

GPS 315/320



User Manual



WARNINGS

USE GOOD JUDGEMENT

This product is an excellent navigation aid, 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. Accuracy can also be affected by poor satellite geometry.

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

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Introduction

Congratulations on your purchase of the Magellan GPS 315/GPS 320 receiver. Since introducing the world's first commercial, hand-held GPS receiver in 1989, Magellan has led the way with innovative GPS products to meet a wide range of positioning and navigation needs.

The receiver is designed to get you out into the "Great Outdoors" rather than spending hours reading the user's manual. In order to get you outdoors quickly, the manual is designed with key sequences rather than wordy sentences.

Before you begin, make sure that your package includes the items listed on the box. If any of these items are missing, please contact your local Magellan dealer or distributor.

Conventions Used in this Manual

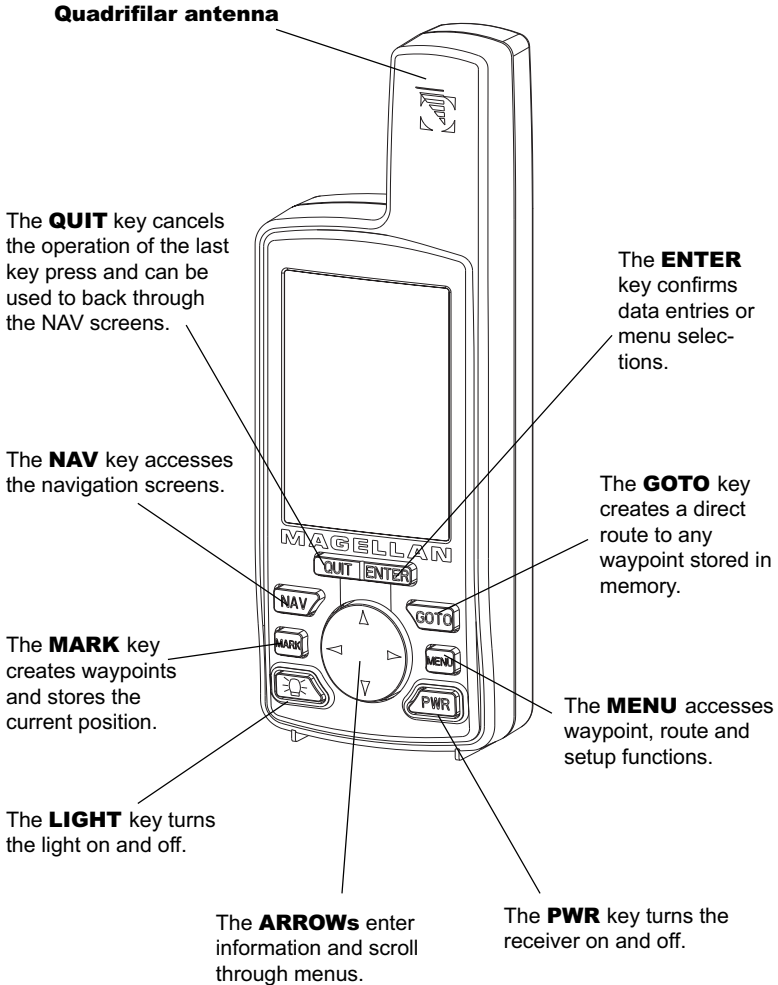
The manual is divided into chapters: *Introduction*, *Getting Started*, *Basic Operation*, *Reference*, *Customizing*, *Troubleshooting* and *Glossary*. There are also subchapters that describe NMEA, Datums and Accessories.

It is very important that you read through the *Getting Started* chapter first as it prepares your receiver for use and provides basic instruction. The *Basic Operation* chapter describes the features found in your receiver including step-by-step instructions on their use.

The *Reference* section contains information to help you navigate using waypoints, routes and auxiliary functions. Following is the *Customizing* chapter, that allows you to establish options you want set in the receiver. The *Troubleshooting* chapter gives you a problem and answer series to guide you. The final chapter, *Glossary*, defines terms that may be unfamiliar to you.

The manual is to be used with either the GPS 315 or the GPS 320. These differ in that the GPS 315 has a database of worldwide cities consisting of major, large, medium and small cities. The GPS 320 has a database of worldwide cities as well as lighthouses, fixed nav aids, buoys, large and medium cities for three different regions of the world (North/Central/South America, Europe/Africa and Australia/Asia).

GPS 315/320 Receiver



Getting Started

This section shows you how to use your receiver for the first time and explains:

- Accuracy
- Battery Installation
- Primary Usage
- Getting a Fixed Position

Receiver Accuracy

The satellite constellation that provides the GPS information used by the receiver is maintained by the Department of Defense (DoD). GPS positioning, for general use, provides 25 meter RMS accuracy or better. Since the signals generated by these satellites are publicly accessible, the DoD has introduced errors in the satellite signals for security reasons. These errors are referred to as Selective Availability (SA).

At present, your GPS position will be accurate within 100 meters horizontally and 150 meters vertically. Due to these errors introduced by SA, it is possible to get readings outside of these values at times.

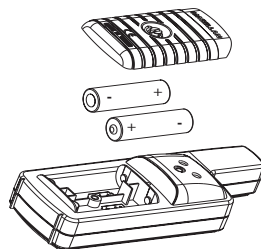
Installing the Batteries

The receiver uses two AA batteries that are installed at the back. To remove the battery cover, turn the ring of the battery door screw counter-clockwise until the battery cover can be removed.

Insert the new batteries as shown, being sure to respect the polarities, and replace the cover.

Replace the screw and turn the ring clockwise until the battery door is held in place securely. Avoid overtightening the battery door screw.

Once the batteries have been removed, the receiver loses time and date after 20 minutes.



Proper Handling - Signal Reception

Clear View of the Sky. Because the receiver attains information it needs from satellites orbiting the earth, the antenna needs to have a relatively unobstructed view of the sky. This allows the receiver to choose from all satellites currently available.

If the view of the sky is poor, (large cliffs or buildings, heavy foliage or other obstructions) the satellite signals can be blocked and the receiver may take longer to compute a position fix.

Holding the Receiver. The receiver is designed to fit comfortably in your hand. Hold the receiver in the palm of your hand with the antenna pointing towards the sky.

Power On



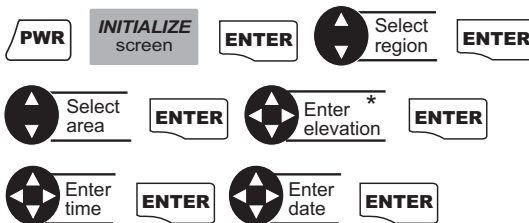
If after powering the receiver on, you do not press **ENTER** within 10 seconds, the receiver will shut off automatically.

Initialize

You do not need to initialize your receiver each time you use it unless the memory has been cleared or if it has been transported more than 300 miles while turned off.

Initialize for First Time Use

If the Initialize screen does not appear, then the receiver has already been initialized. The other steps in this procedure are not required.



* If you do not know your elevation, press **ENTER** .

Selecting Primary Usage

A screen will be displayed asking your primary use for your receiver, MARINE or LAND. The default is MARINE.



You have completed the *Initialization*. The *STATUS* screen will appear on your receiver.

The following chart shows the terminology that your receiver uses while in land or marine mode. **For purposes of this manual, it will be assumed that the receiver is in the marine mode.**

| | Land | Marine |
|---------------------------|------------------------|----------|
| Speed | SPD | SOG |
| Bearing | BRG | BRG |
| Distance | DST | DST |
| Heading | HDG | COG |
| Velocity Made Good | VMG | VMG |
| Course To Steer | CTS | CTS |
| Estimated Time of Arrival | ETA | ETA |
| Time To Go | TTG | ETE |
| Cross Track Error | XTE | XTE |
| Recorded Position | Landmark | Waypoint |
| Units of Measure | MILES/MPH or KM/KPH | NM/KNOTS |

Getting a Fixed Position

Now you should go outside in an area where you can get a clear view of the sky. The receiver will begin acquiring data from the satellites in view and will display the progress on the *STATUS* screen. Once the receiver has computed a fixed position, the *POSITION* screen will be displayed.

Saving Your Waypoint

Once the receiver has computed your current position, you may save (MARK) this position as a waypoint.

Saving Your Position with a Receiver-Created Name.

This is a fast way to save your position.



Saving Your Position with a User-Created Name.



You can save up to 500 waypoints in your receiver and refer back to them at any time.

Creating a GOTO

A GOTO is a route that guides you from your current position to any waypoint in the receiver's memory.






This completes the *Getting Started* section. The following *Basic Operation* section will familiarize you with the NAV screens and more detailed functions.

Basic Operation




Entering Information

Throughout this user manual there are some key presses that will be used often, so please keep them in mind while setting up and navigating. When entering data...

- Use the  for making selections and moving up or down.
- Use the  to move the cursor to the left or right and page through menus.
- Press  to return to the previous screen and to exit a screen or end a process.

Navigation Screens

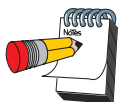
The nine NAV (Navigation) screens (*STATUS*, *POSITION*, *NAV 1*, *COMPASS*, *NAV 2*, *PLOT*, *ROAD*, *SPEED* and *TIME*) provide you with necessary information you will need to use the receiver as a navigational tool.

NAV screens can be viewed by pressing  from any screen. While viewing any NAV screen, you can use the  or  to step through the sequence of NAV screens.

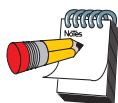
All screens, except *STATUS* and *POSITION* screens, can be disabled by turning them off in the NAV SCREENS portion of SETUP. The *TIME* screen default is off and can be turned on in SETUP as well.

