Owner's Manual & Reference

GPS 120
User's Guide

GARMIN

GPS 120
OWNER'S MANUAL

Software Version 2.00 or above

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CAUTION

The GPS system is operated by the government of the United States, which is solely responsible for its accuracy and maintenance. The system is subject to changes which could affect the accuracy and performance of all GPS equipment. Although the GPS 120 is a precision electronic NAVigation AID (NAVAID), any NAVAID can be misused or misinterpreted, and therefore become unsafe.

Use the GPS 120 at your own risk. To reduce the risk of unsafe operation, carefully review and understand all aspects of this Owner's Manual and thoroughly practice operation using the simulator mode prior to actual use. When in actual use, carefully compare indications from the GPS 120 to all available navigation sources including the information from other NAVAIDs, visual sightings, charts, etc. For safety, always resolve any discrepancies before continuing navigation.

NOTE: This device complies with Part 15 of the FCC limits for Class B digital devices. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other equipment, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by relocating the equipment or connecting the equipment to a different circuit than the affected equipment. Consult an authorized dealer or other qualified service technician for additional help if these remedies do not correct the problem. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The GPS 120 does not contain any user-serviceable parts. Repairs should only be made by an authorized GARMIN service center. Unauthorized repairs or modifications could void your warranty and your authority to operate this device under Part 15 regulations.

Preface

Welcome to the easiest-to-use fixed-mount GPS navigator on the water! The GPS 120 represents GARMIN's continuing commitment to provide mariners with quality navigation information in a versatile, accurate and user-friendly design you'll enjoy for years to come.

To get the most of your new GPS unit, it is important that you take the time to read through this owner's manual to understand the operating features of the GPS 120. The manual is organized into two sections for your convenience:

Section One introduces you to the basic features of the unit and provides a quick-start orientation to the GPS 120. It has been designed to acquaint you with the unit and provide a basic working knowledge necessary to use the unit in typical conditions.

Section Two provides a detailed reference to the advanced features and operations of the GPS 120 in a topical format. This allows you to concentrate on a specific topic quickly, without reading through entire sections of text that you may not need.

Thanks for choosing the GARMIN GPS 120. If you have any questions or comments regarding the use of the GPS 120, our Product Support staff is available to serve you at 1-800-800-1020 or 913-599-1515. You can also reach our Product Support staff by FAX at 913-599-2377.

GPS 120 Capabilities

Designed for easy operation, the GARMIN GPS 120 offers powerful features that make marine navigation as simple and accurate as possible:

Precision Performance

- MultiTrac8™ receiver tracks and uses up to 8 satellites simultaneously for fast, accurate positioning
- Differential-Ready— just add the optional GBR 21 beacon receiver for 5-10 meter accuracy
- Fully gasketed, dry nitrogen-filled case for all-weather use

Advanced Navigating and Plotting

- 250 alphanumeric waypoints
- List of 9 nearest waypoints
- 20 reversible routes of 30 waypoints each
- MOB mode with bearing and distance to mark
- Moving Map Plotting with scales from .2 to 320 miles (0.5 to 600 km)
- Graphic pages for Satellite Status, Position, Plotting and CDI Navigation
- Active graphic display of cardinal heading
- Alarms for anchor drag, crosstrack error and arrival

Before getting started with your new GPS receiver, check to see that your GARMIN GPS 120 package includes the following items. If you are missing any parts, please see your dealer immediately.

Standard Package:

- GPS 120 Receiver with Remote GPS Antenna
- GPS 120 Owner's Manual
- Quick Reference Card
- Warranty Registration Card
- Mounting Bracket
- Power/Data Cable

Optional Accessories:

- PC Kit
- Swivel Mount Bracket

See your local GARMIN dealer for optional accessories.

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SECTION ONE Getting Started

SECTION TWO Reference

What is GPS?

GPS (Global Positioning System) is a satellite-based navigation system developed by the U. S. Department of Defense to provide a consistent, accurate method of simplifying navigation. Originally designed for military applications, it also provides commercial and recreational users with 24-hour, worldwide navigation coverage with accuracy to 15 meters (49 feet).

How Does GPS Work?

GPS navigation uses satellite ranging to determine your position in relation to a set of satellites orbiting the earth. The GPS constellation is made up of a set of satellites, which continuously send radio signals containing precise position and time information for each satellite back to earth.

By knowing the position of any 3 or 4 of these satellites and calculating various time differences between the transmitted signals, your GPS receiver can determine its present position anywhere on earth. And once you're under way, your GPS continuously updates your position and provides speed and track information.

What are the Advantages of GPS Navigation?

For centuries, mariners have been searching for an accurate method of travelling the world's waterways. From celestial navigating to loran and SatNav, each system has had its problems with weather, range and reliability.

GPS takes navigation to a higher level by providing accurate position and course information, anywhere in the world, regardless of the weather or your proximity to land. The accuracy and coverage of GPS navigation can help make your boating safer, smarter and more efficient wherever you may travel.

The GPS 120 is a powerful navigation tool that can guide you anywhere in the world. To better understand its operation and capabilities, it may be helpful to review the basic terms and concepts briefly explained below.

Navigation is the process of traveling from one place to another and knowing where you are in relation to your desired course.

Position is an exact, unique location based on a geographic coordinate system. Marine navigation is based on the latitude/longitude coordinate system.

Meridians of longitude are a set of imaginary circles around the earth that pass through the north and south poles. Longitude describes position in terms of how many degrees it is east or west of the Prime Meridian (0° longitude).

Parallels of latitude are another set of imaginary circles that are perpendicular to the earth's polar axis. Latitude describes position in terms of how many degrees it is north or south of the equator (0° latitude).

A **waypoint** marks an exact position fix so it can be recalled for future use. The GPS 120 lets you mark waypoints electronically, without physical landmarks.

Bearing is a compass direction to a particular destination (waypoint) from your present position.

Track is a compass direction representing your course over ground.

Getting Started

Keypad Usage

The GPS 120's two-speed thumbkey allows convenient, one-handed entry of information. Press on a particular arrow key once to scroll through data options slowly, press and hold an arrow key for faster scrolling.

- Use the up and down arrow keys to select alphanumerical characters and menu choices and to move the field highlight from field to field.

- Use the left and right arrow keys to move the selected character field and to move the field highlight from field to field.

The GOTO key changes the display to the Navigation Page with the waypoint field highlighted.

The POWER key turns the unit on and off and adjusts screen backlighting. To turn the unit off, press and hold the POWER key for 3 seconds.

The QUIT key returns you to a previous page, or clears data entry, restoring a data field's previous value.

The PAGE key scrolls through main data pages in sequence and returns the display from a submenu page to the previous page viewed. It also displays the message screen when a message alert appears.

The MARK key captures a position and displays the Mark Position Page.

The ENTER key confirms data entry and on-screen responses. The ENTER key also activates highlighted fields to allow data entry.

The MOB key performs the man overboard function. This marks the current position, and always displays your current range and bearing from this position. The MOB function is listed in detail on page 26.

Getting Started

Operation Flowchart

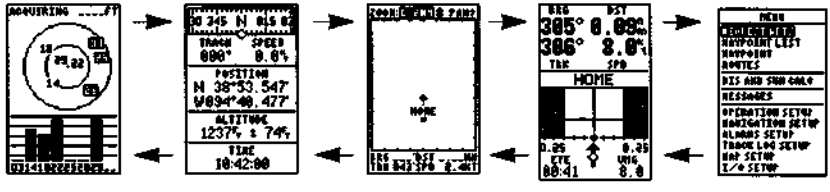
POWER ON

POWER OFF

Hold key for 3 seconds

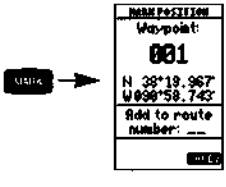
MAIN PAGE SEQUENCE

Press the PAGE key to scroll through pages in sequence.

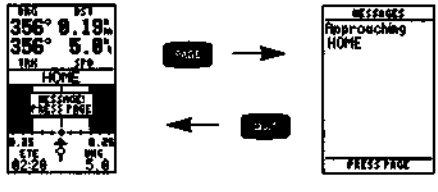


Press the QUIT key to scroll through pages in reverse order.

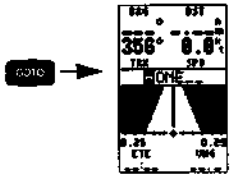
MARK POSITION



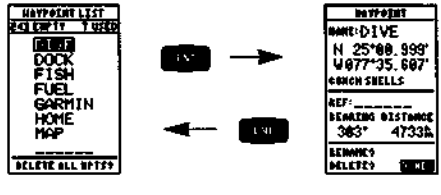
VIEW MESSAGES



GO TO WAYPOINT



REVIEW WAYPOINT DEFINITION PAGE



Getting Started

Power On & Status

Welcome Page

During first time use, the GPS 120 will 'search the sky' to establish your present position. You may speed up the initialization process by manually entering your position coordinates as described on page 17.

The Getting Started Tour assumes you have correctly installed the GPS 120 in your vessel according to the instructions in Appendix A, and have not changed any of the factory settings (units of measure, selectable fields, etc.). If you have changed any of the default settings, ther pictures and descriptions used may not match your unit's configuration.

The first time you power up your new GPS 120 is an important step in getting the best possible GPS performance. The receiver must be given an opportunity to collect satellite almanac data and establish its present position. This process can take 7.5-15 minutes, and is only necessary for first time operation or after memory loss.

You're now ready to power up and discover the world of GARMIN GPS navigation.

1. Press the PWR key firmly to turn the unit on.

The Welcome Page will be displayed while the unit conducts a self test. Once testing is complete, the Welcome Page will be replaced by the Status Page and the unit will begin acquiring satellite data.

Whenever the GPS 120 has something it needs to tell you, a message indicator box will flash on screen. To view a GPS 120 message:

1. Press PAGE to view the message.

In this case, you will see a 'Stored Data was Lost, Searching the Sky' message. This informs you that the unit is beginning to acquire satellite information to calculate your present position.

2. Press PAGE again to return to the previous screen.

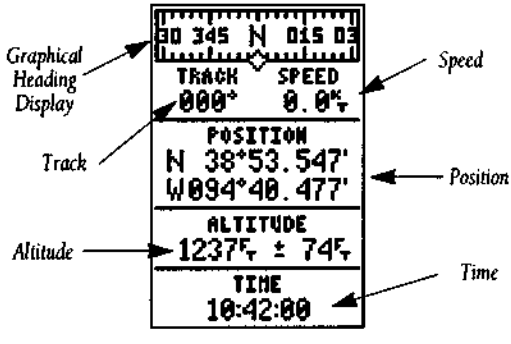
If you're new to GPS navigation, be sure to review the GPS Overview and Basic Navigation Terms on pages 2 and 3 while the unit collects data.

The GPS 120's Status Page provides a visual reference of satellite acquisition and position. As the receiver locks onto satellites, a signal strength bar will appear for each satellite in view, with the appropriate satellite number (1-32) underneath each bar.

The satellite sky view shows a bird's eye view of the position of each satellite relative to the unit's last known position. The outer circle represents the horizon (north up); the inner circle 45° above the horizon; and the center point directly overhead.

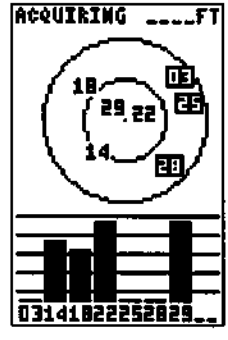
Once sufficient information is received, the Status Page will be replaced with the Position Page.

The Position Page shows you where you are, what direction you're heading and how fast you are going. The heading display at the top of the page indicates your cardinal heading (only while you're moving) with the track and speed indicated below.



The rest of the page shows your current position in three dimensions: latitude, longitude and altitude. The GPS 120 uses this basic information to mark exact positions as waypoints, which help guide you from one place to another.

The numbers to the right of the altitude field give a relative range for the accuracy of the altitude displayed. GPS altitude without differential correction is not as accurate as horizontal position, and fluctuations in this value are normal.



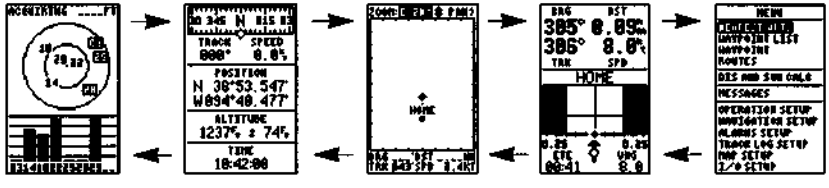
The Status Page's sky view will help you determine if a satellite signal is being blocked by an obstruction. As satellites are locked on to, the sky view indicators will change from a reverse-video highlight (e.g. satellites 3 & 25) to a standard display (e.g. satellites 18 & 14).

Getting Started

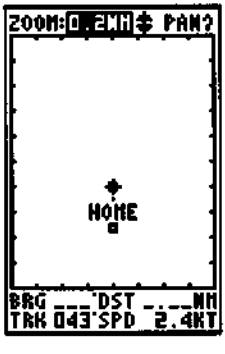
Page Sequence

Getting to know your new GPS requires only a few short keystrokes. Try scrolling through the main pages of the GPS 120:

1. **Press the key to scroll through the five main pages in sequence.**
2. **Press the key to scroll through pages in the opposite direction.**



Use the Page and Quit keys to continuously scroll through the main pages in either direction.



Map Page

The map page also displays your current speed and course, as well as the bearing and distance to a selected destination at the bottom of the page.

Since we've already gone throught the Status and Position Pages, let's move on to a brief overview of the Map, Navigation and Menu pages.

