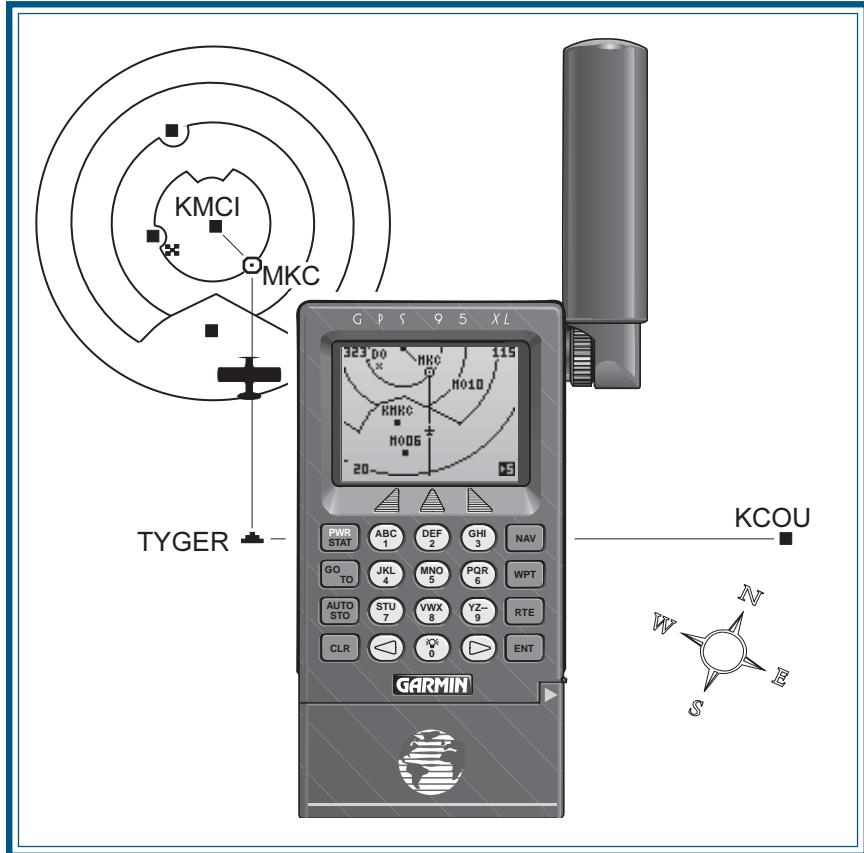


GPS 95 XL

PERSONAL NAVIGATOR™

OWNER'S MANUAL



GARMIN™



GARMIN™

GPS 95 XL

Personal Navigator™

OWNER'S MANUAL

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August, 1994

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PREFACE

GARMIN thanks you for selecting our high performance, full featured Personal Navigator™. The GPS 95 represents our continued commitment to provide you with a portable navigation unit that is versatile, extremely accurate, and easy to use. We are confident you will enjoy using your unit for many years to come.

The GPS 95's rugged construction and quality components offer the reliability demanded by the harshest operating environments. It may be used in aircraft, marine vessels and land vehicles, as well as by hunters, hikers, and military forces. The unit may be operated portably using its own battery pack, or it may use a 5-40 volt DC external power source for fixed mounted applications. You can even use a 115- or 230-volt AC adaptor for planning trips at home.

This manual and accompanying quick reference guide provide complete information on safely operating the GPS 95 to its full potential. Sample trips have been planned for you to practice your navigation skills using the built-in simulator. Afterwards, try a trip of your own to realize the value of the GPS 95 as your Personal Navigator™. If you have any questions or comments, our Product Support Department is eager to serve you at 1-800-800-1020 or 913-599-1515. GARMIN is fully committed to your satisfaction as a customer.