Using the Status Screen

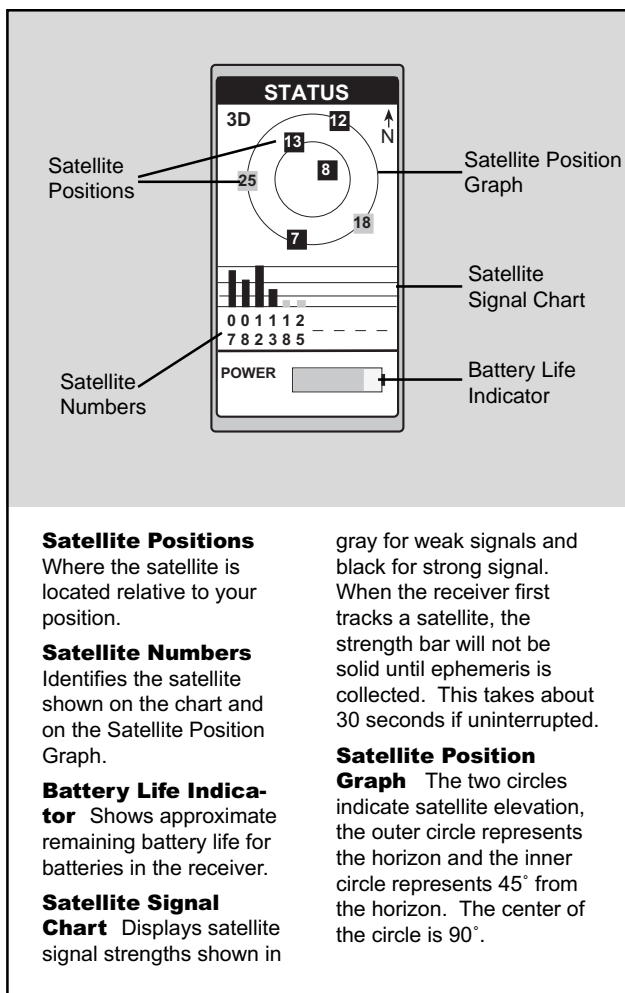
The *STATUS* screen gives you the general well-being of your receiver by showing you satellite status, signal strengths and battery life.



Once the receiver has computed a fixed position, the *STATUS* screen will be replaced by the *POSITION* screen.

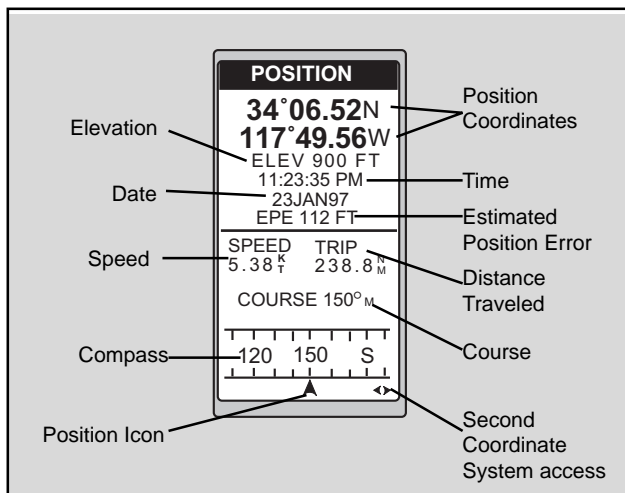
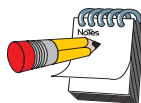


The Battery Life Indicator was designed to be used with AA alkaline batteries. With AA lithium batteries, you will have more battery life available than shown on the Battery Life Indicator.



Using the Position Screen

The *POSITION* screen displays the coordinates of your last computed position and basic navigation data. You also have the option of viewing your position using another coordinate system.



The diagram shows a rectangular screen with a black header labeled "POSITION". Below the header, the screen displays the following information:

- Position Coordinates: $34^{\circ}06.52'N$ and $117^{\circ}49.56'W$
- Elevation: ELEV 900 FT
- Date: 11:23:35 PM and 23JAN97
- Estimated Position Error: EPE 112 FT
- Speed: SPEED 5.38 K°
- TRIP: TRIP 238.8 M°
- Distance Traveled: COURSE 150 M°
- Compass: A scale from 120 to 150 with an arrow pointing to 150 and the letter "S" below it.
- Position Icon: A small triangle on the compass scale.
- Second Coordinate System access: A small icon on the right side of the compass scale.

Position Icon Your current position on the compass.

Estimated Position Error May display the estimated position error value or "DGPS" if DGPS is being fed to receiver, or "Simulate" if simulate is on.

Second Coordinate System Access Displays your present position in a secondary coordinate system. Datums can be selected under SETUP.

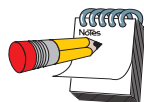
When you are stationary, the receiver begins the averaging mode. While averaging, the receiver continuously takes fixes to create an average. Once you begin moving, averaging stops automatically.

Viewing the Secondary Coordinate Screen

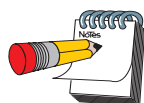
From the *POSITION* screen, use the left/right *ARROWS* to view the *Second Coordinate System* access screen.

Using the NAV 1 Screen

The *NAV 1* screen displays your destination along with four customizable navigation data and a graphical compass.



Ideally, when you are navigating, the Position Icon and the Destination Icon should line up, one above the other.



When the bearing to your destination cannot be displayed within the compass, an arrow will be displayed to indicate the steering direction you should be traveling.

The diagram shows the NAV 1 screen with the following fields and labels:

- Destination Name:** TO: FISH
- Customizable Navigation Data:** DST 50.2ⁿ_m, SOG 8.2^K_T, XTE 3.80ⁿ_m, VMG 7.2^K_T
- Destination Icon:** A small icon above the compass.
- Compass:** A scale from 120 to 150 with 'S' at the end. An arrow points to 150.
- Position Icon:** A small icon below the compass.
- COG:** 150^o_m

Destination Icon This icon represents where you want to go.

Customizable Navigation Data You can change the four navigational fields. You can choose from BRG, DST, SOG, COG, VMG, CTS, ETA, ETE, XTE, TRN, ALT, TME and blank.

| CUSTOMIZE | |
|-----------|--------------------------------|
| BRG | 027 ^o _m |
| DST | 50.2 ⁿ _m |
| SOG | 8.2 ^K _T |
| COG | 056 ^o _m |
| VMG | 7.2 ^K _T |
| CTS | 028 ^o _m |
| ETA | 01:09P |
| ETE | 02H24M |
| XTE | L.2 ⁿ _m |
| TRN | L26 ^o |
| ALT | 83 ^F _T |
| TME | 01:09P |
| BLANK | |

Figure A. Select the data field to appear on the NAV 1 screen.

Customizing the NAV 1 Screen

The *NAV 1* screen can be changed to show the navigation data that you prefer to view.

From NAV 1 screen

MENU Select CUSTOMIZE ENTER Choose field

ENTER FIG. A Select data type ENTER QUIT

Using the Compass Screen

As well as displaying the customizable navigation data, the *COMPASS* screen provides a pointer compass to help you reach your destination.

Destination Name

TO: HOME

BRG 127°_m DST 3.52°_i

COG 156°_m SOG 2.7°_H

Sun Icon

Compass

Steering Indicator

Destination Icon

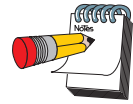
COG Indicator

Moon Icon

Steering Indicator
Displays the bearing of the destination relative to the course over ground.

Destination Icon
Shows the general direction you should be traveling.

COG Indicator Displays direction you are traveling. The COG indicator always points up and the compass rotates according to the COG.



When the COG Indicator and the Steering Indicator point in the same direction, you are on course.

The NorthFinder™ feature displays sun and moon icons, above the horizon, for you to determine the direction of north and your destination. Align the sun on the COMPASS screen with the sun in the sky. When aligned, the Steering Indicator will point you in the direction you should travel to reach your destination.

Customizing the Compass Screen

The *COMPASS* screen can be changed to show the navigation data that you prefer to view.

From COMPASS screen

MENU **Select CUSTOMIZE** **ENTER**

Choose field **ENTER** **FIG. B** **Change field** **ENTER** **QUIT**

| CUSTOMIZE | |
|-----------|-------|
| BRG | ---°m |
| DST | ---nm |
| SOG | ---KT |
| COG | ---°m |
| VMG | ---KT |
| CTS | ---°m |
| BLANK | |

Figure B. Select the data field to appear on the COMPASS screen.

Using the NAV 2 Screen

The *NAV 2* screen displays four customizable navigation data. The *NAV 2* screen is designed to help you see the screen when your receiver is mounted at a distance from you.

Destination Name

TO: CAMP

BRG 14.2°_M

COG 171°_M

SOG 11.2_K_T

DST 50.2_N_M

Customizable Navigation Data

Customizable Navigation Data. You can change the four navigational data fields. You can choose from BRG, DST, SOG, COG, VMG, CTS, ETA, ETE, XTE, TRN, ALT, TME and blank.

| CUSTOMIZE | |
|-----------|--------------------|
| BRG | 027° _m |
| DST | 50.2 _{nm} |
| SOG | 8.2 _{KT} |
| COG | 056° _m |
| VMG | 7.2 _{KT} |
| CTS | 028° _m |
| ETA | 01:09P |
| ETE | 02H24M |
| XTE | L.2 _{nm} |
| TRN | L26° |
| ALT | 83° _T |
| TME | 01:09P |
| BLANK | |

Customizing the NAV 2 Screen

The *NAV 2* screen can be changed to show the navigation data that you prefer to view.

From NAV 2 screen

MENU

Select CUSTOMIZE

ENTER

Choose field

ENTER

FIG. A

Change field

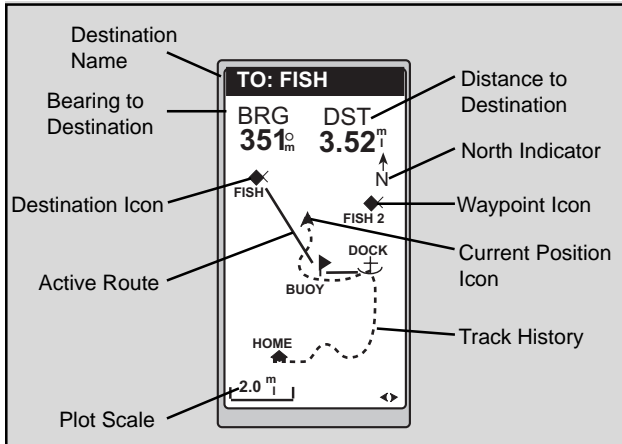
ENTER

QUIT

Figure A. Select the data field to appear on the NAV 2 screen.

Using the Plot Screen

The *PLOT* screen is a mini map that shows where you have traveled and where you want to travel. You can view the active route, your current position and the other waypoints and destination in the *PLOT* screen.



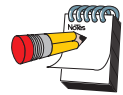
The diagram shows a GPS plot screen with the following elements and labels:

- Destination Name:** TO: FISH
- Bearing to Destination:** BRG 351^m
- Distance to Destination:** DST 3.52^m
- North Indicator:** N
- Waypoint Icon:** FISH, FISH 2
- Current Position Icon:** DOCK
- Active Route:** Solid line with arrow pointing towards FISH
- Track History:** Dashed line showing the path from HOME through BUOY to DOCK
- Plot Scale:** 2.0^m |

Active Route
Indicates the direction required to reach your destination.