The Map Page provides a moving map track plotter which shows your present position (the diamond in the center), a visual track log of your past movement and nearby waypoints. The Map Page also allows you to zoom and pan simultaneously to other areas, mark new waypoints and quickly review on-screen waypoints. Instructions on zooming, panning, and using the map page begin on page 34.

The Nav Page provides all of the necessary information to navigate to a destination. Bearing, track, speed, distance, estimated time enroute (ETE) and velocity made good are all displayed on the Nav Page. This information is accompanied by a graphical steering arrow and highway which you may use to navigate to your destination.

The Menu Page contains prompts to perform many different functions on the GPS 120, including waypoints, routes, alarms, and all setup operations.

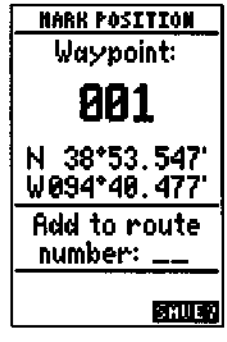
Now that you are familiar with the basic pages of the GPS 120, let's mark your current position as a waypoint for future reference. Before you mark your position, make sure the GPS 120 has acquired satellite information, and is displaying your current position and navigation information.

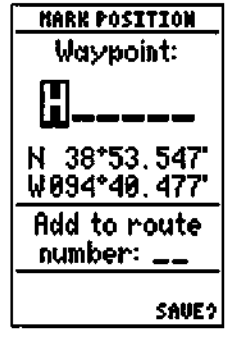
1. Press the MARK key to capture and hold your present position.

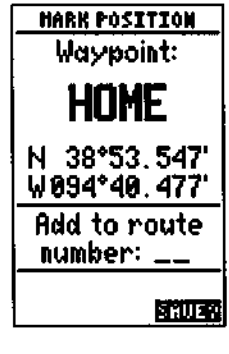
The Mark Position Page will appear, showing the captured position and a default 3-digit waypoint name. Let's change the default name to something that's a little more meaningful.

1. Press the ▲ key twice (or ▼ once) to move the field highlight from the 'save' field to the name field.
2. Press the ENT key to begin entry of your waypoint name (Press ◀ to clear pre-existing name).
3. Press and hold the ▲ key to scroll through the alphabet until the letter 'H' appears.
4. Press the ▶ key once to move the character highlight to the next character space.
5. Repeat steps 3 and 4 until the word 'HOME' is displayed.
6. Press ENT to complete entry of the name.
7. Press the ▼ key once to return the field highlight to the 'save' field.
8. Press the ENT key to confirm that you want to save the position as a waypoint named 'HOME'.

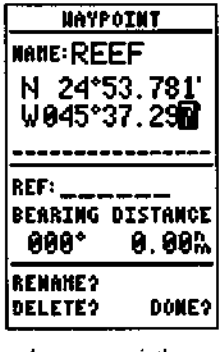
The Mark Position Page will be replaced by the page displayed prior to pressing the MARK key.







Menu Page



A new waypoint's position can be defined by manually entering coordinates, entering a distance and bearing from another waypoint, or entering a distance and bearing from your present position.

Now that you've marked your present position, it's time to enter a new waypoint manually so we may navigate toward it. This will allow you to go directly to this new destination quickly and easily. We can do this one of two ways; either by exact position coordinates, or by referencing a known location.

1. Press PAGE or QUIT until the Menu Page is displayed.

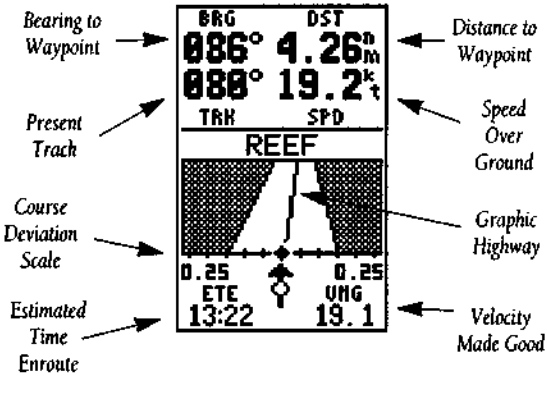
For this example, you'll need to know either a waypoint's position coordinates, or its distance and bearing from another known position (e.g. 'HOME').

1. Press the ▼ key to highlight the 'Waypoint' field and press ENT.
2. Press the ▼ key to highlight the name field.
3. Press ENT to begin entry of the waypoint name.
4. Use the ▲ and ▼ keys to enter your waypoint name, using the ◀ and ▶ keys to move to the next character position.
5. Press ENT to confirm the waypoint name. The position field will now become highlighted, with the receiver's last known position shown.
6. Press ENT to begin entry of the position, or use the ▼ arrow to highlight the 'ref:' field to create the waypoint a certain bearing and distance from your current position.
7. Use the ▲ and ▼ keys to enter your exact position or the reference waypoint name (leave blank to use your current position).
8. If entering a range and distance feature, use ▲ and ▼ to enter the bearing and distance. Press ENT to calculate a new lat/lon position.
9. Press the ENT key to confirm and save your coordinates. The default waypoint comment (UTC date and time of creation) will appear and the highlight will move to the 'done field.
10. Press the QUIT key to return to the Menu Page.

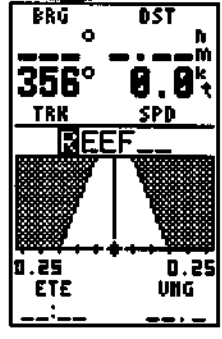
Now that we've seen how to create a new waypoint, lets navigate to it (remember, we'll be navigating a direct course line to your destination, so make sure there isn't an obstruction in your way):

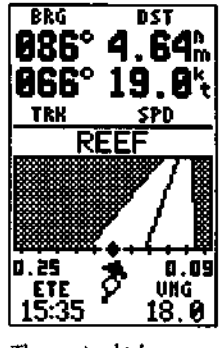
1. **Press the GOTO key.**
2. **The Navigation Page will appear with the waypoint field highlighted. Press the ▲ or ▼ keys to scroll through the available waypoints until the waypoint you just created is displayed.**
3. **Press the GOTO key to confirm that you want to navigate to the displayed waypoint.**

The GPS 120 will now guide you to the waypoint. As you begin moving, the Navigation Page will display nav data and graphic steering guidance. The bearing and distance to waypoint, with your current track and speed are displayed at the top of the screen, with your estimated time enroute (ETE) and velocity made good (VMG, or the rate you are closing in on your destination) at the bottom.

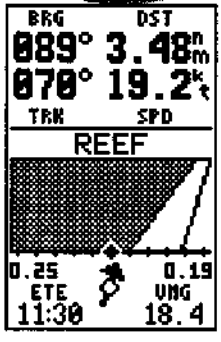


As you head towards your destination, the middle section of the screen provides visual guidance to your waypoint on a moving graphic 'highway'. The moving arrow just below the course deviation scale always points to your selected waypoint (REEF) relative to the direction you are moving.

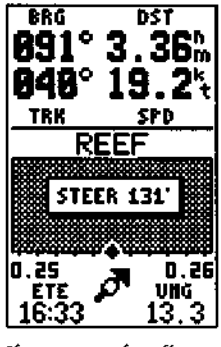




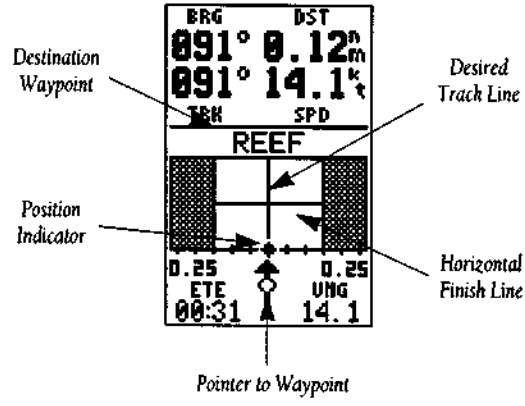
The moving highway provides a visual perspective of the distance and direction to waypoint. The highway will always move to 'point' in the general direction of your destination, with the relative distance indicated by the angle of the outside lines of the highway.



In this example, you are off the desired course to the left by 0.19 n.m. To get back on course, steer right to center the position diamond on the highway.



If you get too far off course, a message box will appear to indicate which course you should steer to get back on course most efficiently.



The line down the middle of the graphic highway represents your desired track (a straight line between the position you started from to the selected waypoint), with your present position indicated by the diamond in the center of the course devition scale. The arrow pointer below the highway serves as a relative bearing pointer to your destination waypoint.

As you navigate toward a waypoint, the highway will actually move, indicating the direction you're off course, relative to the position diamond on the CDI scale. To keep your vessel on the desired course, simply steer toward the center of the highway.

If you do get off the desired course by more than 1/5th of the selected CDI range, the exact distance you are off course will be displayed where the CDI scale setting normally appears (see the example at left). As you approach a waypoint, a horizontal 'finish line' will move toward the bottom of the highway. When the finish line reaches the CDI scale, you've arrived at your destination.

You've now gone through the basic operation of your new GPS and probably know a little more than you think about how it works. We encourage you to experiment with the GPS 120 until it becomes an extension of your own marine navigation skills.

The GPS 120 also features a Simulator mode to help you practice navigation, mark and save waypoints, and to create and travel routes.

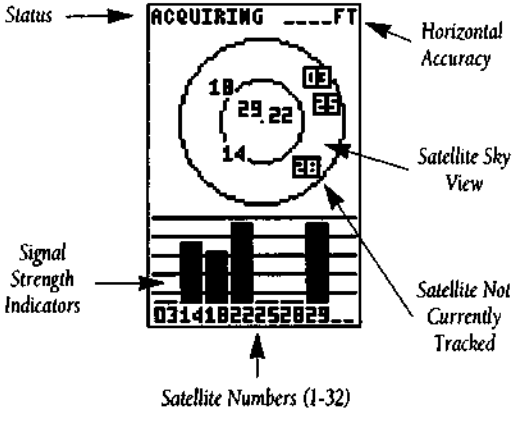
If you encounter any problems using the unit or want to take advantage of the GPS 120's advanced features, refer to the reference section of this manual.

To turn the GPS 120 off:

1. **Press and hold the PWR key for 3 seconds.**

Thank you for choosing the GARMIN GPS 120. We hope that it will be a valuable navigation tool for you, wherever your course may take you.

The power off countdown appears right on screen while you hold the power button. This countdown helps prevent accidental shutoff and loss of data.



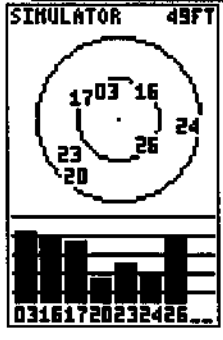
The GPS 120 Status Page displays the status of various receiver functions. The status information will help you understand what the GPS is doing at any given time.

The sky view and signal strength bars give you an indication of what satellites are visible to the receiver, whether or not they are being tracked, and the signal quality. When a satellite is visible but not being tracked, the signal strength bar will remain blank and the sky view indicator will remain highlighted in reverse video.

Receiver status is indicated at the top left of the screen, with the current horizontal accuracy (in feet or meters) at the top right. The status will show one of the following conditions:

Acquiring Satellites is the first status you'll see in normal operation. The GPS 120 is looking for satellites to track based on its last known position.

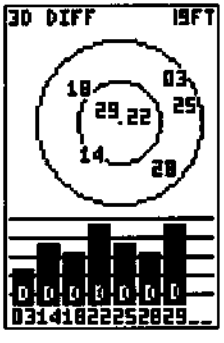
2D Navigation status indicates that at least three satellites with good geometry have been locked onto and a 2 dimensional position fix (latitude and longitude) is being calculated. '2D Diff' will appear when you are receiving DGPS corrections in 2D mode.

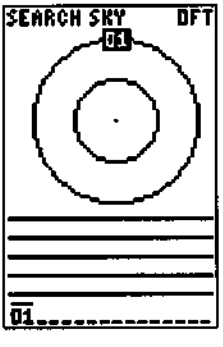


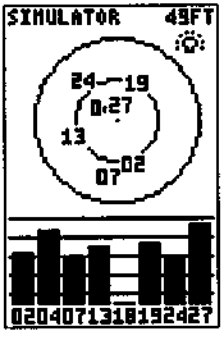
The satellite sky view shows a bird's eye view of the position of each satellite relative to the receiver's last known position.

The outer circle represents the horizon (north up); the inner circle 45° above the horizon; and the center point a position directly over your head. Use the sky view to help determine if there are obstructions shading your reception of satellite signals.

If you are losing coverage or having trouble acquiring a position, use the sky view and signal strength bars to guide you towards a better location for GPS reception.







3D Navigation indicates that at least four satellites with good geometry have been locked onto and your position is now being calculated in latitude, longitude and altitude. '3D Diff' will appear when you are receiving DGPS corrections in 3D mode.

Searching the Sky indicates that the GPS 120 is collecting new almanac data or AutoLocate™ mode has been selected (see page 38). This process can take 7.5 to 15 minutes.

Poor GPS Coverage indicates that the receiver is no longer tracking enough satellites to provide a 2D or 3D position fix.

Simulator indicates that the receiver is in simulator mode.

Not Usable indicates that the receiver is unusable, possibly due to incorrect initialization or abnormal satellite conditions. Turn the unit off and back on.

On the right side of the screen, just below the horizontal accuracy field is the screen backlight indicator. When backlighting is on, a bulb icon will appear. To adjust the screen backlighting:

1. Momentarily press the key to toggle through low, medium, high and off.
2. To adjust the duration of screen backlighting, refer to the operation setup section (page 39).