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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 under development and is subject to changes which could affect the accuracy and performance of all GPS equipment. Although the GPS 95 is a precision electronic NAVigation AID (NAVAID), any NAVAID can be misused or misinterpreted, and therefore become unsafe. Use the GPS 95 at your own risk. To reduce the risk, 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 95 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 has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. Operation is subject to the following two 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.

This device 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 device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between this device and the receiver.
- Connect this device to an outlet on a different circuit than that to which the receiver is connected.
- Consult the dealer or an experience radio/TV technician for help.

This device contains no user-serviceable parts. Repairs should only be performed by an authorized GARMIN service center. Unauthorized repairs or modifications to this device could void your warranty and your authority to operate this device under Part 15 regulations.

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CHAPTER 1

INTRODUCING THE GARMIN GPS 95

1.1 CAPABILITIES

The GPS 95 provides a host of powerful capabilities which were previously found only in much larger systems:

- **Performance:** MultiTrac™ receiver tracks and uses up to eight satellites with high sensitivity, fast first fix, and continuous navigation updates.
- **Portability:** Goes anywhere - air, sea or land. Built-in simulator for trip planning or practicing navigation skills anywhere.
- **Ease of Use:** Graphic screens and intuitive guidance from the display offer ease of operation.
- **Convenience:** Extensive database (Americas or International), covers airports, VORs, NDBs, intersections, special-use airspaces and controlled airspaces. Update the database at home or in your office using your PC.
- **Navigation:** Stores 500 alphanumeric user waypoints; 20 reversible routes of 30 waypoints each. GOTO function sets instantaneous course to waypoint of your choice. AutoStore™ function builds routes as you go. A flashing message annunciator keeps you fully informed of your navigation status.
- **Personalized:** Customize your unit by selecting distance and speed units, Course Deviation Indicator (CDI) sensitivity, keypad and display features, map datums, and interface options.
- **Low Power Consumption:** Battery Saver operation draws less than 1.5 watts; provides up to four hours of continuous operation with the AA battery pack.
- **Trip Planning:** Analyze distance, time, and fuel requirements for your trip. Compute time of sunrise/sunset at your destination. Calculate density altitude before you take off and true airspeed as you fly. Vertical navigation guides you to your cruising altitude and puts you in the traffic pattern before landing.

- **Alarms:** An alarm clock and timer allow the GPS 95 to watch the clock for you. Arrival, CDI and special-use/controlled airspace alerts help you safely navigate your aircraft.
- **Interfaces:** Interface with PC-based moving map programs using NMEA 0183 output, with Differential GPS (DGPS) beacon receivers using RTCM (SC-104 version 2.0) input, or with marine autopilots and graphic plotters using NMEA 0180/0182/0183 outputs. An optional PC kit is also available to download user waypoints and routes to your PC for permanent record.

We encourage you to read this manual and experiment using the built-in simulator. This will help you quickly master the many features of the GPS 95.

1.2 AVIATION DATABASE

The GPS 95 features a Jeppesen database providing direct access to either Americas or International navigation information. When the GPS 95 is turned on the display will show which database the unit contains. Information contained in the database is as follows:

- **Airports:** Identifier, city/state, country, facility name, latitude, longitude, elevation, and fuel services.
- **VORs:** Identifier, city/state, country, facility name, latitude, longitude, frequency and co-located DME (or TACAN).
- **NDBs:** Identifier, city/state, country, facility name, latitude, longitude and frequency.
- **Intersections:** Identifier, country, latitude and longitude.
- **Communication Frequencies:** ATIS, ground, tower, multicom and unicom. (Multicom and unicom frequencies are grouped together under a “unicom” designation.)
- **Runways:** Runway designations, length, surface, lighting (including frequency for pilot-controlled lighting), and graphic runway configuration.
- **Special-use and Controlled Airspaces:** Alert, caution, danger, MOA, restricted, training, warning and prohibited areas. Class B/CTA and Class C / TMA airspaces.