Plot Scale Can be changed by using the left/right arrows. The scale ranges from .1 to 200 miles.

Track History
Automatically records where you have been.



PAN-N-SCAN, an additional feature, allows you to scroll through the *PLOT* screen enabling you to create waypoints and GOTOs.

Selecting PAN-N-SCAN

By using PAN-N-SCAN, you can look ahead or review where you have traveled according to waypoints, routes and track history.



The ARROWs can be used to move the cursor. If the cursor is over the waypoint icon when **MENU** is pressed, the menu will be displayed with WPT INFO added. Moving the cursor over a waypoint brings up the name, bearing and distance. Pressing **MENU** and selecting WPT INFO displays full information.

Setting Track History

Using TRACK HISTORY records where you have been by automatically storing locations, as “dropping bread crumbs” from your starting point as you travel. This is useful when you want to return to your starting point.



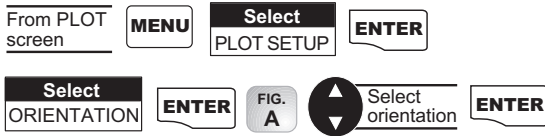
Clearing Track History



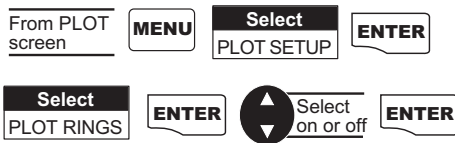
Setting Up the Plotter

This menu allows you to change the orientation, turn the plot rings on or off, set the course projection and set the plotter scale.

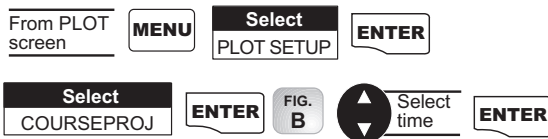
Setting Plotter Orientation.



Turning Plot Rings On or Off. You may want to estimate the distance to a point on the plotter. To assist you, turn the PLOT RINGS option on. The distance between each plot ring is equal to the scale, therefore, at most you will see a portion of 2 rings at one time.



Setting Up Course Projection. You may want to know where you will be after a specified period of time based on your current speed and heading.



A solid black line will appear starting from your position to the projected position.



Figure A. You can choose from TRACK UP (direction you are moving at the top of the screen), COURSE UP (destination of the current leg at the top of the screen) and NORTH UP (north at the top of the screen).

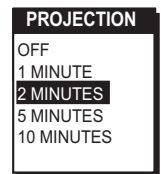
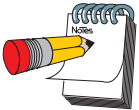


Figure B. You can choose from OFF, 1, 2, 5 and 10 minutes.

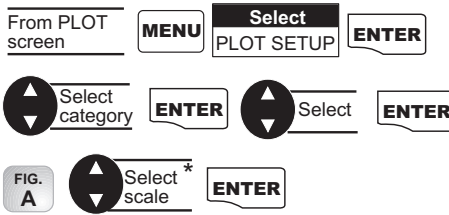
| PLOT SCALES | |
|-------------|--|
| 0.1 | |
| 0.2 | |
| 0.3 | |
| 0.5 | |
| 0.8 | |
| 1 | |
| 2 | |
| 3 | |
| 5 | |
| 8 | |
| 10 | |
| 20 | |
| 50 | |
| 100 | |
| 200 | |

Figure A. You may select the scale for the waypoint to appear on the plotter. The number you select is the maximum scale in which the icon will appear.



Depending on which has been selected previously, you may need to select SHOW DATA to bring the fields into view.

Setting Up Plot Scales. You can set up the maximum scales at which the waypoints appear on the plotter screen.



* Selecting OFF will turn the scales off. If you select either ICONS ONLY or ICONS/NAMES, you will be prompted to change the plot scales for a waypoint.

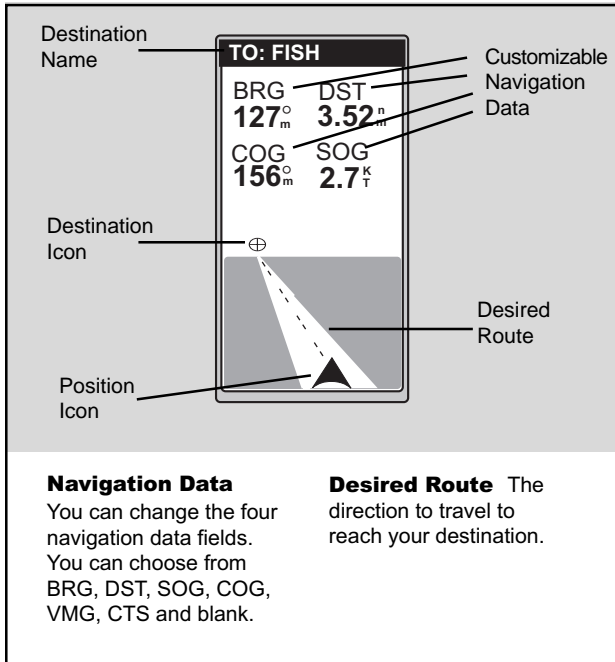
Setting Hide Data/Show Data

You may want bearing and distance to be hidden. You can choose to either hide these navigation data fields or have the fields present. Under HIDE DATA/SHOW DATA, you can turn these fields on or off.



Using the Road Screen

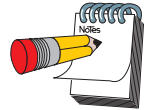
The *ROAD* screen displays four customizable navigation data fields, at the top of the screen, and shows your position on the desired route.



The diagram shows the ROAD screen interface. At the top, it displays 'TO: FISH' and four customizable navigation data fields: BRG 127°_m, DST 3.52_n, COG 156°_m, and SOG 2.7_K_T. Below the data is a map view showing a dashed line for the 'Desired Route' and a black triangle for the 'Position Icon'. A circle with a crosshair represents the 'Destination Icon'. Labels with leader lines identify these elements.

Navigation Data
You can change the four navigation data fields. You can choose from BRG, DST, SOG, COG, VMG, CTS and blank.

Desired Route The direction to travel to reach your destination.



When the destination icon is straight ahead, you are on course. If you are off course and the destination icon is off the screen, an arrow will appear to point you in the direction to get back on course.

Customizing the Road Screen

The *ROAD* screen can be changed to show the navigation data that you prefer to view.

From ROAD screen **MENU** **Select** CUSTOMIZE **ENTER**

Choose field **ENTER** **FIG. B** **Choose field** **ENTER** **QUIT**

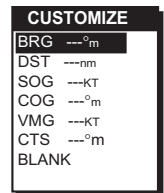


Figure B. You can choose from BRG, DST, SOG, COG, VMG, CTS and blank.

Using the Speed Screen

While using the *SPEED* screen, you can view the graphical speedometer, odometer and trip odometer as well as the numerical bearing, course over ground and speed over ground.

The screenshot shows the following information on the SPEED screen:

- Destination Name:** TO: CAMP
- Navigation Data:** BRG 027°, COG 056°, SOG 14.2 k
- Speedometer:** A graphical speedometer with a needle pointing to approximately 14.2.
- Speed Metrics:** Average Speed Icon (a small car icon) and Instantaneous Speed (14.2 k).
- Odometer:** 00542.5 n
- Trip Odometer:** 054.5 n

Labels on the right side of the screenshot point to: Average Speed Icon, Instantaneous Speed, Graphical Speedometer, Odometer, and Trip Odometer. Labels on the left side point to Destination Name and Navigation Data.

Graphical Speedometer Scale can be increased or decreased by using the right/left arrows.

Instantaneous Speed A graphical representation of speed over ground (SOG).

WARNING

RESET
ODOMETER
TO 000?
YES
NO

Figure A. Select "Yes" to reset the odometer.

Resetting the Odometer

You may want to reset the Odometer field to zero.

From SPEED screen

MENU **Select** **ENTER** **FIG. A**

ODOM RESET

↑ **Select yes or no** **ENTER**

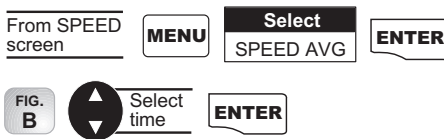
Resetting the Trip Odometer

You may want to reset the Trip field to zero.



Setting the Speed Average

You may want to reset the Speed Average field in your receiver.



The default is 30 seconds.

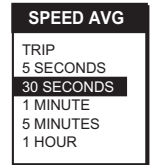
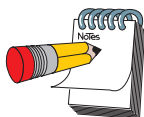


Figure B. You can set the timing for Speed Averaging. You can choose from TRIP, 5, 30 seconds, 1, 5 minutes or 1 hour. TRIP option is for averaging speed over the entire trip.



The default for the *TIME* screen is off.

All data shown on the *TIME* screen applies to the route you are navigating in.

Using the Time Screen

The *TIME* screen displays the current time, estimated time enroute, time of arrival, and elapsed time in regards to the route you are navigating in.

TIME
03:54:21^P_M — Time

Estimated Time Enroute — **ETE**
01:09:24

Time of Arrival — **OF ARRIVAL**
04:34:20^P_M

Elapsed Time — **ELAPSED**
02:24:56

Time Can be customized to correct the current time and to select the time format.

Estimated Time Enroute (ETE)

Time of Arrival (OF ARRIVAL)

Elapsed Time (ELAPSED)

Selecting Time Format

You may need to correct the current time or change the time format.

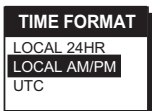


Figure A. You can choose from LOCAL 24HR, LOCAL AM/PM and UTC.

From *TIME* screen

MENU **Select FORMAT** **ENTER**

FIG. A **Select format** **ENTER**

If LOCAL 24HR or LOCAL AM/PM **Change fields** **ENTER**

If UTM is chosen you will not be prompted to make the time change.

Resetting Elapsed Time

You may want to reset the elapsed time to zero.

From TIME
screen

MENU

Select
RESET ELAP

ENTER



You have completed the basic operation for your receiver. From the information provided, you can now navigate from place to place quickly and easily.

The following chapters provide you with additional information on using your receiver that build on what you have learned.

Reference

The *Reference* section contains information that will help you navigate using your receiver. Now that you have read the *Basic Operation* section, you have reviewed the basic usage. The *Reference* section will cover waypoints, routes, and auxiliary functions.

The *Working with Waypoints* section tells you how to create, edit, delete, project and sort waypoints. These functions will guide you in the uses of waypoints. You can create your own waypoints (known as User waypoints) or use the waypoints already in the receiver's memory (Non-User waypoints). You can store up to 500 user positions which can be used to build routes for navigation.