The GPS 120 uses the latest technology in Electro-Luminescent (EL) backlight to provide the most consistent backlighting possible. The typical life of the EL backlight at full brightness is 4000 to 6000 hours of continuous use. Using the lowest backlight level possible, or not using backlight when possible will extend the life of the backlighting by many years.

The GPS 120 Position Page displays your current position's latitude, longitude, altitude and time numerically. It also displays your track (compass direction) and speed when you're moving.

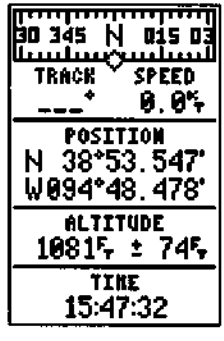
The Position Page also lets you enter a position's latitude and longitude manually. During satellite acquisition, the position displayed is the last computed position stored in memory. If the receiver's position has moved several hundred miles with the power off or memory has been lost due to battery failure, the unit may take 7 1/2 to 15 minutes to acquire satellite data.

To speed up the acquisition process, you can enter the coordinates of your present position. Most maps and charts show the latitude and longitude of major cities.

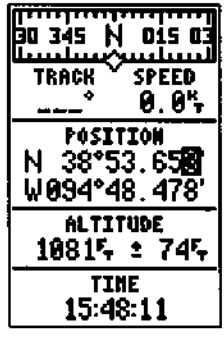
1. Press the ▼ key until the position field is highlighted.
2. Press [ENT] to begin entry of your position.
3. Use the ◀ and ▶ arrow keys to select the character position you want to edit.
4. Use the ▲ and ▼ arrow keys to select the value for each field. All fields must have a value.
5. Press the [ENT] key to confirm your changes.

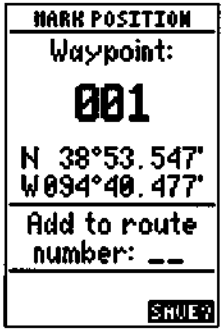
When the GPS 120 is acquiring satellites or navigating in the 2D mode, the last known altitude will be used to compute your position. If the altitude shown is off by several hundred feet, you may enter a corrected altitude manually for greater accuracy.

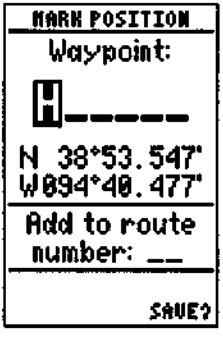
1. Press the ▼ key until the altitude field is highlighted.
2. Press [ENT] to begin entry of your altitude.
3. Use the ▲ and ▼ keys to enter a value in each character field, using the ◀ and ▶ keys to move to the next character position.
4. Press the [ENT] key to confirm the altitude.



The unit of measure for speed, position and altitude are all user-selectable. To change the default settings for these fields, refer to the navigation setup instructions on page 41.







Knowing your present position is only part of any navigation equation. You also need to keep track of where you've been and where you are going. Waypoints serve as electronic markers that let you keep track of starting points, destinations, navaids and any other important position.

The GPS 120 allows you to mark, store and use up to 250 waypoints. A waypoint position can be entered by taking an instant electronic fix or by manually entering a coordinate or range and bearing in reference to an existing waypoint. To mark your present position (make sure you have acquired a satellite position) as a waypoint:

1. Press the MARK key to capture your position.

The Mark Position Page appears, showing the captured position and a default 3-digit waypoint name. To change the default position name :

1. Press the ▲ key twice to move the field highlight from the 'save' field to the name field.
2. Press the ENT key to begin entry of your waypoint name (Press ◀ to clear a pre-existing name).
3. Use the ▲ and ▼ keys to enter a value in the appropriate character field, using the ◀ and ▶ keys to move to each character position.
4. Press ENT to confirm the waypoint name. The field highlight will move to the 'route' field.

If you'd like to add this waypoint to a route:

1. Press the ENT key.
2. Use the ▲ or ▼ keys to enter a route number.
3. Press the ENT key to confirm the route number.
4. Press the ENT key again to save the waypoint.

If you do not want to add this waypoint to a route:

1. Move the field highlight to the 'save' field and press the ENT key.

The GPS 120 has three waypoint submenu pages that let you manage a large number of waypoints quickly and efficiently. The nearest waypoints, waypoint list and waypoint definition pages are accessed through the Menu Page. To select a waypoint submenu page:

1. Press the PAGE or QUIT key until the Menu Page appears.
2. Use the ▲ and ▼ keys to highlight the waypoint submenu page you want to use.
3. Press ENT to display the submenu page.
4. To return to the Menu Page, press the QUIT key.

The nearest waypoints page shows the nine nearest waypoints that are within 100 nautical miles of your present position, with the bearing and range noted for each waypoint. During an emergency or foul weather, the nearest waypoints page can give you a quick reference to the closest points of safety in your area.

The nearest waypoints page will also let you GO TO a selected waypoint or retrieve a waypoint definition page right from the list:

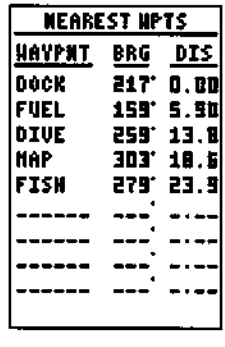
1. Use the ▲ and ▼ keys to highlight a listed waypoint.
2. To select a highlighted nearest waypoint as a destination, press the GOTO key.
3. Once the Navigation Page appears, press the ENT key to confirm the selected waypoint as your destination.

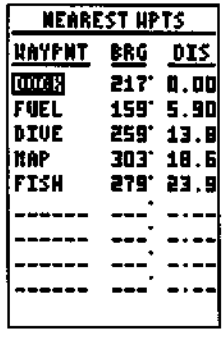
To review the waypoint definition page of a selected waypoint from the list:

1. Press the ENT key.

To return to the nearest waypoint page (when the 'done' field is highlighted):

1. Press the ENT key.





The waypoint list page provides you with a complete list of all waypoints currently stored in the GPS 120. The total number of used and free waypoints is indicated above the waypoint list. From the waypoint list page, you can GOTO a selected waypoint, retrieve a waypoint definition page or delete all user-defined waypoints.

1. Use the ▲ and ▼ keys to scroll through the list and select a waypoint.
2. To select a highlighted waypoint as a destination, press the GOTO key.
3. Once the Navigation Page appears, press the ENT key to confirm the selected waypoint as your destination.

To review the waypoint definition page of a selected waypoint from the list:

1. Press the ENT key.

To return to the waypoint list page (when the 'done' field highlighted):

1. Press the ENT key.

To delete all user defined waypoints:

1. Use the ▲ or ▼ keys to move the cursor highlight to the 'delete all waypoints' field.
2. Press the ENT key.

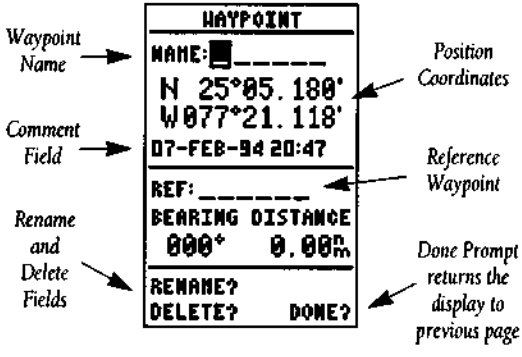
A warning page will appear, asking if you are sure you want to delete all user-defined waypoints and routes. If you want to continue and delete:

1. Press the ◀ key to highlight the 'Yes' field.
2. Press the ENT key.
3. Press the QUIT key to return to the Menu Page.

If you do not want to delete all waypoints:

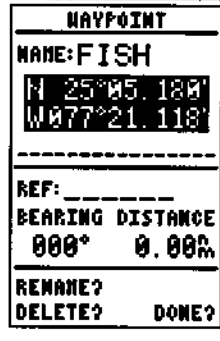
1. Press ENT with the 'no' field highlighted.

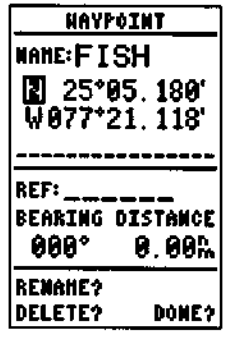
The last of the three waypoint management pages is the waypoint definition page. This page lets you create new waypoints manually, as well as review and edit existing waypoints.

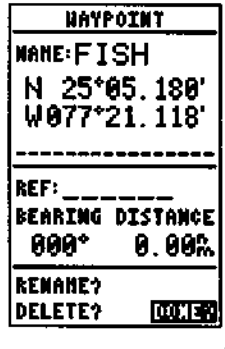


To create a new waypoint manually, you'll need to know its position coordinates or its distance and bearing from an existing waypoint. If you know the position coordinates for your new waypoint:

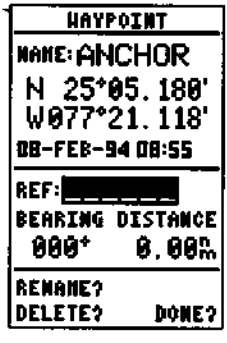
1. Press the ▼ key to highlight the name field.
2. Press ENT to begin entry of the waypoint name.
3. Use the ▲ and ▼ keys to enter your waypoint name, using the ◀ and ▶ keys to move to the next character position.
4. Press ENT to confirm the waypoint name. The position field will now become highlighted, with the receiver's last known position shown.
5. Press ENT to begin entry of the position.
6. Use the ▲ and ▼ keys to enter your position, using the ◀ and ▶ keys to move to each character field.
7. Press the ENT key to confirm and save your coordinates. The default waypoint comment (UTC date and time of creation) will appear and the highlight will move to the 'done' field.
8. Press the ENT key to return to the Menu Page.

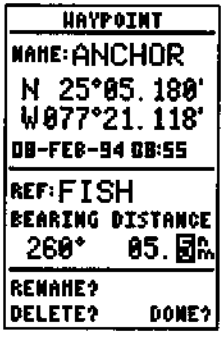


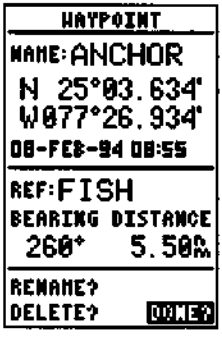


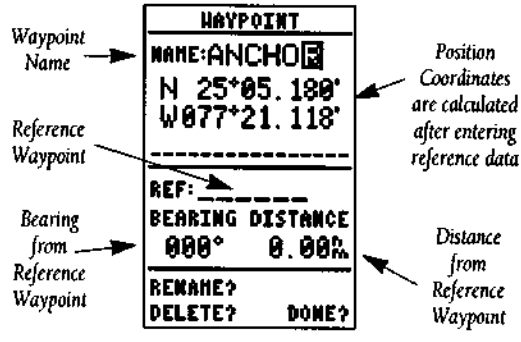


To create a new waypoint manually without knowing its position coordinates, you'll need to enter its bearing and distance from an existing waypoint. The GPS 120 will then calculate the position coordinates for you.









1. Press ▼ until the name field is highlighted.
2. Press ENT to begin entry of the waypoint name.
3. Enter the name of your new waypoint.
4. Press the ENT key to confirm the waypoint name. The position field will now become highlighted, with the receiver's last known position shown.
5. Press the ▼ key to move the cursor highlight to the reference field.
6. Press ENT to begin entry of reference waypoint.
7. Use the ▲ and ▼ keys to enter the name of your reference waypoint, using the ◀ and ▶ keys to move to each character field.
8. Press the ENT key to confirm your entry.
9. Enter the bearing and distance of your new waypoint from the reference waypoint. Remember to use the ENT key to begin entry and confirm each field. The coordinates will be calculated and saved for your new waypoint.
10. Press the ENT key (when the 'done' field is highlighted) to return to the Menu Page.

From the waypoint definition page, you can also review and change any stored waypoint's name, position coordinates, comment field or reference waypoint at any time. The waypoint definition page is also used to delete individual waypoints.

To change a waypoint's position coordinates or reference waypoint:

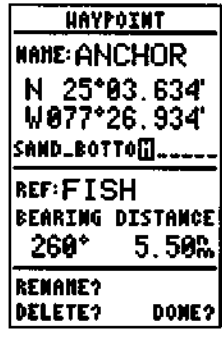
1. Use the ▲ and ▼ keys to highlight the field you want to edit.
2. Press ENT to begin entry in the selected field.
3. Enter your new data.
4. Press the ENT key to confirm your changes.

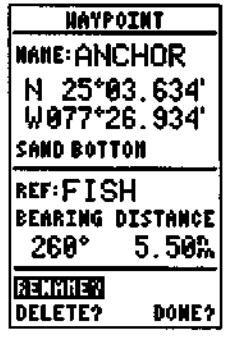
Each waypoint stored in the GPS 120 has a user-defined 16 character comment field. The default comment is the UTC date and time of the waypoint's creation. To change or add a comment:

1. Use the ▲ and ▼ keys to highlight the comment field.
2. Press ENT to begin entry of your comment.
3. Enter your new comment.
4. Press the ENT key to confirm your changes.

The rename and delete function fields are located at the bottom of the screen, to the left of the 'DONE' prompt. To select one of these functions, you need to use the ◀ key to move the cursor highlight out of its main scrolling sequence. To rename a stored waypoint:

1. Use the ◀ and ▶ keys to highlight the 'rename' field.
2. Press the ENT key to activate the rename page.
3. Enter the new waypoint name and press ENT.
4. Press the ENT key to confirm your changes.