The Americas Database covers North, Central and South America. The

International Database covers Europe, Africa, Asia, Australia and Greenland. (Hawaii is contained within both database versions.) Updates for the GPS 95 database, available every 28 days, may be purchased from GARMIN on a one-time basis or by subscription service. When ordering your first update, a cable is also required for connection to a PC-compatible computer. (Order cable separately at time of purchase.) Database update software will automatically transfer the latest information into your GPS 95 making the update process quick and simple. Your local GARMIN dealer may also be equipped to update the database for you.

1.3 BASIC PACKAGE

Your GARMIN GPS 95 basic package includes:

- GPS 95 Unit
- AA Battery Pack
- Detachable Antenna
- Remote Antenna Cable w/Suction Cup Mount
- Yoke Mount
- Surface Mount
- Carrying Case
- Self-coiling Power/Data Cable
- Cigarette Lighter Adaptor
- Permanent Installation Wire Harness
- Lanyard
- Battery Terminal Cover
- Owner's Manual
- Quick Reference Card
- Warranty Card

The basic package allows you to use your GPS 95 for both portable and fixed operations. The unit may be operated from the AA battery pack, or from an external power source (5-40VDC) using the cigarette lighter adapter or permanent installation wire harness.

Handheld Operation:

For handheld operation, the GPS 95 is powered by a AA battery pack which should be filled with four high quality alkaline batteries commonly found in retail stores. The detachable antenna is placed directly on the right side of the unit. The carrying case will protect your GPS 95 when the unit is not in use.

In order to track GPS satellites, the unit must be situated with the antenna pointed straight up and should not be blocked by objects or people. (Signal reception through thin fabric, such as canvas, may be adequate but degraded). When using the GPS 95 inside the cockpit it may be desirable to use the remote antenna cable for better satellite visibility. The detachable antenna is removed from the GPS 95 and replaced by one end of the remote antenna cable. The antenna is then placed on the other end of the cable and, using the suction cup mount, is situated where the best satellite visibility is possible. You may need to experiment to determine the best location for the antenna. (See Appendix C for removal of the detachable antenna.)

A lanyard is provided to prevent accidental dropping of your GPS 95. Connect the lanyard to the eyelet on the back (at the top) of the unit

Fixed Mount Operation:

A surface mount is supplied for panel mount installation. The lower half of the surface mount is also used with the yoke mount. (See Appendix C for instructions on yoke mount installation.) The unit may be operated using aircraft power through the cigarette lighter adaptor or the permanent installation wire harness. Note that there are three cable assemblies (not counting the remote antenna cable). The self-coiling power/data cable plugs directly into the back of the GPS 95. The other end of the self-coiling power/data cable plugs into either the cigarette lighter adapter **or** the permanent installation wire harness, according to your needs or preferences.

While using aircraft power, you may wish to leave the battery pack in the unit. In the event of aircraft power failure, the GPS 95 will automatically switch to battery power. If you do not desire to leave the battery pack on the unit, a battery terminal cover is supplied to protect the battery contacts. Remove the battery pack from the GPS 95 and slide the battery terminal cover on in its place. (See Appendix C for removal of the battery pack.)

In addition to supplying power to the unit, the permanent installation wire harness allows you to interface your GPS 95 with a PC-compatible computer or an ARGUS™ unit. When connected to a PC-compatible computer, the GPS 95 will provide navigation information for many of the popular moving map programs. (See Appendix C for connection of the GPS 95 to other devices.)

1.4 OPTIONAL ACCESSORIES

The following optional accessories are available for your specific needs:

- Rechargeable NiCad Battery Kit
- PC Database Update Kit
- PCX5AVD Software Kit

Rechargeable NiCad Battery Kit:

A rechargeable NiCad battery kit is available for use with the GPS 95. This kit includes a rechargeable NiCad battery, an AC adaptor and a drop-in charger base. Using the drop-in charger base, the NiCad battery is charged in 12-14 hours (not to exceed 24 hours). The rechargeable NiCad battery kit allows you to use the GPS 95 portably for extended periods (up to eight hours per charge).