As stated earlier in the user manual, the GPS 315 has a database of worldwide cities and the GPS 320 has a database of cities and marine nav aids for three different regions of the world: North/Central/South America, Europe/Africa and Australia/Asia.

The *Working with Routes* section tells you of the four different types of routes consisting of GOTO, BACK-TRACK, MOB and MULTI-LEG ROUTE. A route is a planned course of travel defined by a series of waypoints saved in the receiver's memory. The receiver holds 20 routes with 30 legs. The route function allows you to create, activate/deactivate, view/edit or delete any one of the 20 routes.

The *Auxiliary Function* section tells you how to select the Sun/Moon and Fish/Hunt options, contrast, simulate mode and the alarms and message functions. You can choose from the Anchor alarm, Arrival alarm, XTE alarm, Proximity alarm and GPS Fix alarm. These alarms can be reset to the alarm default settings or can be cleared of defaults.

Following, you will find the *Customizing* section. Customizing allows you to use the Setup menu to establish the options you would like to set in your receiver.

Working with Waypoints

This section tells you how to edit, delete, project and sort waypoints. You can store up to 500 user positions which can be used to build routes for navigation.

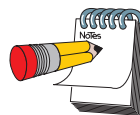
Waypoints consist of two types, User and Non-User. The User types are made up of waypoints that you can save in the receiver's memory. You can edit and delete these waypoints, if you wish. The Non-User types display locations, their coordinates and a description. These are permanently stored in the receiver's memory and cannot be deleted unless written over by waypoints downloaded from the DataSend™ CD.

To help you understand the difference, the chart below shows the functions of the User and Non-User waypoints.

| WPT Types | Available Functions |
|-----------|---|
| User | <ul style="list-style-type: none"> • Create • Edit • Delete • Project • Sort |
| Non-User | <ul style="list-style-type: none"> • Find • Project • Sort |

The chart below shows the differences between the GPS 315 and GPS 320.

| GPS 315 | GPS 320 |
|--|--|
| Worldwide major cities | Worldwide major cities |
| Worldwide large, medium and small cities | Regional large and medium cities |
| | Regional buoys, lighthouses and fixed nav aids |



You can store up to 10 Non-User waypoint categories.

As you are working with waypoints, you will notice that the cities (non-user waypoints) are divided into categories. This division is based on the population of the city using the following guidelines:

| | |
|-------------|-------------------|
| Major city | 500,000+ |
| Large city | 100,000 – 500,000 |
| Medium city | 20,000 – 100,000 |
| Small city | Less than 20,000 |

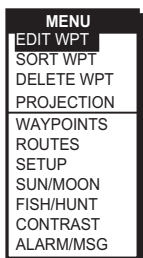


Figure A. This menu allows you to select the edit waypoint mode. Only User waypoints can be edited.

Creating a User Waypoint

A waypoint is a recorded position that can be used in a route or a GOTO. You can save up to 500 user waypoints in your receiver.



or



Editing a User Waypoint

Editing a Selected Waypoint



Figure B. You may change any of the data fields in this screen.



Editing Waypoint Fields. Follow the instructions on selecting a waypoint and use the following to edit the desired fields.

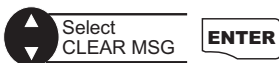


Creating/Editing/Deleting a Message in a User Waypoint

To create a message. Follow the instructions on selecting a waypoint and use the following to create/edit/delete a waypoint.



To delete a message. Follow the instructions on selecting a waypoint.



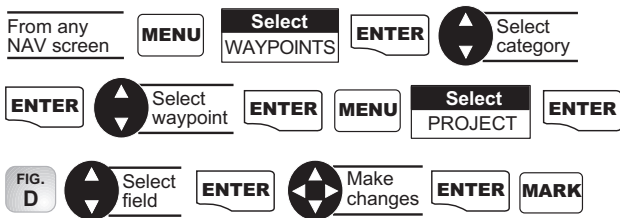
Saving Changes to a Selected Waypoint

To save your edits. Follow the instructions on selecting a waypoint.



Projecting a Waypoint

This function allows you to create a waypoint at a certain distance and direction from an existing waypoint.



You can change any of the three sections in the *PROJECTION* screen. Once you have the necessary information in the data fields and the receiver has projected the position, you can save the position by pressing **MARK**.

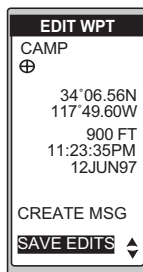


Figure C. Once you have made your changes, be sure to select **SAVE EDITS**.

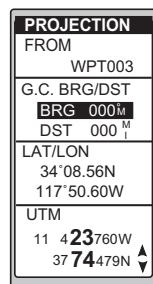


Figure D. You can change the data fields shown in the above screen except the FROM waypoint.



In the G.C. (Great Circle) BRG/DST field, you can input the bearing and distance into the data fields in order to compute the projection. You can also input information into the coordinate fields.

Sorting a Waypoint

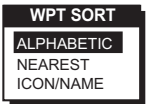
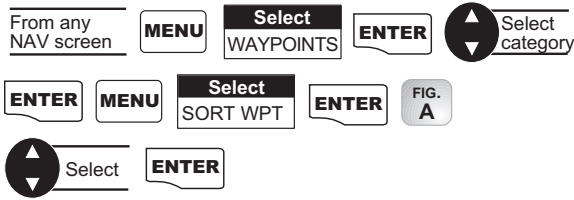


Figure A. You can choose from ALPHABETIC (shows all waypoints), NEAREST (shows closest 20 waypoints) and ICON/NAME (cannot sort Non-User waypoints).

You may want to change how the waypoints are sorted.

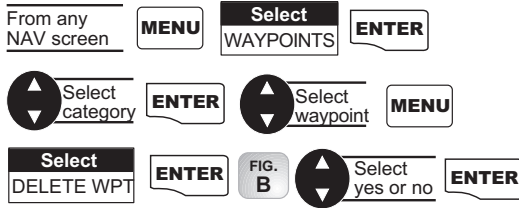


Deleting a User Waypoint

You may find that you have saved waypoints that you no longer use. If so, you can delete these unnecessary waypoints.



Figure B. This screen prompts you to select YES or NO in deleting the waypoint named.



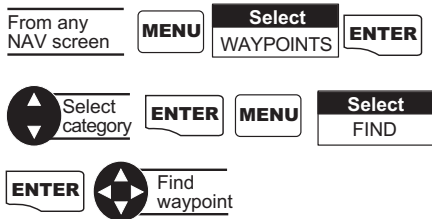
Once these waypoints are deleted, you cannot undo this process or retrieve these deleted waypoints.



To find the waypoint use the **ARROWS** to change the letters. For example, to find Dodger Stadium, use the **ARROWS** to change the first letter to "D". Then use the **ARROWS** to find the second letter, "O". Continue until the name is found.

Finding a Non-User Waypoint

To simplify your search for a waypoint, you can find it using the smart scroll function.



DataSend™ CD (optional)

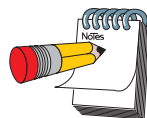
DataSend™ software contains a database of waypoints that can be sent to your receiver and are broken down into multiple categories. The software allows you to select a geographical area and enable waypoint categories for that location to be transferred into the receiver.

Using DataSend™

After you have installed DataSend™ you are ready to view and send waypoints to the receiver. While running DataSend™ you will see a background map of the world that you can zoom in to see enabled waypoints.

If you want to send waypoints to your receiver, you must select the geographic area first, then from the waypoint list you can make your selection of waypoints to send. The software will compute the amount of memory required and whether your selection fits into your receiver. If it exceeds the available receiver memory, either the geographic area, list of waypoints selected, or both, can be decreased and the memory requirements recomputed. The list of waypoints selected in the specified geographic area can then be saved under a project name you enter.

You can then send the waypoints to the receiver which replace all waypoints in the receiver. The default waypoints that came with the receiver can be restored at any time.



Don't worry about losing the waypoints that came with the receiver, they are available on the CD for retransmission to the receiver.

Working with Routes

Creating/Clearing a GOTO

A GOTO is a route that guides you from your current position to any waypoint in the receiver's memory. As an example, you can save a waypoint at your home. No matter where you go, you will always be able to navigate back home by using GOTO.

To create a GOTO



To clear a GOTO. The CLEAR GOTO function allows you to delete an active GOTO route.



If there are no active GOTOs, the CLEAR GOTO will not be displayed in the MENU.

Creating GOTO on the Plotter Screen

A GOTO route can be created by selecting a waypoint on the plotter screen. While on the plotter screen, follow this procedure to access PAN-N-SCAN and set a GOTO by:



When the crosshair is over the waypoint icon, the waypoint name is displayed at the top of the screen.

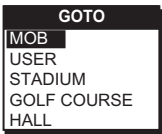


Figure A. Your menu may differ depending on the waypoints in memory.



By selecting the GOTO destination waypoint from the plotter screen, you can avoid selecting the wrong waypoint if its name is shared with another waypoint.

Creating a Man Over Board (MOB) Route

Another type of route is a Man Over Board (MOB). The MOB route is useful when you want to instantly create and activate a route to the last computed position.



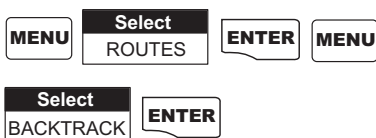
MOB waypoints will be created and titled MOB001, MOB002 and so on. If a MOB already exists, the receiver will give you the option of replacing the MOB.

To clear a MOB. The CLEAR MOB function allows you to delete an active MOB route.



Creating a Backtrack Route

Backtrack creates a route that starts from the last point recorded in track history using the “bread crumbs” saved, to the first point recorded for track history. By following this route, you “retrace your steps” back to the starting point.



A route will be created and given a name in the format of BXXPxx. XX is the BACKTRACK number and xx is the waypoint number ranging from 01 to 31. For example, your first backtrack will read B01P01. The backtrack waypoints will be listed in the menu just as other waypoints.

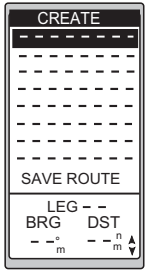
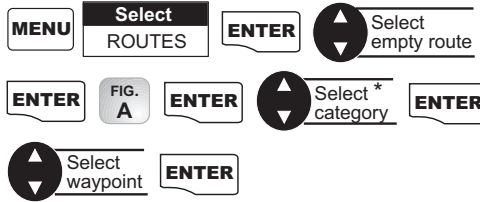


Figure A. Highlight the first dotted line to place the first waypoint in the multi-leg route.