Deleting Waypoints

To delete a stored waypoint:

1. Use the ◀ key to move the cursor highlight from the 'DONE' prompt to the 'delete' field.
2. Press the ENT key to activate the delete page.
3. A warning message will appear, asking you to confirm your deletion.
4. Press the ◀ key to select the 'YES' prompt.
5. Press the ENT key to delete the waypoint and return to the waypoint page.

Waypoints that are part of an active or stored route cannot be deleted. You must first go to the route page and remove the waypoint from all routes. See pages 31 and 32 for complete instructions on editing routes.

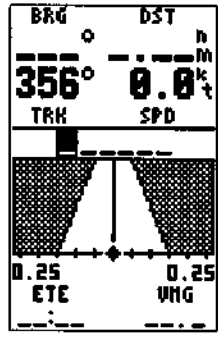
The GPS 120's GOTO function lets you choose any stored waypoint as a destination and quickly set a course from your present position. Once the GOTO function has been activated, the Navigation Page will provide you with graphic steering guidance to your destination. To activate the GOTO function:

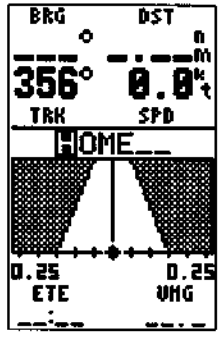
1. Press the GOTO key.
2. The Navigation Page will appear with the waypoint field ready to accept changes.
3. Enter your destination waypoint.
4. Press the ENTER key to confirm that you want to navigate to the displayed waypoint.

You can also quickly activate the GOTO function from any other page by simply highlighting a waypoint and pressing the GOTO key.

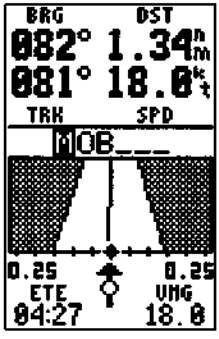
Another time-saving function of the GPS 120 that you may have noticed when entering waypoint names is the waypoint scanning feature. As you enter waypoint characters, the screen will automatically display the first numerical or alphabetical match of the character you have entered. This will save you from always entering an entire waypoint name. To use the scan feature when the waypoint field is highlighted:

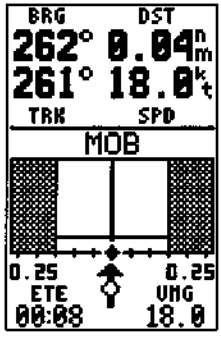
1. Press the ◀ key to clear the name field.
2. Use the ▲ and ▼ keys to scroll through your waypoints.
3. If you have more than one waypoint that begins with the same letter or number, you must use the ▶ key to move to the next character positions as needed. Only the first character match is listed for each character set.
4. Once you've found the desired waypoint, press ENTER.





To cancel an active GOTO from any page, press the GOTO key. Next, press the left arrow key, and confirm your cancellation by pressing the enter key. This will stop continued steering guidance along the original GOTO desired track.



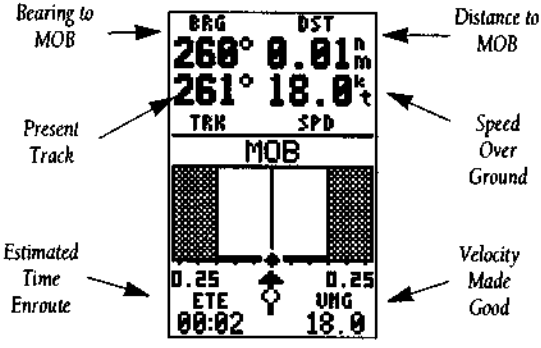


Marking an MOB

The GPS 120's man overboard function (MOB) lets you simultaneously mark and set a course to a position for quick response in emergency situations. To activate the MOB mode:

1. Press the MOB key.
2. The Navigation Page will appear with the default GOTO waypoint 'MOB' as the destination.
3. Press the MOB key to confirm the MOB entry.

The Navigation Page will now guide you to the MOB waypoint position.



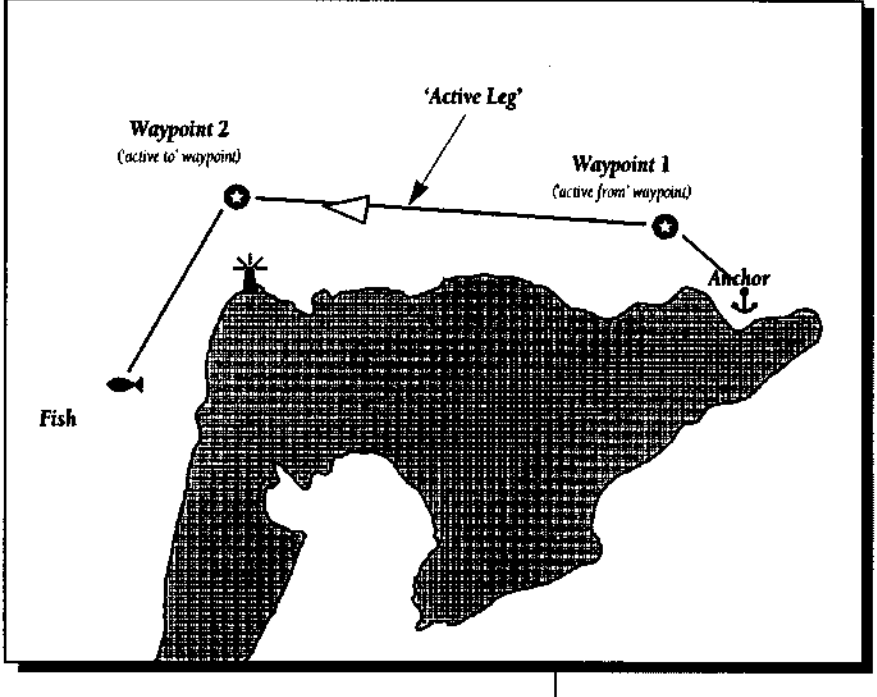
The graphic 'highway' provides visual steering guidance to the MOB waypoint. The moving arrow just below the course deviation scale always points to your selected waypoint relative to the direction you are moving.

Your present position is represented by the diamond in the center of the course deviation scale. The line down the middle of the highway is your desired track. As you head toward a waypoint, the highway will move indicating the direction and distance you are off course, relative to the position diamond on the CDI scale. To keep your vessel on course, steer toward the center of the highway.

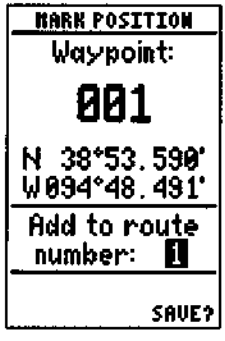
If you want to save the MOB waypoint, be sure to rename it, as it will be overwritten the next time a MOB is executed.

The GPS 120's route navigation feature lets you plan and navigate a course from one place to another using a set of pre-defined waypoints. Routes are often used when it's not practical, safe or possible to navigate a direct course to a particular destination.

Routes are broken down and navigated in smaller segments called 'legs'. The waypoint you are going to in a leg is called the 'active to' waypoint, and the waypoint immediately behind you is called the 'active from' waypoint. The line between the 'active to' and the 'active from' waypoint is called the 'active leg'.



When you activate a route with the GPS 120, it will automatically select the route leg closest to your position as the active leg. As you pass a waypoint in your route, the unit will select the next waypoint as the 'active to' waypoint.



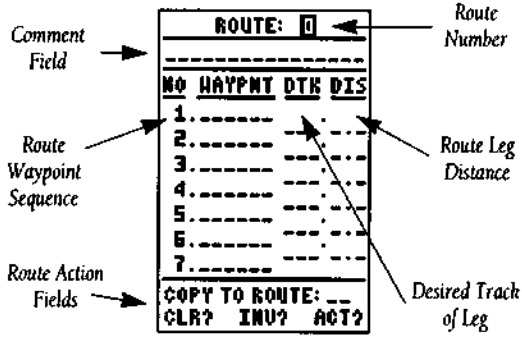
If you're heading out on the water without a planned route to navigate, the GPS 120 route feature can still provide a helping hand back home.

Create a series of waypoints with the mark key and save them to an open route from the Mark Position Page. When you are ready to head back to port, simply activate the route you created in inverted order (see page 30).

This method is especially useful when you're in unfamiliar waters or you are simply running out of daylight.

The GPS 120 lets you create and store up to 20 routes of 30 waypoints each. Routes are created, copied and edited through the route definition page, which is accessed through the Menu Page. To select the route definition page:

1. Press PAGE until the Menu Page appears.
2. Use the ▲ and ▼ keys to highlight the 'routes' submenu page.
3. Press the ENT key to display the routes page.
4. To return to the Menu Page, press PAGE.



The route number field is displayed at the top of the page, with a 16 character user comment below. If no user comment is entered, the field will display the first and last waypoint in the route. The waypoint list in the middle of the page accepts up to 30 waypoints for each route, with fields for desired track and distance between legs.

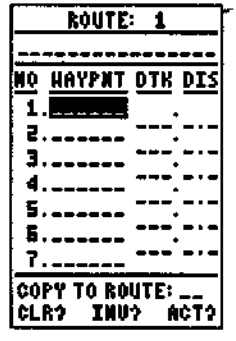
Below the waypoint list are the route page function fields which let you copy, clear, invert or activate the displayed route. Routes 1-19 are used as storage routes, with route 0 always serving as the active route you are navigating. If you want to save a route currently in route 0, be sure to copy it to another open route, as it will be overwritten by the next route activation.

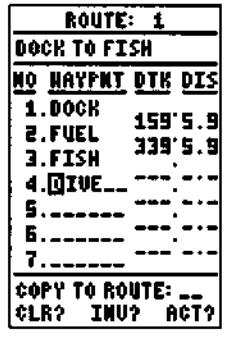
To create a route in the GPS 120:

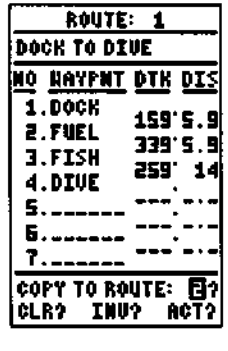
1. Press [ENT] to begin route number selection.
2. Use the ▲ or ▼ key to enter a route number.
3. Press the [ENT] key to confirm the route number.
4. Press [ENT] to begin entry of a route comment. (Note that the default (first and last waypoint) comment will only appear if the comment field is blank).
5. Enter your comment and press the [ENT] key.
6. Highlight the No. 1 waypoint field and press [ENT].
7. Enter the name of the first waypoint of your route and press [ENT].
8. Continue entering the rest of your waypoints in order, using the [ENT] key to start and confirm each field entry. The list will automatically scroll down as needed to enter up to 30 waypoints.
9. After you have finished entering all your waypoints, press [PAGE] to return to the Menu Page.

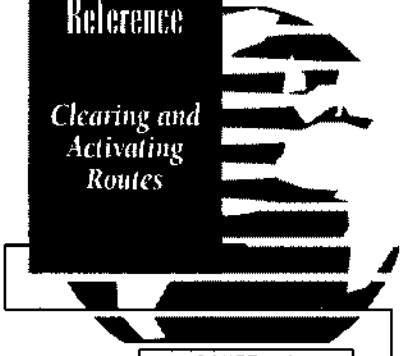
The route definition page is also used to copy a route to another route number. This feature is useful when you make changes to the active route and want to save the new route and the original route. To copy a route:

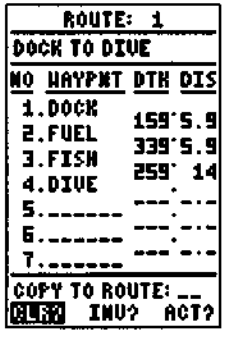
1. Press [ENT] to begin route number selection.
2. Enter the route number to be copied and press [ENT].
3. Move the field highlight to the 'copy' field and press [ENT].
4. Scroll through the available routes and select a destination route number. Only open routes will be available as choices. Press the [ENT] key to copy the route.
5. Press the [PAGE] key to return to the Menu Page.

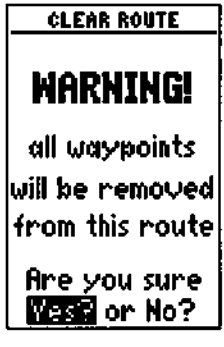


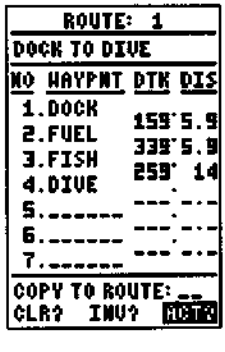












To clear a route from memory:

1. Press [key] to begin entry of the route number.
2. Enter the route number and press [key].
3. Select the 'clear' field and press [key].

The clear route warning will appear, asking you to confirm that you want to remove all waypoints from the route.

1. Highlight the 'yes' field with the ◀ key.
2. Press [key] to confirm your action.
3. Press [key] to return to the Menu Page.

After a route has been entered in the GPS 120, it can be activated in its defined sequence or inverted from the route definition page. The process of activating or inverting a stored route takes a storage route (routes 1-19) and copies it into the active route (route 0) for navigation. The storage route is now no longer needed and will be retained in its original format under its existing route number.

This system allows you to have an active route that you may edit during navigation and save as an entirely new route from the original. You will have to copy the active route to an unused storage route to save it, since new route activation overwrites route 0. To activate a route:

1. Select the route definition page and press the [key] key to activate the route number field.
2. Enter the route number to be activated and press the [key] key.
3. Move the field highlight to the 'act' field and press [key].