PC Database Update Kit:

The PC Database Update Kit allows you to update the GPS 95's aviation database (Americas or International) at home, or in your office, using a PC-compatible computer. The PC Database Update Kit includes the database diskette(s) and instructions. When ordering your first update, be sure to also order a **PC interface cable** (part no. 9541). This cable, which connects to a COM port on your PC, is not part of the update kit.

PCX5AVD Software Kit:

The PCX5AVD Software Kit allows you to download route, waypoint and track data from the GPS 95 to your PC-compatible computer. You may also edit this data and upload it back into the GPS 95. With the software kit you can plot data files and/or display current position in real-time on your computer's monitor. Data files can be printed for future reference. For planning purposes, the software kit provides animated satellite orbit displays and allows you to print a satellite visibility chart. The software kit includes a 3.5" diskette, an instruction manual and a **PC interface cable**. This cable can be used with both the PCX5AVD Software Kit and the PC Database Update Kit.

1.5 OPERATIONAL MODES

While using your GPS 95, you may select from one of four operational modes: Normal or Battery Saver modes for actual navigation, Simulator mode for practicing/trip planning, or AutoLocate™ mode to determine your new position when travelling several hundred miles between uses. In Normal and Battery Saver modes, typical time to first fix is less than 2.5 minutes. (If you have used your unit within the hour, it may take as little as 15 seconds.) In Simulator mode the GPS 95 will not acquire satellites, but will display a position based on the last known location or any other position that you designate.

Normal mode offers continuous navigation updates and should be selected when the GPS 95 will be used in a high dynamics environment (i.e., frequent speed and heading changes). The GPS 95 will typically operate over three hours using the AA battery pack, or over five hours using the optional NiCad battery pack.

Battery Saver mode, suitable for most applications, offers position updates that adapt to your needs while extending battery life. The GPS 95 will typically operate over four hours using the AA battery pack, or over eight hours using the optional NiCad battery pack.

Simulator mode allows you to simulate the operation of the GPS 95 while at home or in your office. The simulator mode can be selected while learning to use your GPS 95 and is ideal for planning routes and entering waypoints. Keep in mind that the GPS 95 is not tracking satellites in the simulator mode. **YOU SHOULD NEVER ATTEMPT TO USE THE SIMULATOR MODE FOR ACTUAL NAVIGATION.**

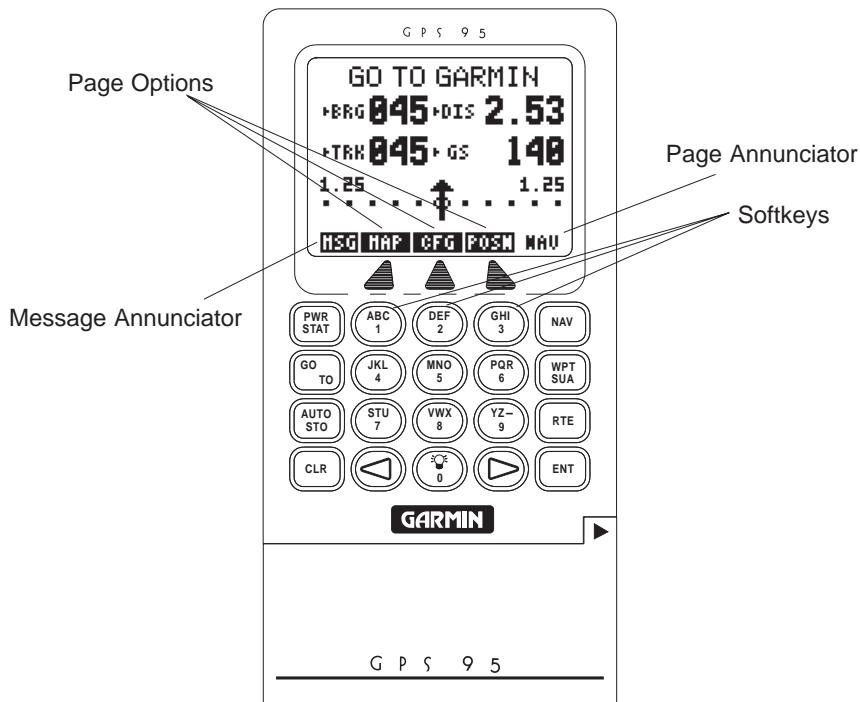
AutoLocate™ mode is used when the GPS 95 has been moved more than one thousand miles from its last known position. This mode forces the receiver to search for a new set of satellites and compute your new position. Once a new position is obtained, the GPS 95 will automatically revert to whichever mode you previously used, Normal or Battery Saver.

