as tasks waiting to be performed, stations waiting for connection or messages waiting for transmission.
<b>Queuing</b>	Temporarily storing packets until a task or resource can consume or route them.

<b>Receiver</b>	A detector and electronic circuitry to change optical signals to electrical signals.
<b>Reverse Route</b>	Reverses the order of landmarks in an existing route.
<b>Satellite Constellation</b>	Described by the number of satellites, the number of planes, the altitude, the inclination, the spacing of the right ascension of ascending nodes of the planes and the relative phasing of the satellites between and within the planes.
<b>Selective Availability</b>	A random error that is introduced by the Department of Defense, to the Standard Positioning Service (SPS) code ephemeris and timing data that reduces the accuracy of any SPS. The size of the error changes, but rarely exceeds 100 meters.
<b>Serial Port</b>	A port in which each bit of information is brought in/out on a single channel. Serial ports are designated for devices that receive data one bit at a time.
<b>Store &amp; Fwd</b>	Store & Fwd messages are up to 229 user bytes per packet to be sent by the SC and 182 user bytes per packet to be received.
<b>Subscriber Database Management</b>	Manages the configuration of each subscriber account.
<b>Subscriber Provisioning Server</b>	Sets up accounts for Gateway customer subscribers and configures, activates and deactivates SCs. managing the Satellites and the US ORBCOMM Gateway and for supporting Licensee's ORBCOMM Gateways.
<b>Terminal</b>	A device, usually equipped with a keyboard and display, capable of sending and receiving data over a communications link.

<b>Time To Go</b>	The estimated time for the receiver to reach the destination from its current position based on the current VMG.
<b>True North</b>	The direction to the geographical North Pole from an observer's position. The north direction on any geographical meridian.
<b>Track</b>	The actual path travelled, may differ from the planned course.
<b>Track History</b>	The track over a selected period of time.
<b>UT</b>	Universal Time, formerly referred to as Greenwich Mean Time (GMT).
<b>UTM</b>	Universal Transverse Mercator (UTM) metric grid system used on most large and intermediate scale land topographic charts and maps.
<b>VMG</b>	Velocity Made Good. The component of the velocity that is in the direction of the destination.
<b>Waypoint</b>	A location saved in the unit's memory which is obtained by entering data, editing data, calculating data or saving a current position. Used to create routes.
<b>2-D</b>	Two Dimensional. A 2-D position is defined as latitude and longitude. Altitude is assumed to be fixed.
<b>2-D GPS Mode</b>	A procedure for determining a 2-D position using signals received from the best (for only) three available GPS satellites. Altitude is assumed to be known and constant. A 2-D position solution will only be determined if signals from three or more satellites are available.
<b>3-D</b>	Three Dimensional. A 3-D position is defined as latitude, longitude and altitude.

**3-D GPS Mode** A procedure for determining a 3-D position using signals received from the best (for only) four available GPS satellites. A 3-D position solution will only be determined if signals from four or more satellites are available.

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All Magellan GPS receivers are navigational aids, and are not intended to replace other methods of navigation. The purchaser is advised to perform careful position charting and use good judgement. Read the User Guide carefully before using this product.

### **1. MAGELLAN SYSTEMS CORPORATION WARRANTY**

Magellan Systems Corporation warrants their GPS receiver and accessories to be free of defects in material and workmanship for a period of one year from the date of original purchase. **This warranty applies only to the original purchaser of this product.**

In the event of a defect, Magellan Systems Corporation will, at its option, repair or replace the product with no charge to the purchaser for parts or labor. The repaired or replaced product will be warranted for ninety (90) days from the date of return shipment, or for the balance of the original warranty, whichever is longer.

### **2. PURCHASER'S REMEDY**

Purchaser's Exclusive Remedy under this written warranty or any implied warranty shall be limited to the repair or replacement, at Magellan Systems Corporation's option, of any defective part of the receiver or accessories which are covered by this warranty. Repairs under this warranty shall only be made at an authorized Magellan Service Center.

### **3. PURCHASER'S DUTIES**

To obtain warranty service, the purchaser must return the receiver or accessories postpaid, with proof of the date of original purchase and purchaser's return address to **Magellan Authorized Service Centers**. Prior to returning your receiver the purchaser must first contact Magellan for return authorization.

### **4. LIMITATION OF IMPLIED WARRANTIES**

Except as set forth in item 1 above, all other expressed or implied warranties, including those of fitness for any particular purpose and merchantability, are hereby disclaimed.

Some states do not allow limitations on warranties, so the above limitation may not apply to you.

## 5. EXCLUSIONS

This warranty does not cover the following:

- Installation
- Battery Pack, excluding workmanship
- Finishes
- Defects resulting from installation
- Any damage due to accident, resulting from inaccurate satellite transmissions. Inaccurate transmissions can occur due to changes in the position, health or geometry of a satellite.
- Any damage due to shipping, misuse, negligence or tampering or improper use.
- Servicing performed or attempted by anyone other than an authorized Magellan Service Center representative.
- Modifications to the receiver which may be required due to any change in the Global Positioning System (GPS). [Note: All Magellan GPS receivers use GPS to obtain position, velocity and time information. GPS is operated by the U.S. Government, which is solely responsible for its accuracy and maintenance. Certain conditions can cause inaccuracies which could require modifications to the receiver. Examples of such conditions include but are not limited to changes in the GPS transmission. Such modifications are **not** covered by this warranty].
- Damage resulting from improper external connections.

**Opening of this product by anyone other than an Authorized Magellan Service Center representative will void this warranty.**

## 6. EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES

Magellan Systems Corporation shall not be liable to purchaser or any other person for any incidental, special, indirect or consequential damages whatsoever, including but not limited to lost profits, damages resulting from delay or loss of use, loss of or damages arising out of the use or inability to use this product, or breach of this warranty even though caused by negligence or other fault. In no event will Magellan Systems Corporation be responsible for such damages, even if Magellan Systems Corporation has been advised of the possibility of such damages.

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

## **7. MERGER**

This written warranty is the complete, final and exclusive agreement between Magellan Corporation and the purchaser with respect to the quality of performance of all the goods and any and all warranties and representations. **This warranty sets forth all of Magellan Corporations's responsibilities regarding this product.**

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

## **8. FOR PURCHASERS OUTSIDE OF THE UNITED STATES**

**This warranty gives you specific rights. You may have other rights which vary from province to province and certain limitations contained in this limited warranty may not apply to you.**

If you purchased this product outside of the United States, this limited warranty is governed by the laws of the State of California and shall benefit Magellan Corporation, its successors and assigns.

For further information concerning this limited warranty please call or write:

Magellan Corporation  
960 Overland Court  
San Dimas, California 91773  
Phone: (909) 394-5000  
FAX: (909) 394-7050  
e-mail: wireless@mgln.com



**960 Overland Court, San Dimas, CA 91773**  
**(909)394-5000**

**22-60104-000**