Inverting a route allows you to navigate route legs in reverse order, without editing the original route. To activate a route in inverted order:

1. Follow the same steps as above, but select the 'inv' command field and press the [key] key.

Once a route has been activated, the Active Route Page will appear, displaying the waypoint sequence of your route with the estimated time enroute (ETE) at your present speed and distance to each waypoint. As long as you are navigating an active route, the Active Route Page will become part of the main page sequence of the unit.

The Active Route Page will also allow you to change the ETE field to display desired track (DTK) or estimated time of arrival (ETA) for each leg. You can also clear or invert the active route. To display DTK or ETA for each leg:

1. Highlight the estimated time enroute (ETE) field and press the ENT key.
2. Use the ▲ or ▼ keys to select 'DTK' or 'ETA' and press the ENT key.

To invert a route from the Active Route Page:

1. Press the ▲ key once to move the field highlight to the 'invert' field.
2. Press the ENT key to invert the route.

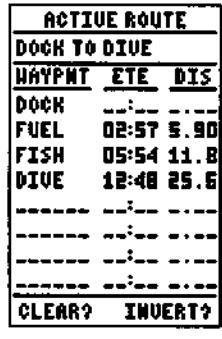
To clear the active route from the Active Route Page and stop route navigation:

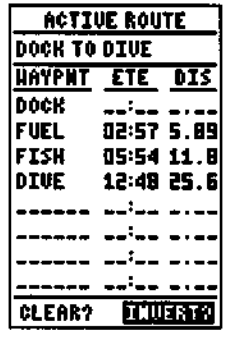
1. Use the ▲ and ◀ keys to select the 'clear' field.
2. Press the ENT key to clear the active route.

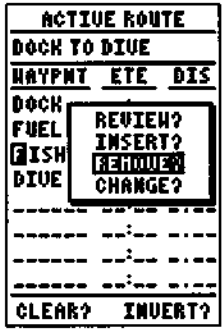
Once a route has been created and stored in the GPS 120, it can be edited at any time, even if it is the active route. To edit a route from the Active Route Page or the route submenu page:

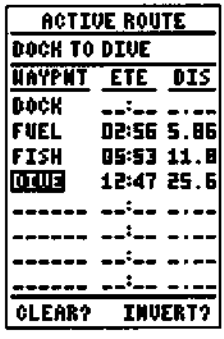
1. Use the ▲ and ▼ keys to select the waypoint you want to edit and press ENT.

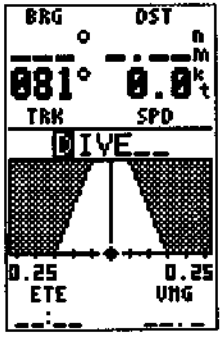
An on-screen menu of editing choices will appear, with options for reviewing, inserting, deleting or changing the waypoint field highlighted. Use the ▲ and ▼ arrow keys to select among the editing choices.











Once you've selected a waypoint from the route list, choose a menu function:

1. To review the definition page for the waypoint, highlight the 'review' field and press .
2. To add a new waypoint that precedes the selected waypoint, highlight the 'insert' field and press the key.
3. To remove the selected waypoint, highlight the 'remove' field and press the key.
4. To replace the selected waypoint with a new waypoint, highlight the 'change' field and press the key.

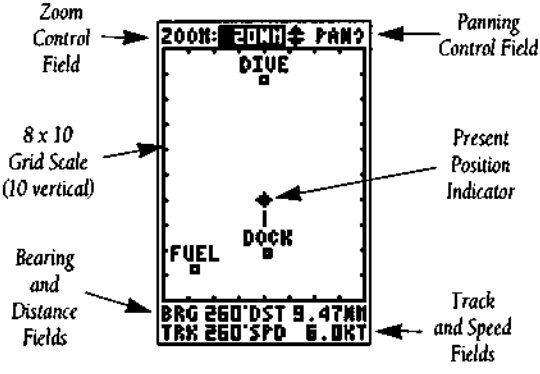
Use the waypoint editing instructions described earlier (see page 29) for creating a route to complete your changes. If you are editing the active route (route 0), copy your new route version to an empty route to save it, as the active route will be overwritten by a new route activation.

If you add, delete or change the first or last waypoint of a route, the default comment (first and last waypoint) will automatically be updated after your changes.

At the beginning of the route section, we mentioned that the GPS 120 will automatically select the route leg closest to your position as the active leg. This will give you steering guidance to the desired track of the active leg. If you would prefer to steer directly towards a route waypoint, you can perform an 'on-route GOTO' right from the active route page.

1. Use the ▲ and ▼ keys to highlight the desired route waypoint and press the key.
2. Once the Navigation Page appears, press to confirm the on-route GOTO waypoint..

The GPS 120 features a powerful moving map display that can do much more than just plot your course and route. The Map Page also provides you with a moving map cursor that will let you pan ahead to nearby waypoints, determine the distance and bearing to any map position and mark new waypoints while you navigate.

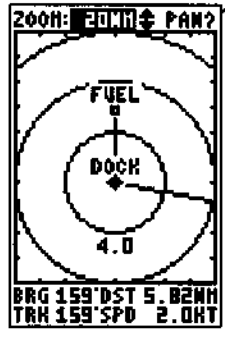


The Map Page can be broken down into three main sections:

The zoom function and panning control fields are located at the top of the screen. There are 12 selectable zoom ranges from 0.2 to 320 miles or 0.5 to 600 km, measured vertically.

The map portion of the page is bordered by an 8 x 10 grid to help you estimate distances based on the map scale you are using. Your present position is indicated by a position diamond, with your track and/or route displayed as a solid line. Nearby waypoints are represented as squares, with the waypoint name also listed. You may select which of these features are shown through the map setup submenu page (see page 43 for more information).

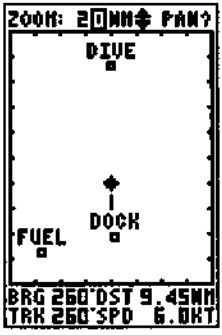
The last fields directly below the map show your bearing and distance to one of three selectable destinations: an active destination waypoint; a highlighted on-screen waypoint; or to the panning target crosshair. Your current track and speed are displayed just below the bearing and distance fields.

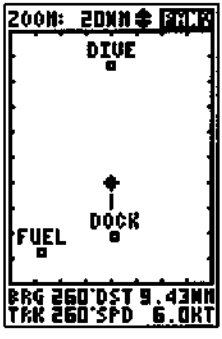


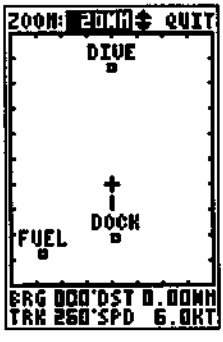
The GPS 120 has on-screen range rings to help you estimate distances relative to your present position. The value of each ring is determined by the current zoom scale.

The distance value of each ring is equal to 1/5th of the current zoom range, with the interval of each ring noted below the first range ring.

To turn the range ring display on or off (the default setting is off), see the map setup instructions on page 43.







There are three main functions you can perform from the Map Page— zooming, pointing and panning. Each of these functions has its own 'field', which may be selected and activated for use.

Whenever the Map Page first appears, the zoom field (at the top left) is always selected. The Map Page has 12 map scales which are selected through the zoom function field. To select a zoom scale:

1. Press ◀ or ▶ to highlight the zoom field.
2. Press the ENT key to begin range selection.
3. Use the ▲ or ▼ keys to scroll through and find the desired range scale.
4. Press ENT to confirm your selection.

The second function field on the Map Page is the pan field, located at the top right of the screen. The pan function allows you to move the map with the four arrow keys to view areas outside the current map. To activate the pan function:

1. From the zoom field, use the ▶ key to highlight the pan field.
2. Press the ENT key to activate the pan function.
3. Use the arrow keys to move the map in any direction.

As you begin to move the map, a crosshair will appear. This crosshair will now serve as a target marker for the moving map. The distance and bearing to destination will now be replaced by the distance and bearing from your present position to the target crosshair.

As you pan around the moving map display, you'll notice that the target crosshair will 'snap' to on-screen waypoints and highlight the waypoint name. Once a waypoint name is highlighted, you can review its waypoint definition page or execute a GOTO function right from the Map Page.

To review the definition page for a waypoint highlighted in the map field:

1. Press the key.
2. To return to the Map Page, press .

To GOTO a waypoint highlighted in the map field:

1. Press the key.
2. Press the key to confirm the destination.
3. To return to the Map Page, press the key.

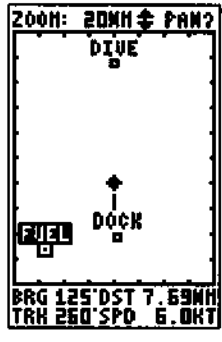
To stop the panning function and return to your present position:

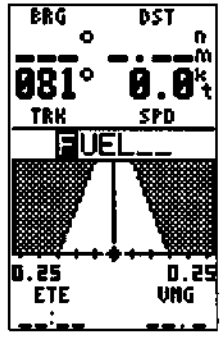
1. Press the key.

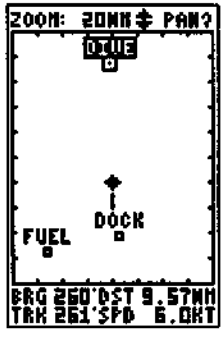
The last field on the Map Page is the map itself. From the zoom or pan fields, the cursor highlight may be moved into the map display by pressing the down arrow key. The arrow keys will now move the highlight through the map and 'point' at on-screen waypoints. To point at a displayed waypoint:

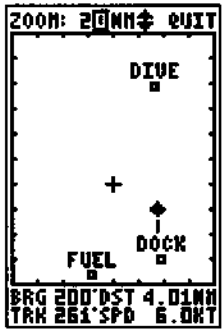
1. Use the arrow keys to move the cursor highlight from the zoom field into the map field.
2. Once you are in the map field, use the four arrow keys to scroll through on-screen waypoints. The arrow key you use will determine the direction of your scroll. Once you have scrolled through all the waypoints, the cursor will move back to the zoom or pan function field.

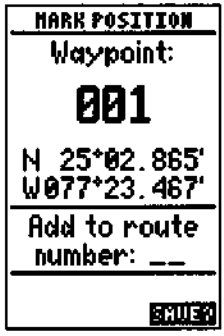
Once a waypoint has been selected in the map field, its distance and bearing from your present position will be displayed in the destination field. You can also review its waypoint definition page or select it as a GOTO destination by following the same steps outlined above for waypoints highlighted on the map field.

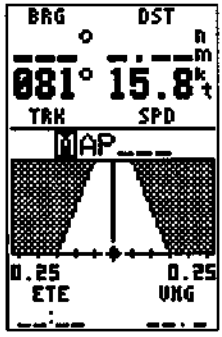












One of the benefits of a moving map display is being able to pan to different map areas and see what's out there. To get the most out of panning, you'll need to be able to zoom in and out while you're panning. This lets you move the map at a faster speed and zoom in for waypoint details. Once the pan function is activated, the cursor highlight moves back to the zoom field. To adjust the zoom range while panning:

1. Press the key to begin range selection.
2. Use the ▲ and ▼ keys to select the desired zoom range.
3. Press to return to normal panning mode.

During panning, the crosshair represents a target position right on the moving map, with the range and bearing to the target displayed at the bottom of the screen. You can also use the target crosshair to mark a new waypoint position or as a GOTO destination right from the map field. To mark the target crosshair position as a new waypoint:

1. Press the key to capture the position.
2. Enter a new name and route number if you wish.
3. Press the key to return to the Map Page.

You can also use the target crosshair as an instant GOTO destination. Similar to the MOB mode, this function will mark and instantly set a course for a new waypoint called 'MAP'. To GOTO the target crosshair:

1. Press the key to capture the position.
2. Press the key to confirm the MAP GOTO.
3. Press to return to the Map Page.

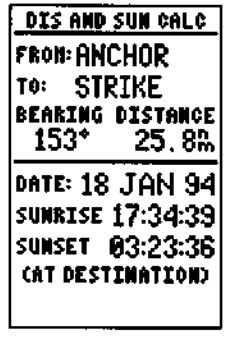
If you want to save the MAP waypoint, be sure to rename it, as it will be overwritten the next time a map GOTO is executed.

The GPS 120 Menu Page provides access to submenu pages that are used to select and customize operation and navigation setup. The 11 submenus are divided into categories by function. The waypoint and route management submenus are discussed in their own respective sections. We'll now address the rest of the submenus in the order they appear on the Menu Page. To select a submenu page from the Menu Page:

1. Highlight the submenu page you want to view.
2. Press the ENT key to display the submenu page.
3. To return to the Menu Page, press the QUIT or MENU key.

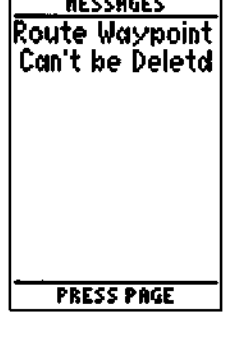
The distance and sun calculation page will give you the distance and bearing between any two waypoints and calculate the sunrise and sunset (in local time) at a destination waypoint for a particular date. To perform a distance and sun calculation:

1. Highlight the 'from' field and enter the desired waypoint. Press ENT to move to the next field.
2. Highlight the 'to' field and enter the destination waypoint. Press the ENT key to calculate the range and bearing to the destination waypoint.
3. Highlight the 'date' field and enter the date for your destination. Press the ENT key to display the sun information.



The messages page displays all current messages in the GPS 120. There are two types of messages: temporary alerts (eg. approaching a waypoint) and condition alerts (eg. battery power is low). All messages are initially indicated by a flashing on-screen indicator. After a temporary alert has been viewed, it is cleared from the message page. Condition alerts are displayed on the messages page until the condition has been resolved. To view the messages page:

1. Move the field highlight to the 'messages' field and press PAGE.



See appendix B for a complete list of messages.