NOTE: In lieu of selecting AutoLocate mode, you may enter a more accurate initial position directly on the Present Position Page to speed up the acquisition process in Normal or Battery Saver modes. (Section 5.4 provides more information on the Present Position Page.)

CHAPTER 2

GETTING STARTED

2.1 FRONT PANEL

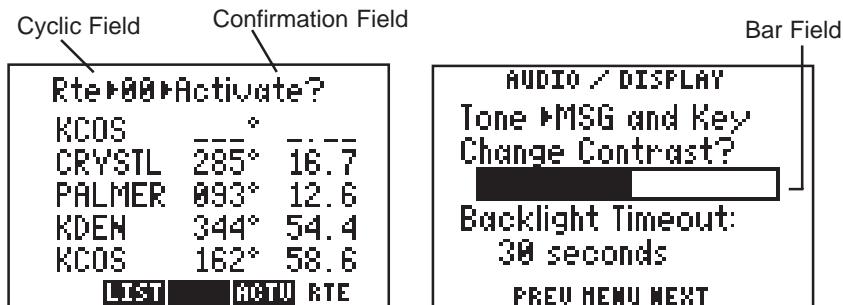


The front panel consists of a 20-key keypad with a 85 x 64-pixel LCD display. Both the display and keypad may be illuminated for nighttime operation.

2.2 SOFTKEY OPERATION

Information displayed on the LCD is referred to as a "page." The GPS 95 works with "softkey" operation. At the bottom of the screen is a list of page options. To select a different page, press the appropriate key ("1", "2", or "3") below the desired option. Please note that the page options must be highlighted in order to use the softkeys. On the bottom line, extreme right, is the page annunciator which indicates the current page you are viewing.

2.3 CURSOR AND FIELDS



The area of the page which is highlighted in reverse video is called the **cursor**. The cursor may be moved to locations on the page called **fields** which allow you to enter data or change options. You will encounter five types of fields.

- **Numeric fields** accept numbers only.
- **Alphanumeric fields** accept numbers as well as letters.
- **Cyclic fields** allow selection from several available options. A cyclic field is preceded by a prompt (▶). You may cycle through the choices by pushing CLR.
- **Confirmation fields** allow you to indicate your approval. For example, you will be asked to confirm that you want to delete a waypoint. Confirmation fields always end with a "?" character. Press ENT to approve the confirmation field.
- **Bar fields** allow an adjustable scale entry with the length of the bar representing the minimum to maximum setting. Use the arrow keys to make adjustments in bar fields.

2.4 KEYPAD OPERATION

 The PWR/STAT key is a dual function key that controls unit power and system status. Pressing this when the unit is off will turn the unit on. To turn the unit off, press and hold PWR/STAT until the display is blank.

Pressing PWR/STAT momentarily while the unit is on will take you to the status pages. (See Chapter 8.) If the message annunciator is flashing and the tone sounds, you may push PWR/STAT to view the message.

**GO
TO**

Pressing GOTO allows you to instantly define a destination waypoint and plot a course from present position to that destination. (See Chapter 4.)