Creating a Multi-Leg Route

You may want to create a route with your saved waypoints. For example, if you want to create a route from your home, to a campsite and then to a favorite fishing spot, you can create a route that would take you to each place.



* You can combine waypoints of different categories in the same route.

The receiver will display the selected waypoint in the starting location and will highlight the destination for leg 2.

Press **ENTER** for your next selection. Continue this process until you have completed the route.

To end the creation process:



or

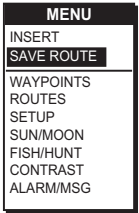
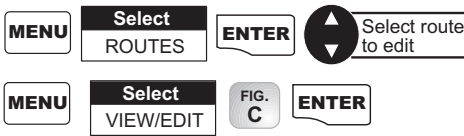


Figure B. Use this menu as an option for saving your route.

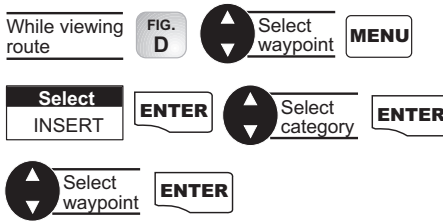


When selecting a navaid for a route, be sure you are selecting the correct one because there may be nav aids with the same names in different parts of the world.

Viewing/Editing a Route



Inserting a Leg. With the route you have created, from your home to a campsite, you can insert a leg in the route. For example, on your way to the campsite, you find a stream that you want to stop at on your way back. You can add the waypoint for the stream to your route.



Changing a Waypoint in a Route. Using your home to campsite route, you want to go to the fishing spot on the way to the campsite and not stop at the stream. You can replace the stream waypoint with the fishing spot.

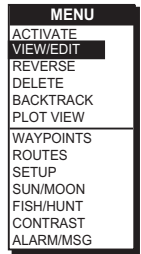
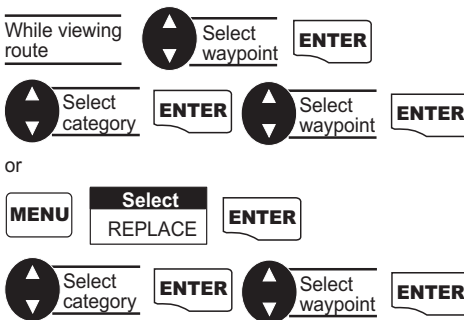


Figure C. To view or edit a route, highlight View/Edit.

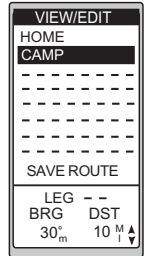


Figure D. You can add to an already existing route by highlighting the next available dotted line.

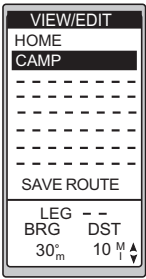
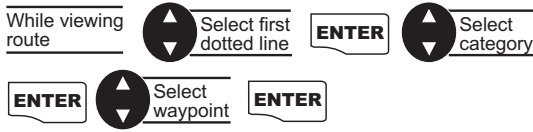


Figure A. Highlight the waypoint you want deleted.

Adding a Waypoint at the End of a Route. You may be navigating using the home to campsite route and find a great picnic spot. You would want to add this to the end of your route.



Deleting a Waypoint in a Route. On your next trip navigating from the home to campsite route, you find the campsite has closed. You may want to delete the campsite leg from your route.



Figure B. Use this menu as an option for saving the changes made to your route.



Saving a Route. Once you have made changes to your route, you may want to save those changes.

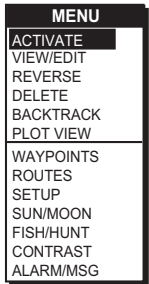
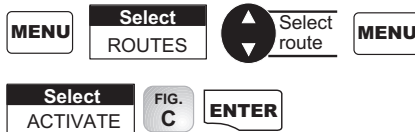
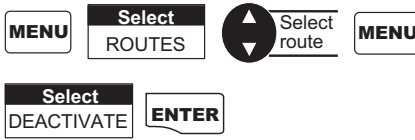


Figure C. The menu may read Deactivate, depending on which was chosen previously.

Activating/Deactivating a Route. While navigating in your route from home to campsite, you may decide you want to activate (turn on) the home to campsite route and begin navigating.



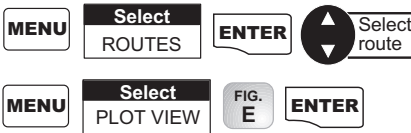
While navigating in your route from home to campsite, you may decide you want to deactivate (turn off) the route and return to it later.



Reversing a Route. Once you have reached the end of your route, you can reverse the route to return home. For example, Camp...Fish, goes from A to B to C to D, reversed would read from D to C to B to A and the title would read Fish...Camp.



Using Plot View in a Route. While navigating in your route, you can view the entire route in a small screen overview with the use of Plot View.



Deleting a Route. After your last trip using your home to campsite route, you decide you no longer want to visit those sites. You can delete the route from your receiver.

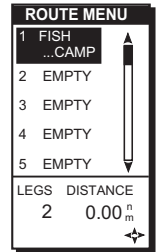


Figure D. The route title will change when you reverse a route.

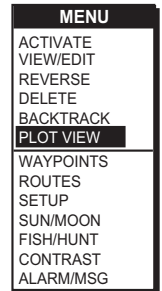


Figure E. Use this menu for accessing Plot View in a route.

Working with TrackRoute

TrackRoute (previously called Map 'N Track in the receiver) consists of track points collected by the Track History function. A track can be up to 1200 points in size.

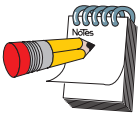
Activating. By activating the TrackRoute at the top of the ROUTE MENU, you can navigate from the first created track point to the last track point, making a reverse BACKTRACK. This turns the Track History logging off to keep from overwriting track points in memory. The top of the navigation screens will indicate TO: LEGXXXX where XXXX is between 0 to 1200. As you navigate with the receiver and pass individual track points, the legs will switch and countdown until you reach LEG 0 which is your final destination.

Deactivate. When TrackRoute is deactivated, Track History logging begins. The track points will be overwritten once the receiver records new position fixes.

Reverse. This reverses the TrackRoute or the track in Track History.

Delete. This erases the track points in Track History.

Backtrack. This activates BACKTRACK Route by saving the Track History as a 30 leg route and activating it.



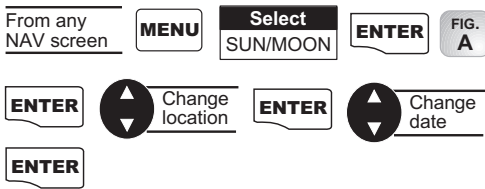
There may be some track points that are close to each other causing the receiver to skip 1 or more of these legs.

Auxiliary Functions

Working with Sun/Moon and Fish/Hunt

The Sun/Moon function displays solar and lunar calculations and the Fish/Hunt function displays times for excellent and good Fishing/Hunting. The default will be the current position unless the function is accessed from a waypoint menu or waypoint information screen.

Sun/Moon



Fish/Hunt

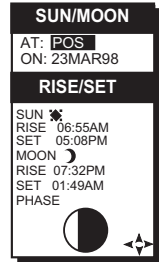
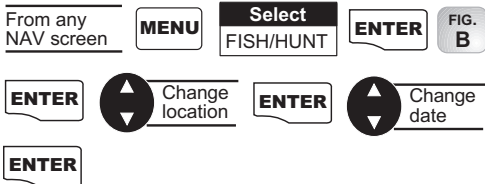


Figure A. You can change the location (AT) and/or the date (ON) for the calculation.

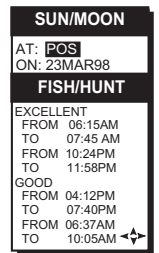


Figure B. You can change the location (AT) and/or the date (ON) for the calculation.

Selecting the Simulate Mode

The Simulate mode will help you become familiar with your receiver and how it works by generating artificial position fixes. By utilizing Simulate, the receiver will create a route and will continue until you end it. In order to end and delete the created route, you can return to the window (where you initiated the mode) and select OFF or power the receiver off.

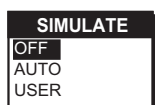
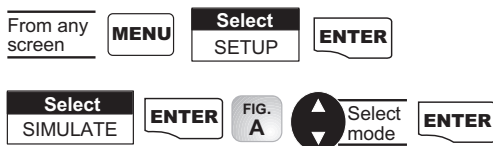


Figure A. If USER is selected, you will be asked to input SOG and COG.



Default setting: OFF

Both AUTO and USER modes generate a route and simulate navigation using that route. AUTO mode uses a speed of 25 mph and automatically generates a COG to follow the route. USER mode allows you to set the speed and COG to values you enter.



Figure B. Use the cursor to adjust the screen to your preference.



If your receiver is not computing a position fix after exiting Simulate mode, you may need to reset your present position by reinitializing. This is due to the Simulated position being more than 300 miles from your actual present position.

Selecting Contrast

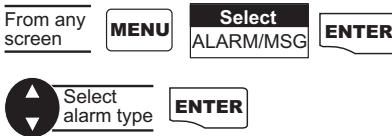
You may want to change the contrast of your receiver. You can adjust the brightness depending on your preference.



Selecting Alarm/Message

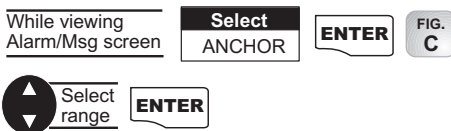
Accessing the Alarm/Message Menu

While navigating, you may decide to set an alarm. The receiver has five types of alarms: Anchor alarm, Arrival alarm, XTE alarm, Proximity alarm and GPS Fix alarm. To access the Alarm/MSG menu:



Selecting Anchor Alarm

The Anchor alarm will notify that you have moved from the set position. For example, while boating, you can set your Anchor alarm. Once anchored, your boat begins to drift from the set position, a pop-up window will appear to notify that you are moving.



The alarm will sound when the GPS position is at a distance greater than the distance you have chosen. The alarm will sound until turned off or the condition is corrected.

Default setting: OFF



When the pop-up window for an alarm is displayed, the distance and a message, if there are any messages, will appear.

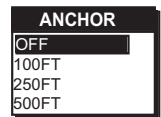


Figure C. You can choose from OFF, 100, 250 or 500 feet.

Selecting Arrival Alarm

The Arrival alarm will notify you when you are within the arrival circle of the destination waypoint.

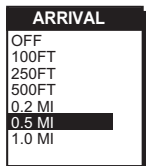


Figure A. You can choose from OFF, 100, 250, 500 feet, 0.2, 0.5 and 1.0 miles.