The remaining submenu selections on the Menu Page are grouped together as setup pages. The first setup page is the operation setup page, which is used to select the operating mode, time offset and screen and tone preferences.

The GPS 120 has three available operating modes:

Normal Mode operates the unit with satellite information and is the mode the unit will usually be operating.

Simulator Mode allows you to operate the unit without acquiring satellites, and is ideal for practicing or entering waypoints and routes while at home.

AutoLocate™ Mode forces the receiver to search for a new set of satellites in situations where you have moved more than 300 miles from the unit's last known position.

To select an operating mode:

1. Move the field highlight to the 'mode' field and press the key.
2. Use the ▲ and ▼ keys to choose the desired mode and press .

The date and time field is located directly below the mode field. The date and time are calculated from satellites and *cannot* be edited. Because the time shown is UTC time, you will need to enter a time offset to display the correct local time for your area. To determine the time offset for your area, note your current position and refer to the chart on appendix E. To enter the time offset:

1. Move the field highlight to the 'offset' field and press the key.
2. Enter the time offset for your longitude and press . Remember to select a positive or negative indicator for your offset.

The GPS 120 features adjustable screen contrast for optimum viewing in any condition. The screen contrast is set by using an on-screen bar scale. To set the screen contrast:

1. Move the field highlight to the 'contrast' field and press the key.
2. Use the ◀ and ▶ keys to adjust the bar scale for the desired contrast and press the key.

The screen backlight timer is adjustable for 0, 15, 30, 60, 120 and 240 seconds. The '0' setting will keep the screen backlighting on as long as the unit is on. Whenever screen backlighting is on, a light bulb icon will appear on the Status Page. To set the backlight timer:

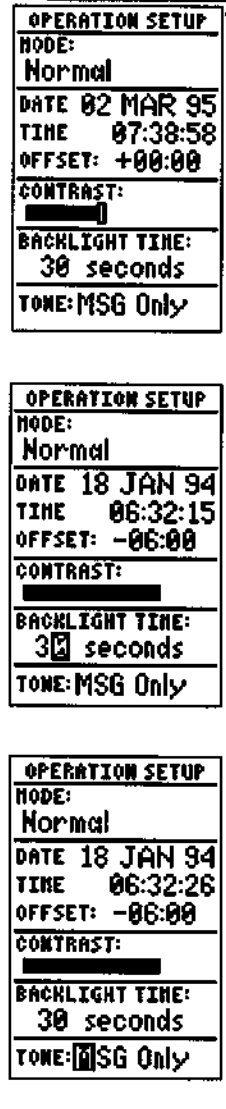
1. Move the field highlight to the 'backlight time' field and press the key.
2. Use the ▲ and ▼ keys to toggle through and select the desired setting. Confirm the setting by pressing the key.
3. To adjust the backlighting through its three levels, press momentarily.

The last available field on the operation setup page is the tone field. This field lets you specify an audible tone for message alerts and keystroke confirmation. The tone may be set to sound for messages only, messages and keystrokes or no sound at all. To select a tone setting:

1. Move the field highlight to the 'tone' field and press the key.
2. Use the ▲ and ▼ keys to toggle through and select the desired setting. Confirm the setting by pressing the key.

We've now gone through the operation setup submenu and its various settings. To return to the Menu Page:

1. Press the key.



NAVIGATION SETUP
POSITION FORMAT: hddd°mm.mmm'
MAP DATUM: WGS 84
CDI SCALE: ±0.25
UNITS: Nautical
HEADING: Auto Mag E004

The GPS 120 comes with the latitude and longitude position format and WGS 84 map datum as the default settings.

The WGS 84 map datum is a worldwide datum that's suitable for use with most government charts. Only change the map datum if the charts you are using specify a different map datum in the legend.

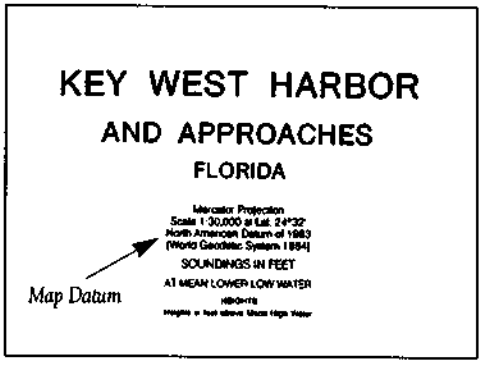
WARNING!

Using the wrong datum can seriously effect the accuracy of your GPS. Always set the GPS to the same datum indicated on the charts you are currently using.

The navigation setup page is used to select units of measurement for position format, map datum, CDI scale, and distance, speed and heading information.

The default position setting for the GPS 120 is latitude and longitude in degrees and minutes (hddd°mm.mmm'). You may also select degrees, minutes and seconds (hddd°mm'ss.s"); degrees only (hddd.ddddd°); UTM coordinates; or British, Irish, German, Swedish or Swiss Grid formats. To select a format:

1. Move the field highlight to the 'position format' field and press the [ ] key.
2. Use the ▲ and ▼ keys to select the desired setting. Confirm the setting by pressing [ ].



The map datum field is located just below the position format field, and comes with a WGS 84 default setting. Although 105 total map datums are available for use (see the map datum listing in appendix D), you should only change the datum if you are using charts that specify a different datum than WGS 84. To enter a different map datum:

1. Move the field highlight to the 'datum' field and press the [ ] key.
2. Use the ▲ and ▼ keys to toggle through and select the desired setting. Confirm the setting by pressing the [ ] key.

The course deviation indicator (CDI) scale definition field lets you select the +/- range of the CDI bar scale. Three scales are available: +/- 0.25, 1.25 and 5.0 miles or kilometers, with 0.25 being the default setting. To enter a CDI scale setting:

1. Highlight the 'CDI scale' field and press ENT.
2. Use the ▲ and ▼ keys to select the desired CDI scale setting.
3. Press the ENT key to confirm the selection.

The GPS 120 lets you select nautical (default), statute or metric units of measure for all speed and distance fields. To change the unit of measure:

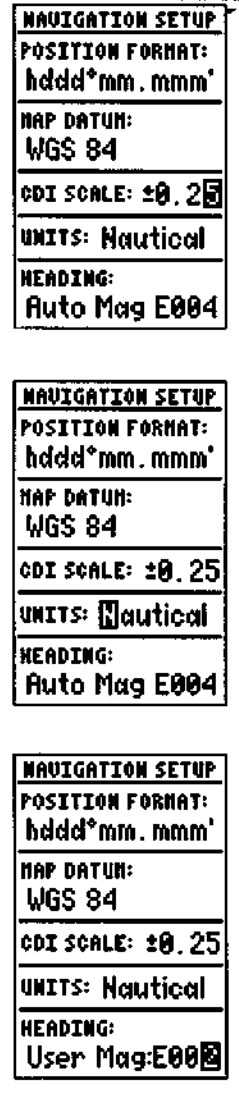
1. Highlight the 'units' field and press the ENT key.
2. Use the ▲ and ▼ keys to select the desired unit of measure.
3. Press the ENT key to confirm the selection.

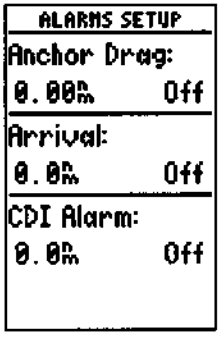
The GPS 120's heading information can be displayed referencing magnetic north (automatic or user-defined), true north or calculated grid headings. The default setting is automatic magnetic north, which is suitable for most applications. To select a reference:

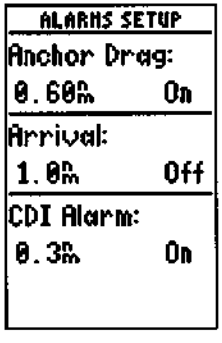
1. Highlight the heading field and press ENT.
2. Use the ▲ and ▼ keys to select the desired heading preference.
3. Press the ENT key to confirm the selection.

To enter a magnetic heading:

1. Select the 'user mag' heading and press ENT.
2. Use the ▲ and ▼ keys to enter the degrees of magnetic variation.
3. Press the ENT key to confirm the magnetic variation value.







The alarms setup page is used to set the three alarms available on the GPS 120; the anchor drag alarm, arrival alarm and CDI alarm.

The anchor drag alarm will sound if your vessel has moved outside a range entered by the user from a central point. The arrival alarm sounds when you are approaching a waypoint and have reached the user-defined distance. The CDI alarm will alert you when you have exceeded a specified crosstrack error.

The arrival and CDI alarms may be set from 0.0 to 9.9 units. The anchor drag alarm may be set up to 9.99 distance units. To set the alarms

1. Move the field highlight to the 'alarms setup' field and press the ENT key.
2. Use the ▲ and ▼ keys to select the desired alarms distance field and press the ENT key.
3. Enter the desired distance for the alarm and press the ENT key.
4. If you would like to change the on/off setting, press the ENT key and use the ▲ and ▼ keys to turn the alarm on or off.

You may repeat to change other alarms, or press the QUIT key to return to the Main Menu.

When setting the anchor drag alarm, remember that Selective Availability can degrade your GPS position to be off as much as 100 meters and may cause false anchor drag alerts.

The track log setup page lets you manage the GPS 120's tracking data. From this page, you can select whether or not to record a track and define how it is recorded. To turn the track log on or off:

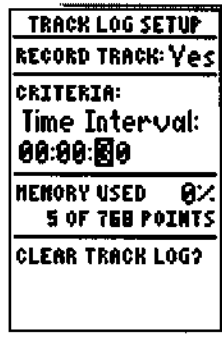
1. Highlight the 'record track' field and press ENT.
2. Select 'yes' or 'no' and press ENT.

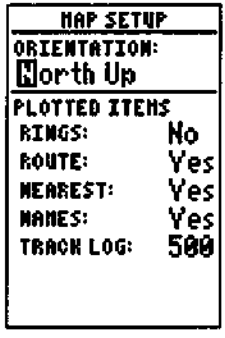
The stored track criteria determines how often positions are stored in the track log. The default setting is automatic, which stores track based on resolution. This setting gives you the most efficient use of track memory. To change the criteria to record points based upon a specific time interval:

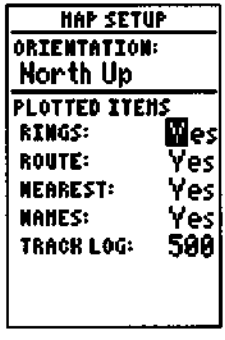
1. Highlight the 'criteria' field and press ENT.
2. Use the ▲ or ▼ key to select 'time interval' and press ENT.
3. Press ENT to begin entry of the interval.
4. Enter a value in hours, minutes and seconds in the field and press the ENT key.

The rest of the track log setup page displays the percentage of available memory currently used to store track log data and a function field to clear the track log memory. To clear the track log:

1. Highlight 'clear track log?' and press ENT.
2. A warning page will appear, asking you to confirm your actions. Use the ◀ key to move the field highlight to the 'yes' field and press ENT.







The map setup page lets you select map orientation and specify what items are displayed. The map may be oriented to north up, the direction of current travel (track up) or the direction of an active route leg (desired track up). The default setting is track up. To change the map orientation:

1. Highlight the 'orientation' field and press ENT.
2. Use the ▲ and ▼ keys to toggle through and select the desired setting and press ENT.

The rest of the map setup page lets you specify what items are displayed or plotted on the Map Page. The first 4 plot items may be turned on or off by selecting 'yes' or 'no' in the appropriate field:

- The 'rings' selection will display the 3 present position range rings on the map.
- The 'route' selection will plot the straight leg lines between waypoints of an active route and display all route waypoint names.
- The 'nearest' selection will display the nine nearest waypoints to your present position (not to the target cursor on the map).
- The 'names' selection will display the waypoint name for the nine nearest waypoints.

To turn a plotted item on or off:

1. Highlight the confirmation (yes or no) field for the plotted item and press ENT.
2. Use the ▲ and ▼ keys to select 'yes' or 'no' and press the ENT key.

The track log sets the number of points the unit will attempt to plot. The maximum setting is 768 points. Once you've reached the maximum number of track points, the older points will be lost as new points are added. To enter a log setting:

1. Highlight to the 'track log' field and press ENT.
2. Enter a value in the 3-digit field and press ENT. If you do not want to display a track, enter '000'.

The last GPS 120 setup page is the I/O setup page. This page lets you specify the interfacing formats for connecting external devices. There are six I/O options available: GRMN/GRMN, None/None, None/NMEA, NMEA/NMEA, RTCM/None, and RTCM/NMEA.

Each designation lists the input format first, followed by the output format. To select I/O format:

1. Highlight the I/O field and press ENT.
2. Use the ▲ and ▼ keys to toggle through and select the desired setting and press ENT.

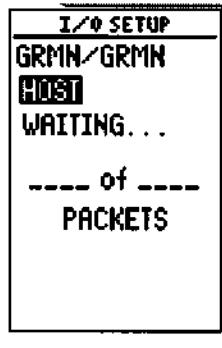
The GRMN/GRMN setting is a proprietary format that lets you exchange information such as waypoints, routes and track logs between two compatible GARMIN GPS units or a PC with an optional GARMIN PC kit. During data transfer, the number of packets being exchanged will be displayed on screen. To select a transfer option:

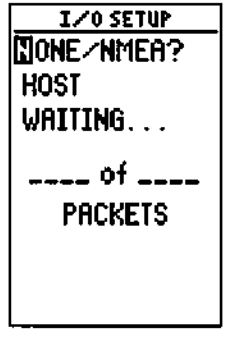
1. Highlight the 'host' field and press ENT.
2. Use the ▲ and ▼ keys to select the desired setting and press ENT.

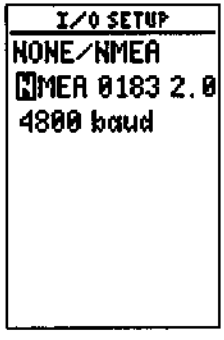
To disable all GPS 120 interfacing capabilities, select the None/None setting. If you want to output NMEA data to compatible external devices without any differential input capability, select the None/NMEA setting.

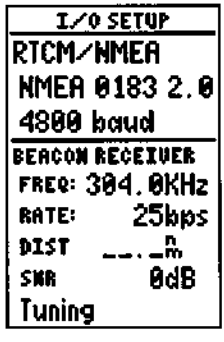
Once a NMEA output setting has been selected (with or without RTCM input), the NMEA field will become highlighted. To choose an NMEA format (0180, 0182 or 0183 version 1.5 or 2.0):

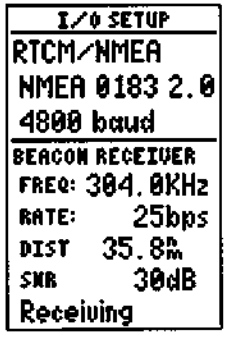
1. Press ENT to begin a NMEA selection.
2. Use the ▲ and ▼ keys to select the desired setting and press ENT.
3. The baud rate will be selected automatically.











The last two format settings allow the GPS 120 to accept RTCM DGPS corrections in RTCM 104 version 2.0 format. The RTCM/NONE format will allow connection to any manually tuned beacon receiver with the proper output interface, with the baud rate selectable from the GPS 120.

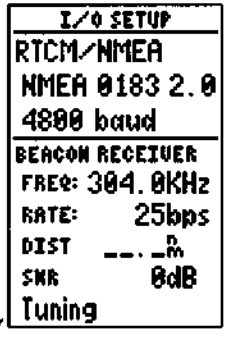
Differential GPS is capable of correcting your calculated position to be within 5-10 meters. Differential correction transmitters are not available in all areas, however. Check local area providers for service coverage.

The RTCM/NMEA selection controls the GARMIN GBR-21 beacon receiver. Once a RTCM setting has been selected, the GPS 120 will automatically try to tune the last frequency and bit rate you selected or will switch to the default frequency of 304.0 kHz with a bit rate of 100 bps if no previous beacon has been tuned. You may also enter your own frequency and bit rate if desired.

To enter a DGPS beacon frequency:

1. Highlight the 'freq' field and press ENT.
2. Enter the desired frequency and press ENT.
3. Highlight the 'rate' field and press ENT.
4. Use the ▲ and ▼ keys to select the desired transmission rate.
5. Press the ENT key to confirm your entry.

When the GPS 120 is receiving DGPS corrections from the GBR-21, the 'beacon receiver' section of the I/O setup page will display the beacon frequency and signal strength, as well as the distance from the transmitter to the beacon receiver.



Status Message

At the bottom of the beacon receiver field, a status message will constantly keep you informed of DGPS activity:

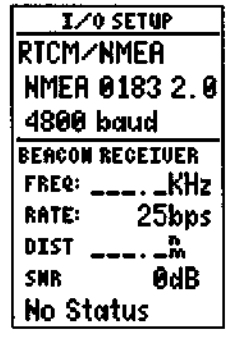
- A 'tuning' message will be displayed while a beacon signal is being tuned.
- Once the beacon signal has been tuned, the status message will display a 'receiving' message.
- If a beacon signal is tuned and no corrections are being received, a 'no data' message will be displayed.
- If a beacon signal cannot be tuned, a 'no status' message will be displayed.

The GPS 120 will also display alert messages concerning DGPS operation through the message page. Three DGPS messages may appear:

No DGPS Position indicates that not enough data is available to compute DGPS position.

No RTCM Input indicates that the beacon receiver is not properly connected or the baud rates do not match.

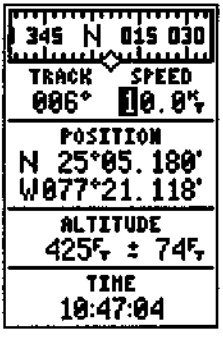
RTCM Input Failed indicates that DGPS data was being received but has been lost.

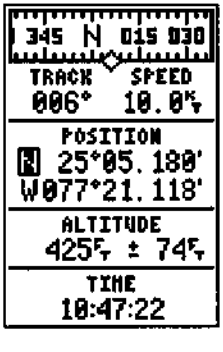


Beacon Receiver Status

The GARMIN GBR 21 is the recommended beacon receiver for use with the GPS 120.

Other RTCM 104 v. 2.0 receivers are compatible with the GPS 120, but may not provide complete on-screen status or tuning control.





The GPS 120's simulator mode lets you practice all aspects of its operation without active satellite acquisition. You can also plan and practice trips, enter new waypoints and routes and save them for use during normal operation.

The simulator mode is activated from the Menu Page, with vessel speed and heading controlled from the Position or Navigation Pages. To activate the simulator mode:

1. From the Menu Page, highlight the 'mode' field and press the ENT key.
2. Use the ▲ or ▼ keys to scroll through and select the simulator mode.
3. Press the ENT key to confirm simulator mode.
4. Press QUIT to return to the Menu Page.

Once the simulator mode has been activated, use the Position or Navigation Page to set your speed and track. You may also enter a new position if you desire (only from the Position Page). To enter track, speed and position:

1. Highlight the 'track' field and press the ENT key.
2. Enter a track heading and press ENT.
1. Highlight the 'speed' field and press ENT.
2. Enter a speed and press ENT.
1. Highlight the 'position' field and press ENT.
2. Enter a position and press the ENT key.

The GPS 120 does not track satellites in simulator mode. Although you can create and save waypoints and routes while using the simulator mode, never attempt to use the simulator mode for actual navigation. The GPS 120 will always power up in the last selected satellite mode.

Appendix A

Installation

Your GPS 120 system includes the following hardware components:

- GPS 120 Unit
- Gimbal Mount Bracket & two mounting knobscrews
- GPS Antenna with 30' cable
- Power/Data Cable

If you are missing any of these pieces, see your dealer. To complete the standard installation, you will also need the following pieces:

- 1 amp in-line fuse (may be included with Power/Data cable)
- Four 1/4" (6mm) diameter mounting screws
- 1" x 14 marine antenna mount and screws

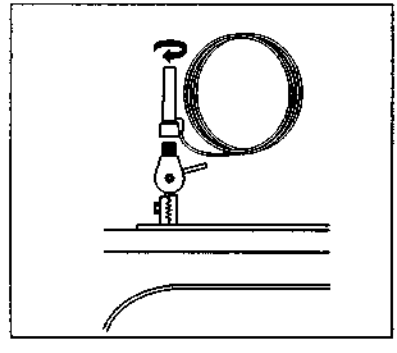
Several optional accessories are also available to provide flexible installation on any vessel. See your GARMIN dealer for more information on these items:

- Swivel Mount
- AC Adapter
- Antenna Cable Extension
- Cigarette Lighter Adapter

To begin installation, you'll need to select a suitable mounting position for the antenna and the unit. Once you've identified the best mounting locations for your application, install the antenna and cable first, then the unit and wiring harness.

Mounting the GPS antenna

The antenna should be mounted in a location that has a clear, unobstructed view of the sky in all directions to ensure the best reception in all conditions. Avoid mounting the antenna where it will be shaded by the boat's superstructure, a radome antenna, or mast. Most marine VHF and loran antennas will not seriously degrade the GPS antenna's reception. Never paint the antenna or clean it with harsh solvents.



To install the GPS antenna:

1. Screw the antenna directly onto the 1" – 14 mount.
2. Route the cable to the location of the display unit, using the appropriate tie-wraps,escutcheon plates and sealant to secure the cable along the route and through any bulkhead or deck.
3. Once the GPS 120 unit has been installed, connect the cable to the antenna connector on the back of the display unit. Turn the antenna connector 1/4 turn clockwise to lock the cable into place.

Appendix A

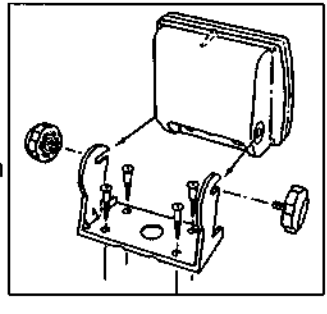
Installation

Mounting the GPS 120 unit

The GARMIN GPS 120's compact, waterproof case is suitable for mounting in exposed locations or at the nav station. The unit comes with a gimbal bracket that can be used for surface, overhead, or flush mounting. When choosing a location for the display unit, make sure you consider the following conditions:

- There should be at least 2.00" (5.0 cm) clearance behind the case to allow connection of the antenna and power/data cables.
- The mounting surface should be rigid enough to support the unit and protect it from excessive vibration and shock.
- The GPS 120 screen will provide crisp contrast in most lighting conditions, even in full sunlight.

To surface mount the GPS 120:

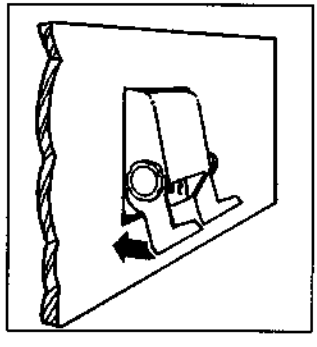


1. Place the mounting bracket in the desired location.
2. Mark and drill the four mounting holes for the fasteners you are using. Note: The hole pattern is compatible with Johnny Ray JR-400 swivel mount.
3. Fasten the bracket to the surface using the appropriate fasteners.
4. Insert the GPS 120 into the mounting bracket.
5. Screw the two mounting knobs through the bracket and into the GPS 120.
6. Connect the power/data and antenna cables to the back of the unit, making sure the locking rings are fully tightened on both connectors.

To flush mount the GPS 120:

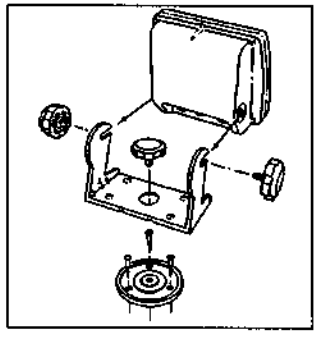
The GPS 120 can be mounted flush with a flat panel of .08-.52" thickness using the cam lobe feature on its mounting bracket.

1. Cut a 4.15" W x 4.67" H hole in panel.
2. Place GPS 120 into hole from the front until its flange rests against the mounting surface.
3. From the back side of the panel, loosely attach the bracket such that the slot in the ratchet area points away from the mounting panel.
4. Rotate the bracket downward until the panel is pinched tightly between the the units flange and bracket lobe.
5. Tighten knobs and connect the power/data and antenna cables.



To swivel mount the GPS 120 (with optional swivel mount bracket):

1. Place the swivel mount bracketin the desired location.
2. Mark and drill the three mounting holes for the fasteners you are using.
3. Fasten the bracket to the surface using the appropriate fasteners.
4. Place the mounting bracket on top of the swivel mount bracket, and secure using the knob included with the swivel mount kit. Insert the GPS 120 into the mounting bracket.
5. Screw the two mounting knobs through the bracket and into the GPS 120. Connect the power/data and antenna cables to the back of the unit.

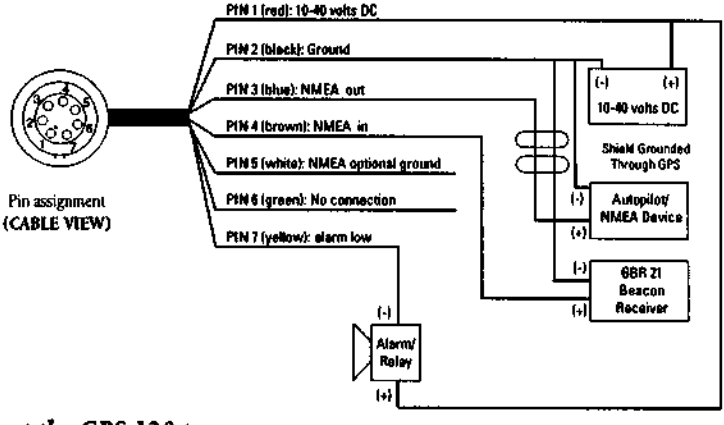


Appendix B

Wiring & Interfaces

Connecting the power/data cable

The power/data cable connects the GPS 120 system to a 10-40 volt DC power source and provides interface capabilities for connecting NMEA devices and an external alarm (see below for interface operation details). The diagram below indicates the appropriate harness connections.



To connect the GPS 120 to a power source:

1. **Connect the RED harness lead to the positive side of a 10-40 volt DC power source. Make sure the power lead has an in-line 1-amp fuse installed.**
2. **Connect the BLACK harness lead to a ground strip or the negative side of a 10-40 volt DC power source.**

To connect an external alarm, connect the ground side of the alarm device to the YELLOW harness lead. (100 mA DC load max.) The following interface formats are supported by the GPS 120 for driving three NMEA devices:

NMEA 0180, NMEA 0182,
NMEA 0183 version 1.5:
Approved sentences:
GPBWC, GPGLL, GPRMB, GPRMC, GPXTE, GPVTG, GPWPL
Proprietary sentences:
PGRMM (map datum), PGRMZ (altitude), PSLIB (beacon rec. control)

NMEA 0183 version 2.0:
Approved sentences:
GPGGA, GPGLL, GPGSA, GPGSV, GPRMB, GPRMC, GPRTE, GPWPL
Proprietary sentences:
PGRME (estimated error), PGRMM (map datum), PGRMZ (altitude), PSLIB (beacon receiver control)

Appendix C

Glossary

Almanac Data—Satellite constellation information (including location and health of satellites) that is transmitted to your receiver from every GPS satellite. Almanac data must be acquired before GPS navigation can begin.