While viewing Alarm/Msg screen **Select** **ENTER** **FIG. A**
ARRIVAL



The alarm will sound and a pop-up window will appear when the GPS position is within the arrival circle you have chosen. The pop-up window will display the arrival circle distance as well as any message you have inputted for the waypoint. The alarm will sound until turned off.

Default setting: OFF

Selecting XTE Alarm

The XTE (Cross Track Error) alarm will notify you when you have gone off your set course.

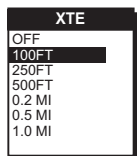


Figure B. You can choose from OFF, 100, 250, 500 feet, 0.2, 0.5 and 1.0 miles.

While viewing Alarm/Msg screen **Select** **ENTER** **FIG. B**
XTE

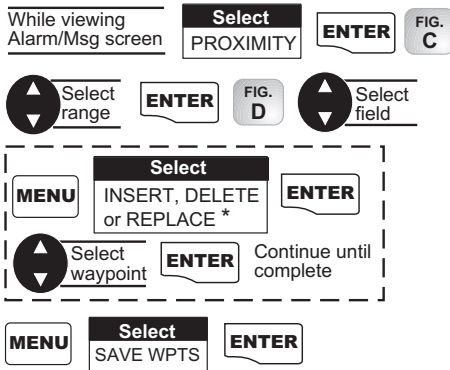


The alarm will sound when the GPS position is off your set course by the distance you have chosen. The alarm will sound until turned off or the condition is corrected.

Default setting: OFF

Selecting Proximity Alarm

The Proximity alarm will sound when you are within the proximity of any waypoints you have chosen that are not on the active route.



* DELETE and REPLACE will be displayed only if you select a used waypoint field.

The alarm will sound and a pop-up window will appear when the GPS position is within the proximity distance you have chosen. The pop-up window will display the proximity distance as well as any message you have inputted for the waypoint. The alarm will sound until turned off.

Default setting: OFF



Due to government imposed Selective Availability, alarm limit values under 100 feet may have errors. Do not rely on this feature for precise navigation.

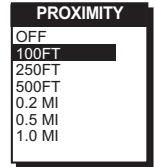


Figure C. You can choose OFF, 100, 250, 500 feet, 0.2, 0.5 and 1.0 miles.

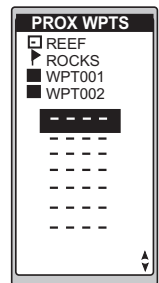


Figure D. You can select any saved waypoint to list on the Proximity waypoint screen.



Figure A. You can choose from OFF or ON.

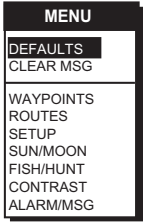


Figure B. You can restore the default settings or clear all messages.



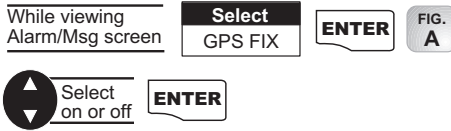
Figure C. The screen verifies the selection you made.



Figure D. Once cleared you cannot retrieve this information.

Selecting GPS Fix Alarm

The GPS Fix alarm allows the Poor GPS alarm to be turned off. Therefore, when the GPS reception is poor, you will not be notified.



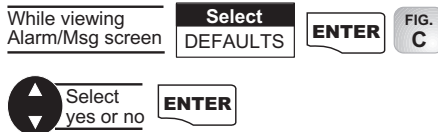
Default setting: OFF

Viewing the Alarm/MSG Menu



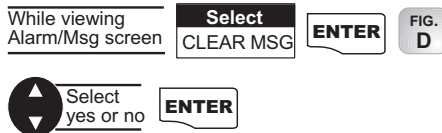
Selecting Alarm Defaults

After a memory clear, you may want to restore the alarm default settings.



Clearing Alarm Defaults

The message buffer may become cluttered with information. You can use the CLEAR MSG to delete the messages.



Customizing

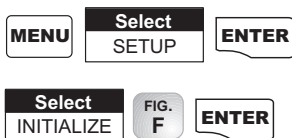
Selecting Setup

Setup allows you to initialize the receiver and set system parameters to your preference.



Selecting Initialize

By initializing your receiver, you establish the initial position for the receiver. This will enable the receiver to search the sky for available satellites. You will need to reinitialize if you have traveled more than 300 miles while the receiver is turned off. To initialize:



Follow the steps requested to initialize, as done when the receiver was initialized the first time (see *Getting Started*).

Disabling NAV Screens

You may find that you do not use one, or more, of the nine NAV screens provided in the receiver. You have the option to disable NAV screens, except for the *STATUS* and *POSITION* screens.



Figure E. Refer to this screen anytime you want to access Setup.

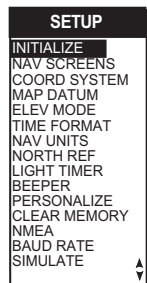
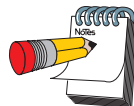


Figure F. If you need to initialize again, make this selection.



The default for the TIME screen is off.



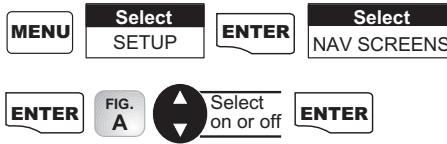
Figure A. You can turn NAV screens on or off.



Figure B. You can choose from LAT/LON, UTM, TD, OSGB, Irish, Swiss, Swedish, Finnish, German, French, MGRS and User Grid.



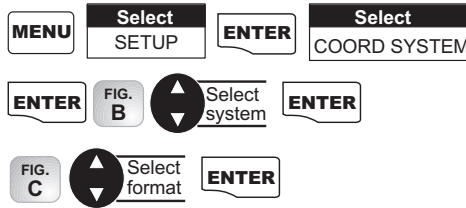
Figure C. You can choose from DEG/MIN.MM, DEG/MIN.MMM or DEG/MIN/SEC. The screen will be different for other coordinate systems.



The COMPASS screen is displayed next with the same pop-up menu. You will continue to be prompted for the other NAV screens.

Selecting a Coordinate System

A coordinate system is provided for you. This option allows you to select primary and secondary coordinates used for entering and viewing position information. The most common is LAT/LON.



If a format is required for the coordinate system you have chosen, a pop-up menu will be displayed.

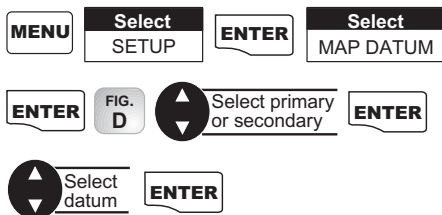
The default primary coordinate system will be Lat/Lon in Degrees/Minutes and the default secondary coordinate system will be UTM.



You will want the receiver to use position coordinates in the same map datum that is used by your maps.

Selecting Map Datum

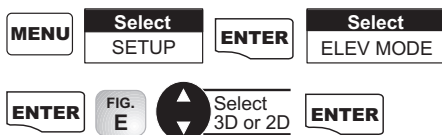
You can change the datum the receiver uses to compute position coordinates. You will want your receiver's datum to match the datum on the map or chart you are using. Use the map "legend" to determine the datum required for the map or chart. If you are not using a map or chart or are unsure which datum to use, select WGS84.



Default setting: WGS84

Selecting Elevation Mode

You have the option of changing your elevation mode to 2D (2-Dimensional) or 3D (3-Dimensional). You may find 2D useful if you know the elevation of your position and the elevation will not change. Your receiver will compute elevation in 3D mode but will not in 2D mode.



If you select 3D, the receiver will return to SETUP. If 2D is selected, the receiver will ask for elevation.



Default setting: 3D



Figure D. Be sure the map datum matches the datum required for the maps or charts you are using.



Figure E. You can choose from 2D or 3D.



Figure F. If you are at sea level, you can use 2D because your elevation is zero.

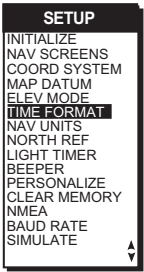


Figure A. You can access Time Format from this menu.

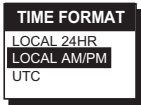


Figure B. You can choose from LOCAL 24HR, LOCAL AM/PM or UTC.

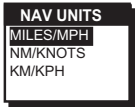


Figure C. You can choose from MILES/MPH, NM/KNOTS and KM/KPH.

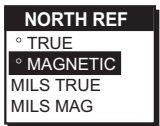
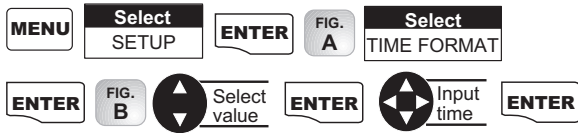


Figure D. You can choose from TRUE, MAGNETIC, MILS TRUE or MILS MAG.

Selecting Time Format

You have the option of changing the format for the time.

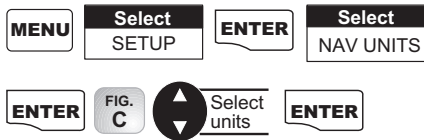


If UTC is selected, the receiver will return to SETUP. If LOCAL 24HR or LOCAL AM/PM are selected, a pop-up menu will be displayed prompting you to input the correct time.

Default: Local AM/PM

Selecting NAV Units

You can choose the units of measure used by your receiver.

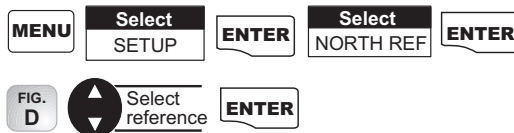


Default setting is MILES/MPH for land use in the United States and KM/KPH for land use outside the United States.

Default setting is NM/KNOTS for marine use.

Selecting North Reference

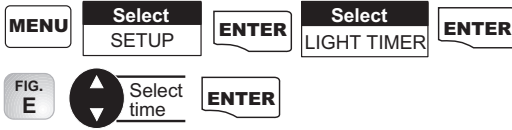
The receiver uses magnetic north as a default reference for all navigation computation. You can change this to true north (good, if you are using a map) or back to magnetic north (default, good to use if you are using a compass), or mils true or mils mag under SETUP.



Default setting: MAGNETIC

Selecting Light Timer

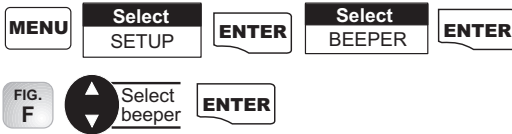
The light timer is a power saving function that automatically turns the light off.