Bearing—The compass direction from your position to a destination.

Course Made Good (CMG)—The bearing from the 'active from' position (your starting point) to your present position.

Crosstrack Error (XTE)—The distance you are off a desired course in either direction.

Desired Track (DTK)—The compass course between the 'from' and 'to' waypoints.

Differential GPS (DGPS)—An extension of the GPS system that uses land-based radio beacons to transmit position corrections to GPS receivers.

Estimated Time of Arrival (ETA)—The time of day of your arrival at a destination.

Estimated Time Enroute (ETE)—The time left to your destination at your present speed.

Grid—A coordinate system that projects the earth on a flat surface, using square zones for position measurements.

Ground Speed—The velocity you are travelling relative to a ground position.

Latitude—A north/south measurement of position perpendicular to the earth's polar axis.

Longitude—An east/west measurement of position in relation to the Prime Meridian, an imaginary circle that passes through the north and south poles.

Position—An exact, unique location based on a geographic coordinate system.

Track (TRK)—The direction of movement relative to a ground position.

Universal Transverse Mercator- (UTM)— A grid coordinate system that projects global sections onto a flat surface to measure position in specific zones.

Velocity Made Good (VMG)—The speed you are closing in on a destination along a desired course.

Appendix D

Messages

The GPS 120 uses a flashing on-screen message to alert you to important information. Whenever the message indicator appears, press the key to view the message page. There are two types of messages: temporary alerts and condition alerts. Temporary alerts are cleared from the message page after viewing, while condition alerts remain on the message page until the condition has been resolved. Pay careful attention to all messages for your own safety.

Accuracy has been Degraded—The accuracy of the GPS 120 has been degraded beyond 500 meters due to poor satellite geometry or data quality. You should check other navigation al sources to verify the position indicated.

Already Exists—The waypoint name you are entering already exists in the GPS 120's memory.

Anchor Drag Alarm—The vessel has moved outside of the anchor drag range. You should verify the position change and reset the anchor, if necessary. Remember that the GPS position calculated by the GPS 120 can vary significantly due to coverage variations and Selective Availability.

Approaching—You are less than one minute away from reaching a destination waypoint.

Arrival at WPT—You have entered the arrival alarm range for the destination waypoint.

Can't change Active WPT—You have attempted to change the 'active to' or 'active from' waypoint. Clear the active route or GOTO before making your changes.

CDI Alarm—Your crosstrack error has exceeded the alarm minimum.

No DGPS Position—Not enough data is being received to compute a DGPS position.

No RTCM Input—Beacon receiver is not properly connected or baud rates do not match.

Poor GPS Coverage—The GPS 120 cannot acquire the necessary number of satellites to compute a position.

Power Down and Re-init—The GPS 120 is not able to calculate a position due to abnormal satellite conditions. Turn the unit off and verify the last position shown by other means.

Read Only Mem has Failed—The permanent memory has failed and the unit is not operable. Take your unit to an authorized GARMIN dealer for repairs.

Received an Invalid WPT—A waypoint was received during upload transfer that has an invalid identifier.

Receiver has Failed—A failure in receiver hardware has been detected. If this message persists, do not use the unit and take it to an authorized dealer for repair.

Route is Full—You have attempted to add more than 30 waypoints to a route.

Route is not Empty—You have attempted to copy into a route already in use.

Route Waypoint Can't be Deleted—The waypoint you are trying to delete is part of a route. You must first delete the waypoint from the route before striking it from memory.

Route Waypoint was Deleted—A route waypoint entered does not exist in the database and has been deleted from the route.

RTCM Input has Failed—DGPS data being received has been lost. You are no longer receiving the beacon signal.

Searching the Sky—The GPS 120 is in searching the sky for almanac data or the unit is in AutoLocate™ mode.

Stored Data was Lost—All waypoints, routes and almanac data has been lost due to battery failure.

Transfer has been Completed—The receiver is finished uploading or downloading information to the connected device.

WPT Memory is Full—You have used all 250 waypoints in the GPS 120. Delete unwanted waypoints to make room for new entries.

Appendix F

Time Offset

The chart below gives the UTC time offset for the various longitudinal zones. If you are in daylight savings time, add one hour to the offset.

Longitudinal Zone	Offset
W180.0° to W172.5°	-12
W172.5° to W157.5°	-11
W157.5° to W142.5°	-10
W142.5° to W127.5°	-9
W127.5° to W112.5°	-8
W112.5° to W097.5°	-7
W097.5° to W082.5°	-6
W082.5° to W067.5°	-5
W067.5° to W052.5°	-4
W052.5° to W037.5°	-3
W037.5° to W022.5°	-2
W022.5° to W007.5°	-1
W007.5° to E007.5°	0
E007.5° to E022.5°	1
E022.5° to E037.5°	2
E037.5° to E052.5°	3
E052.5° to E067.5°	4
E067.5° to E082.5°	5
E082.5° to E097.5°	6
E097.5° to E112.5°	7
E112.5° to E127.5°	8
E127.5° to E142.5°	9
E142.5° to E157.5°	10
E157.5° to E172.5°	11
E172.5° to E180.0°	12

Appendix F

Specifications

The GPS 120 is constructed of high quality materials and should not require user maintenance. Should your unit ever need repair, please take it to an authorized GARMIN service center. The GPS 120 has no user serviceable parts. Never attempt any repairs yourself.

To protect your GPS, never allow gasoline or other solvents to come in contact with the case or lens. Clean the case and lens with a soft cloth and a household window cleaner.

PHYSICAL

Case:	Waterproof, dry nitrogen-filled
Size:	4.9"H x 5.3"W x 2.4"D (15.6 x 5.1 x 1.23 cm)
Weight:	Less than 1 lb. (454g)
Temperature Range:	5° to 158°F (-15° to 70°C)

PERFORMANCE

Receiver:	Differential-ready MultiTrac8™
Acquisition Time:	Approx. 20 seconds (warm) Approx. 2 minutes (cold) Approx. 7.5 minutes (AutoLocate™)
Update Rate:	1/second, continuous
Position Accuracy:	5-10 meters (16-33 ft.) with DGPS corrections* 15 meters (49 ft.) RMS**
Velocity Accuracy:	0.1 knot RMS steady state, 99 knots max.
Dynamics:	Performs to specification to 3g's

POWER

Input:	10-40v DC
Usage:	2 watts

Specifications subject to change without notice.

* With optional GARMIN GBR 21 Beacon Receiver Input.

** Subject to accuracy degradation to 100m 2DRMS under the US DOD-imposed Selective Availability Program.

Appendix G

Map Datums

The following list shows the 104 map datums available for the GPS 120. Menu Page abbreviations are listed first, followed by the corresponding map datum name and area.

Adindan	Adindan- Ethiopia, Mali, Senegal, Sudan
Afgooye	Afgooye- Somalia
AIN EL ABD '70	AIN EL ANBD 1970- Bahrain Island, Saudi Arabia
Anna 1 Ast '65	Anna 1 Astro '65- Cocos Isl.
ARC 1950	ARC 1950- Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe
ARC 1960	ARC 1960- Kenya, Tanzania
Ascnsn Isld '58	Ascension Island '58- Ascension Island
Astro B4 Sorol	Astro B4 Sorol Atoll- Tern Island
Astro Bcn "E"	Astro Beacon "E"- Iwo Jima
Astro Dos 71/4	Astro Dos 71/4- St. Helena
Astr Stn '52	Astronomic Stn '52- Marcus Island
Astrln Geod '66	Australian Geod '66- Australia, Tasmania Island
Astrln Geod '84	Australian Geod '84- Australia, Tasmania Island
Bellevue (IGN)	Efate and Erromango Islands
Bermuda 1957	Bermuda 1957- Bermuda Islands
Bogata Observ	Bogata Obsrvatry- Colombia
Campo Inchspe	Campo Inchauspe- Argentina
Canton Ast '66	Canton Astro 1966- Phoenix Islands
Cape	Cape- South Africa
Cape Canavrl	Cape Canaveral- Florida, Bahama Islands
Carthage	Carthage- Tunisia
CH-1903	CH 1903- Switzerland
Chatham 1971	Chatham 1971- Chatham Island (New Zealand)
Chua Astro	Chua Astro- Paraguay
Corrego Alegr	Corrego Alegre- Brazil
Djakarta	Djakarta (Batavia)- Sumatra Island (Indonesia)
Dos 1968	Dos 1968- Gizo Island (New Georgia Islands)
Easter Isld 67	Easter Island 1967
European 1950	European 1950- Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland
European 1979	European 1979- Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland
Finland Hayfrd	Finland Hayford- Finland
Gandajika Base	Gandajika Base- Republic of Maldives
Geod Datm '49	Geodetic Datum '49- New Zealand
Guam 1963	Guam 1963- Guam Island
Gux 1 Astro	Gux 1 Astro- Guadalcanal Island
Hjorsey 1955	Hjorsey 1955- Iceland
Hong Kong '63	Hong Kong '63- Hong Kong
Hu-Tzu-Shan	Hu-Tzu-Shan- Taiwan
Indian Bngldsh	Indian- Bangladesh, India, Nepal
Indian Thailand	Indian- Thailand, Vietnam
Indonesia '74	Indonesia 1974- Indonesia
Ireland 1965	Ireland 1965- Ireland
ISTS 073 Astro	ISTS 073 ASTRO '69- Diego Garcia
Johnston Island	Johnston Island Kandawala Kandawala- Sri Lanka
Kerguelen Islnd	Kerguelen Island
Kertau 1948	Kertau 1948- West Malaysia, Singapore
L. C. 5 Astro	Cayman Brac Island
Liberia 1964	Liberia 1964- Liberia
Luzon Mindanao	Luzon- Mindanao Island

Appendix C

Map Datums

Luzon Philippine	Luzon- Philippines (excluding Mindanao Island)
Mahe 1971	Mahe 1971- Mahe Island
Marco Astro	Marco Astro- Salvage Island
Massawa	Massawa- Eritrea (Ethiopia)
Merchich	Merchich- Morocco
Midway Ast '61	Midway Astro '61- Midway
Minna	Minna- Nigeria
NAD27 Alaska	North American 1927- Alaska
NAD27 Bahamas	North American 1927- Bahamas (excluding San Salvador Island)
NAD27 Canada	North American 1927- Canada and Newfoundland
NAD27 Canal Zone	North Am. 1927- Canal Zone
NAD27 Caribbn	North American 1927- Caribbean (Barbados, Caicos Islands, Cuba, Dom. Rep., Grand Cayman, Jamaica, Leeward and Turks Islands)
NAD27 Central	North American 1927- Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua)
NAD27 CONUS	North Am. 1927- Mean Value (CONUS)
NAD27 Cuba	North American 1927- Cuba
NAD27 Gruland	North American 1927- Greenland (Hayes Peninsula)
NAD27 Mexico	N. American 1927- Mexico
NAD27 San Sal	North American 1927- San Salvador Island
NAD83	North American 1983- Alaska, Canada, Central America, CONUS, Mexico
Nhrwn Masirah	Nahrwn- Masirah Island (Oman)
Nhrwn Saudi A	Nahrwn- Saudi Arabia
Nhrwn United A	Nahrwn- United Arab Emirates
Naparima BWI	Naparima BWI- Trinidad and Tobago
Observtorio '66	Observatorio 1966- Corvo and Flores Islands (Azores)
Old Egyptian	Old Egyptian- Egypt
Old Hawaiian	Old Hawaiian- Mean Value
Oman	Oman- Oman
Ord Srvy GB	Old Survey Gn Britn- England, Isle of Man, Scotland, Shetland Isl., Wales
Pico De Las Nv	Canary Islands
Ptcairn Ast '67	Pitcairn Astro '67- Pitcairn Isl.
Prov S Am '56	Prov So Amrica '56- Bolivia, Chile,Colombia, Ecuador, Guyana, Peru, Venezuela
Prov S Chln '63	Prov So Chilean '63- S. Chile
Puerto Rico	Puerto Rico & Virgin Islands
Qatar National	Qatar National- Qatar
Qornoq	Qornoq- South Greenland
Reunion	Reunion- Mascarene Island
Rome 1940	Rome 1940- Sardinia Island
RT 90	Sweden
Santo (Dos)	Santo (Dos)- Espirito Santo Island
Sao Braz	Sao Braz- Sao Miguel, Santa Maria Islands (Azores)
Sapper Hill '43	Sapper Hill 1943- East Falkland Island
Schwarzeck	Schwarzeck- Namibia
Sth Amrcn '69	South American '69- Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trinidad and Tobago
South Asia	South Asia- Singapore
SE Base	Southeast Base- Porto Santo and Madiera Islands
SW Base	Southwest Base- Faial, Graciosa, Pico, Sao Jorge and Terceira Islands (Azores)
Timbalai 1948	Timbalai 1948- Brunei and E. Malaysia (Sarawak and Sabah)
Tokyo	Tokyo- Japan, Korea, Okinawa
Tristan Ast '68	Tristan Astro 1968- Tristan da Cunha
Viti Levu 1916	Viti Levu 1916- Viti Levu/ Fiji Islands
Wake-Eniwetok	Wake-Eniwetok- Marshall Isl.
WGS 72	World Geodetic System 1972
WGS 84	World Geodetic System 1984
Zanderij	Zanderij- Surinam

Appendix H

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