Default setting: ALWAYS ON

Selecting the Beeper

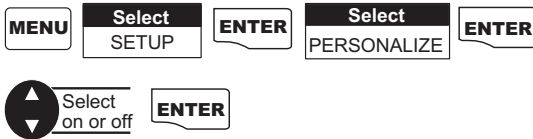
You can select the options for when the beeper will sound.



Default setting: KEYS/ALARM

Selecting Personalize

With the personalize function, you have the option of inputting your name into the receiver.



If ON is selected:



Figure E. Once the timer turns the light off, it can be turned on with the next key press. Suppose you select the timer setting for 30 seconds. Press the light key to turn the light on, it remains lit. With the next key press, the light turns on again for 30 seconds. This continues until you turn the light or the receiver off.



Figure F. You can choose from OFF, KEYS ONLY, ALARM ONLY and KEYS/ALARM.

Selecting Clear Memory

The Clear Memory function allows you to delete track history, waypoints and routes as well as reset the settings to the factory defaults. There is also an option to delete everything in the receiver's memory. Use caution when accessing the Clear Memory function. **Once you have deleted, you cannot undo the process or retrieve this deleted data.**

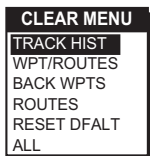


Figure A. You can choose from TRACK HIST, WPT/ROUTES, BACK WPTS, ROUTES, RESET DFALT and ALL.



If you clear all memory, the receiver will clear everything and power itself off.

Selecting NMEA

Your receiver can be set to output GPS data to interface with your personal computer.

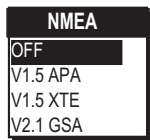
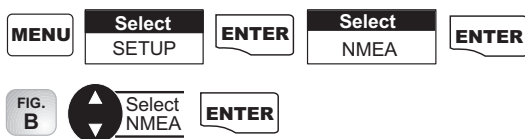


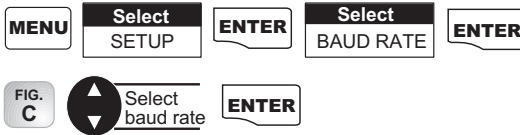
Figure B. You can choose from OFF, V1.5 APA, V1.5 XTE and V2.1 GSA.



Default setting: OFF

Selecting Baud Rate

Connection to external devices requires that the baud rate of the data being sent or received by the receiver be matched to the baud rate of the external device.



Default: 4800 baud

| BAUD RATE |
|------------|
| 1200 BAUD |
| 4800 BAUD |
| 9600 BAUD |
| 19200 BAUD |

Figure C. You can choose from 1200, 4800, 9600 and 19200 baud.

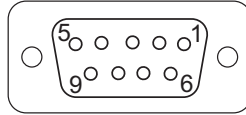
Connecting to DGPS

For the DBR (differential beacon receiver) that has a DB9 connector on the housing, the pinout is:

Pin 2: Data out to GPS

Pin 3: Data in

Pin 5: Sig. GND



To use the PC interface cable to interface the GPS receiver with the DBR-2 or DBR-3, you must use a null modem (Radio Shack P/N: 26-264A) and a gender changer (Radio Shack P/N: 26-280A) to connect the GPS receiver properly. This is due to the pinout being the opposite of the DB9 connector configuration for a PC connection.

Troubleshooting

Receiver will not turn on:

1. Check to see if batteries are installed correctly.
2. Replace with two new AA alkaline or lithium batteries.

Takes more than 10 minutes to get a position fix:

1. If there are any obstacles nearby or overhead, move to a new location.
2. Make sure that the antenna is pointing up, has a clear view of the sky and is a reasonable distance away from your body.
3. Check Satellite Status to see where the satellites are and if the receiver is acquiring data.
4. If the receiver still does not get a position fix within 10 minutes, you may wish to repeat the initialization procedure.

Elevation jumps up and down:

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

Battery life seems shorter than it should be:

1. Make sure that you are using two AA alkaline or lithium batteries.
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 *Map Datum* under *Reference* for instructions on selecting the map datum in your receiver.
2. Check your LAT/LON format. Make sure that the format selected in COORDINATE SYSTEM (DEG/MIN/SEC or DEG/MIN.MM) is in the same format as the map you are using.

Commonly Asked Questions

Does the receiver adjust itself for daylight savings time?

No. You need to reset the time for changes in your area (see *Selecting Time Format*).

Will my receiver function correctly in the year 2000?

Yes. Even though the last two digits of the year are displayed, the full year designator is stored in memory.

Why won't the receiver accept the coordinates I am inputting?

The most common cause is that you are trying to enter coordinates that are in degrees/minutes while your receiver is set to degrees/minutes/seconds. Because the last two digits in degrees/minutes are in hundredths (00-99) and degrees/minutes/seconds can be no higher than 59 (00-59), inputting a number higher than 59 while in deg/min/sec results in an error and the receiver does not accept the entry.

Can I use NiCad batteries in my receiver?

Yes. However, the battery life of your receiver will be diminished as well as the possibility of an incorrect reading on the battery life gauge with the use of NiCad batteries.

You say my receiver should work up to 15 hours on two batteries, but mine doesn't last that long?

There can be two reasons. The first, and most common, reason is that you have the display backlight on. The light increases the drain on the batteries causing the decrease in battery life. The second reason is that you are using NiCad batteries. As mentioned, while your receiver will operate on NiCad batteries, the battery life is diminished.

Why is the time and date incorrect after I replace the batteries?

If the batteries are removed for 20 minutes or more, the receiver will lose the time and date. The receiver will collect time and date soon after tracking a satellite.

Contacting Magellan

If after using the troubleshooting section, you are still unable to solve your operation problems, please call Magellan's Technical Service at (800) 707-9971.

Representatives are available Monday through Friday from 7 AM to 5 PM, PST. Faxes can be sent to Customer Service at (909) 394-7070.

If necessary, you can also return your receiver to Magellan for repair (please call for assistance first). If possible, please notify us before shipping the receiver by Parcel Post or UPS and include a description of the problem, your name, address and a copy of your sales receipt. If your return ship address is different, please indicate.

Please return the enclosed registration card in order to have your information on file.

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

Packages should be sent to:

Magellan Corporation
960 Overland Court
San Dimas, CA 91773
ATTN: Warranty/Repair

Shipping Your Receiver

When shipping your receiver by air, loosen the battery door screw by turning the screw by 1/2 turn. This will prevent damage to the receiver's water seal during shipping due to pressure differences.

NMEA DATA MESSAGES

Your GPS receiver can be set to output GPS data in the NMEA 0183 version 1.5 or version 2.1 format to interface with other marine devices or equipment.

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. The baud rate can also be set to 1200, 9600 or 19200.

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

| SET | OUTPUT/USAGE |
|----------|--|
| V1.5.APA | BWC, APA, GLL, VTG Remote displays, version 1.5 marine autopilots |
| V1.5 XTE | XTE, BWC, GLL, VTG Version 1.5 Marine autopilots |
| V2.1 GSA | GSA, GSV, GLL, GGA, RMB, RMC, APB, and autopilots. Vers. 2.1 NMEA recommended navigation data, satellite data and autopilots. |

NMEA Message Definitions

| | |
|-----|---|
| APA | Autopilot cross track error, direction to steer, status of GPS, route status, destination waypoint 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 waypoint. |
| 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. |
| GSA | GPS receiver operating mode, satellites used in the navigation solution reported by the S-GGA sentence and DOP (Dilution of Precision) values. |
| GSV | Number of satellites in view, satellite numbers, elevation, azimuth, and SNR value. |
| 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, heading, and date. |
| VTG | Track (magnetic and true) and groundspeed (knots and KPH). |

NMEA OUTPUT DATA FORMAT - VERSION 1.5

APA Autopilot Format A

1 2 3 4 5 6 7 8 9 10

APA,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 waypoint.

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

10 Dest WPT. identifier

BWC To Selected Waypoint, Great Circle

1 2 3 4 5 6 7 8 9 10 1112

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 waypoint

4-5 Long, E or W of waypoint

6-7 Bearing, True

8-9 Bearing, Magnetic

10-11Distance, naut. miles

12 Waypoint identifier

GLL Geographic Position — Latitude/Longitude

1 2 3 4 5 6

GLL,1111.11,a,yyyy.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

VTG Actual Track and Ground Speed (SPD)
 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

XTE Cross Track Error
 1 2 3 4 5
 XTE, A,A,X.XX, L,N

1 Or'ed value Blink and SNR (A=Valid, V=Invalid)
 2 Cycle Lock, (A=Valid, V=Invalid)
 3 Cross Track Error
 4 Steer Left of Right (L = Left, R = Right)
 5 Units (N.Mi.)

NMEA 0183 VERSION 2.1

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: A = Data valid
 V = Loran-C Blink or SNR warning
 V = 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 waypoint
 8-9 Bearing origin to destination, M/T
 10 Destination waypoint ID
 11-12 Bearing, present position to destination, Magnetic or True
 13-14 Heading to steer to destination waypoint, Magnetic or True

GGA Global Positioning System Fix Data

1 2 3 4 5 6 7 8 9 10 11
GGA, hhmmss.ss, 1111.11, 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 SPS Mode, Fix valid
 - 2 = Differential GPS, SPS Mode, fix valid
 - 3 = GPS PPS Mode, fix valid
- 7 Number of satellites in use (00-12, may be different from the number in view)
- 8 Horizontal dilution of precision
- 9 Antenna altitude above/below mean sea level
- 10 Units of antenna altitude, meters
- 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, hhmmss.ss, A*hh

- 1-2 Latitude, N/S
- 2-3 Longitude, E/W
- 4 UTC of position
- 6 Status A = Data valid
 - V = Data not valid

GSA GPS DOP and Active Satellites

GPS receiver operating mode, satellites used in the navigation solution reported by the \$--GGA sentence, and DOP values.

```
1 2 3                               4 5 6 7
GSA,a,x,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,x.x,x.x,x.x*hh<CR><LF>,
1   Mode: M=Manual, forced to operate in 2D or 3D mode,
      A=Automatic, allowed to automatically switch 2D/3D
2   Mode: 1= Fix not available, 2=2D, 3=3D
3-4 PRN numbers of satellites used in solution (null for unused
      fields)
5   PDOP
6   HDOP
7   VDOP
```

GSV GPS Satellites in View

Number of satellites (SV) in view, PRN numbers, elevation, azimuth and SNR value. Four satellites maximum per transmission, additional satellite data sent in second or their message. Total number of messages being transmitted and the number of messages being transmitted is indicated in the first two fields.

```
1 2 3 4 5 6 7 8           9 10           11
GSV,x,x,xx,xx,xx,xxx,xx.....,xx,xx,xxx,xx*hh<CR><LF>
1   Total number of messages, 1 to 9
2   Message number, 1 to 9
3   Total number of satellites in view
4   Satellite PRN number
5   Elevation, degrees, 90° maximum
6   Azimuth, degrees True, 000 to 359
7   SNR (C/No) 00-99 dB, null when not tracking
8-9 2nd-3rd SV
10-11 4th SV
```

Notes: 1) Satellite information may require the transmission of multiple messages. The first field specifies the total number of messages, minimum value 1. The second field identifies the order of this message (message number), minimum value 1.

2) A variable number of "PRN-Elevation-Azimuth-SNR" sets are allowed up to a maximum of four sets per message. Null fields are not required for unused sets when less than four sets are transmitted.

RMB Generic Navigation Information (immediately follows RMC)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|

RMB,A,X.XX,a,c--c,c--c,1111.11,a,yyyyy.yy,a,x.x,x.x,x.x,A *hh

1 Data 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 waypoint ID

5 Destination waypoint ID

6-7 Destination Waypoint Latitude (N or S)

8-9 Destination Waypoint Longitude (E or W)

10 Range naut. miles, present fix to destination waypoint Great Circle. [If range exceeds 999.9 nm, display 999.9.]

11 Bearing, True, Great Circle, Present fix to dest. waypoint

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 waypoint.)

14 CHECKSUM (Mandatory in this sentence.)

RMC Transit Specific (to be followed by RMB)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|----|----|

RMC,hhmmss.ss,A,1111.11,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,aa*hh

1 Time, UTC of position fix

2 Status (A = valid, V = Navigation receiver warning)

3-4 Latitude at UTC time, N or S

5-6 Longitude at UTC time, E or W

7 Speed over ground, knots

8 Course over ground, degrees

9 Date (DDMMYY)

10 Magnetic variation, degrees (E or W)

11 Mode Indicator

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, PO Box 3435 New Bern, NC 28564-3435

Available Datums

| Datum | Full Name | Datum | Full Name |
|--------------|-------------------------------|--------------|--------------------------------|
| WGS84 | World Geodetic System | IRELA | Ireland 1965 |
| NAD27 | North America 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 Egypton |
| CAPE | Cape | OHAWA | Old Hawaiian |
| CARTH | Carthage | OMAN | Oman |
| CENAM | Central America | PITCA | Pitcairn Astro 1967 |
| CHATH | Chatham 1971 | QATAR | Qatar National |
| CHUAA | Chau 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 of 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 | USER DEFINED | |
| 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

Performance

Receiver: 12 parallel-channel technology, tracks up to 12 satellites to compute and update information with quadrifilar antenna

Acquisition Times (under optimal conditions):

Warm Approximately 15 seconds

Cold Approximately 1 minute

Update Rate 1 second continuous

Accuracy:

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

Velocity 0.1 knot RMS steady state (with Selective Availability turned off)

Limits:

Speed 951 mph

Altitude 17,500 meters

Physical:

Size 6.2" x 2.0" x 1.3" [h] x [w] x [d]

15.75 cm x 5.08 cm x 3.30 cm

Weight 7 ounces (198.45 grams) with 2 AA batteries installed

Display 2.2" x 1.33" [h] x [w]

5.59 cm x 3.38 cm

high contrast LCD with EL backlit display

Housing Waterproof (Battery compartment is splashproof)

Temp. Range:

Operating 14°F to 140°F to (-10°C to 60°C)

Storage -40°F to 167°F (-40°C to 75°C)

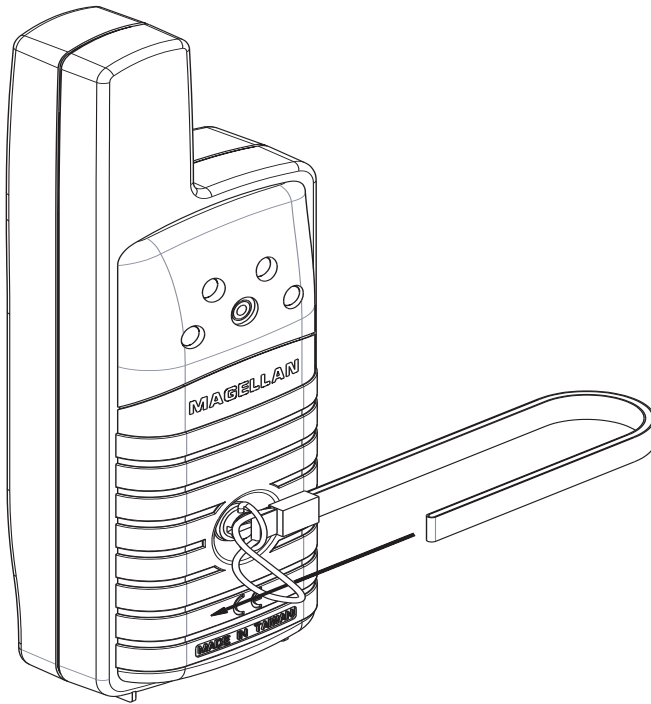
Power:

Source 2 AA alkaline or lithium batteries or 9-16 VDC with power cable

Battery Life Up to 15 hours

Attaching the Wrist Lanyard

The lanyard for your GPS receiver can be easily attached by inserting the small loop of the lanyard through the ring provided on the battery door locking screw and then looping the other end of the lanyard strap through the small loop.



Accessories

Accessories for your receiver are available from your Magellan dealer or you can order directly from Magellan using the order card supplied with your receiver or call Magellan at (800) 669-4477 (press 3 twice to place an order).

Swivel Mounting Bracket: Mounts the receiver on a surface, allowing for hands-free operation.

Vehicle Mounting Bracket: Mounts the receiver on the windshield, allowing for hands-free operation.

Nylon or Leather Carrying Case: The carrying case protects your receiver from the elements and allows you to carry your receiver on your belt.

Power/Data Cable (Bare Wires): Allows you to connect your receiver to external power and data.

PC Interface Cable with Cigarette Lighter Adapter: Connects your receiver to your PC for data transfer and to a cigarette lighter for external power.

External Power Cable with Cigarette Lighter Adapter: Allows you to connect the receiver to a cigarette lighter for external power.

DataSend™ CD-ROM: The software contains a database of points of interest that can be sent to your receiver. You can select from a number of geographical locations and download them into your receiver.

DataTrack Waypoint Management Software: Includes DataTrack 3.5 floppy disc GPS data management software.

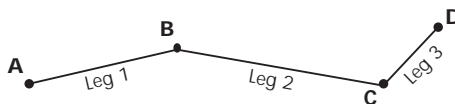
Instructional Video: A video in VHS format that provides you with instructions on how to use and operate your receiver.

Differential Beacon Receiver (DBR-3): Connects to your receiver to receive differential corrections (DGPS) for 5-10 meter accuracy.

Glossary

| | |
|-------------|--|
| Active Leg | The segment of a route currently being traveled. |
| Altitude | The current elevation above sea level. |
| BRG | Bearing. The compass direction from your position to a destination, measured to the nearest degree. |
| Buoy | A navigation aid (usually found in marine charts) that is floating in water. The position can vary due to the magnitude and direction of the current. |
| COG | Course Over Ground. The direction the receiver is moving. COG can be reported in true or magnetic north values. |
| Coordinates | A unique numeric or alphanumeric description of the position. |
| CTS | Course to Steer. The direction you should be traveling in order to return to the course while proceeding towards the destination. It is a “compromise” course bearing that projects from your current position to a point on the courseline mid-way between a point perpendicular to your position and the current leg destination waypoint. |
| Datum | Refers to the theoretical mathematical model of the earth’s sea level surface. Map makers may use a different model 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. If you are unsure of which datum to use, use WGS84. |
| Default | The value or setting automatically chosen by the unit unless otherwise directed. Can be changed in Setup. |
| DST | Distance. Distance from position to destination. |

| | |
|--------------|---|
| Ephemeris | The position and velocity of the satellites in the sky. The receiver uses the ephemeris to calculate the precise distance from the GPS receiver to the satellite. |
| ETA | Estimated Time of Arrival. The estimated time of day the leg's destination waypoint will be reached. |
| ETE | Estimated Time Enroute. The estimated time remaining to reach the next waypoint in a route. |
| Fixed Navaid | A navigation aid (usually found in marine charts) that has a fixed position and can be found on land or water. An example is a T.V. tower on land or a Greenday mark in water. |
| HDG | Heading. The direction you are facing, defined as an angle from North. |
| Latitude | The angular distance north or south of the equator measured by lines encircling the earth parallel to the equator from 0° to 90°. |
| LAT/LON | Coordinate system using latitude and longitude coordinates to define a position on the earth. |
| Leg (Route) | A segment of a route that has a starting (FROM) waypoint and a destination (TO) waypoint. A route may consist of 1 or more legs. A route that is from waypoint A to waypoint B to waypoint C to waypoint D has three legs with the first being from waypoint A to waypoint B. |



| | |
|----------------|--|
| LMK | Landmark. 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. Same as a waypoint. |
| Longitude | 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°. |
| Magnetic North | The direction relative to a magnetic compass |
| NMEA | National Marine Electronics Association. A professional organization that defines and maintains the standard serial format used by marine electronic navigation equipment and computer interfaces. |
| OSGB | A coordinate system describing only Great Britain, similar to UTM's. Used with GRB36 datum. |
| Position fix | Position coordinates as computed by the GPS receiver. |
| SOG | Speed Over Ground. The speed at which the receiver is moving. |
| TRN | Turn. Degrees or direction to turn. |
| True North | The direction to North Pole from an observer's position. The north direction on any geographical meridian. |
| TTG | Time To Go. The measurement of how long it will take you to arrive at your destination. TTG is based on how fast you are moving towards the destination and the distance remaining. |

| | |
|----------|--|
| UTC | Universal Time Coordinated. Formerly referred to as Greenwich Mean Time (GMT). |
| UTM | Universal Transverse Mercator metric grid system used on most large and intermediate scale land topographic charts and maps. |
| VMG | Velocity Made Good. The component of the velocity that is in the direction of the destination. |
| Waypoint | WPT. A location saved in the receiver's memory which is obtained by entering data, editing data, calculating data or saving a current position. Used to create routes. |
| XTE | Cross Track Error. The distance, left or right, of the desired courseline. The courseline is a straight line from your present position to your destination. |

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