**AUTO
STO**

Pressing AUTOSTOre allows you to capture your present position instantaneously. (See Chapter 7.)

NAV

Pressing NAV allows you to view position and navigation information as well as the Map Display. (See Chapter 5.)

**WPT
SUA**

The WPT/SUA key is a dual function key that allows you to view information about airports, NAVAIDs, intersections and user waypoints; or about nearby special-use/controlled airspaces. The WPT/SUA key allows you to create, edit, delete, and rename user waypoints. This key is also used to view nearest waypoints. (See Chapter 3.)

RTE

The RTE key allows you to create, edit, review, activate, and delete routes. (See Chapter 6.)



Pressing either of the arrow keys allows you to move the cursor, scroll through information lists, and enter letters of the alphabet.

**ABC
1**

The alphanumeric keys allow you to enter letters and numbers. Use the arrow keys to select the desired letter or number from a given alphanumeric key.

Pressing this key while the cursor is not on a numeric or alphanumeric field allows you to change the backlight level. There are two backlighting levels.

CLR

Pressing CLR erases information in the cursor field. If the cursor is over a cyclic field, pressing CLR will toggle through several available options.

ENT

Pressing ENT confirms an entry or selection.

2.5 ENTERING DATA

You may enter data such as waypoint identifiers and user waypoint coordinates on certain pages. To enter data you must first move the cursor to the desired field by pressing the right or left arrow key. A data entry operation is completed by pressing the ENT key. If an error is made during the data entry process, press the CLR key to remove the erroneous character.

To enter a number...

- Press the key that is labeled with the desired number. The numbers will fill in from the right side of the field and move to the left as each new number is entered. For example, if you wish to enter "51" in a three space field, you must press the 5 and 1 keys in that order. You do not have to enter a leading zero. (Note: When entering numbers in an alphanumeric field press the key that is labeled with the desired number, then press the right or left arrow key twice.)
- Press CLR if you enter an incorrect number.
- Press ENT when you have filled all significant digits of the field with numbers.

To enter a letter...

- Press the key that is labeled with the desired letter.
- Press the right or left arrow key until the desired letter is displayed.
- Press CLR if you enter an incorrect letter.
- Press ENT when all the characters are entered.

The GPS 95 features a keypad feedback tone which will sound each time you press a key. If you enter data which is not appropriate for the field, the feedback tone will quickly sound three times indicating an error. The keypad feedback tone can be turned off if you wish. (See Section 8.8.)

2.6 VIEWING MESSAGES

From time to time, the GPS 95 will use a message to tell you of conditions needing attention. When the GPS 95 has a new message, the MSG annunciator will flash. When this occurs, press PWR/STAT to view the new message(s). Press PWR/STAT again to see the page you were viewing prior to reading the message. (See Appendix A for a complete list of GPS 95 messages.)

While the MSG annunciator is flashing, the GPS 95 will also generate a tone to alert you of the message. (If your unit is connected to an external alarm, it will also be activated.) Messages that demand immediate attention, such as an arrival alarm, generate a quick tone that will not stop until you view the message. All other messages generate a slow tone that will cease after 15 seconds. The message tone may be turned off if you wish. (See Section 8.8.)

Important messages will remain on the Message Page after being viewed. If this occurs, the MSG annunciator will be in view but will not flash. (If no messages exist, the MSG annunciator will not be visible.) To review these messages, press PWR/STAT to reveal the status page options, then press the key underneath the "MENU" page option. With the arrow keys, highlight "Messages" and press ENT.

2.7 TURNING THE GPS 95 ON

When the GPS 95 is turned on it will automatically perform internal checks to ensure proper operation, begin acquiring satellites and, once a sufficient number are received, display your present position. To see this power on sequence, take the GPS 95 outside to a location that is well away from buildings and other structures that might limit its view of the sky.

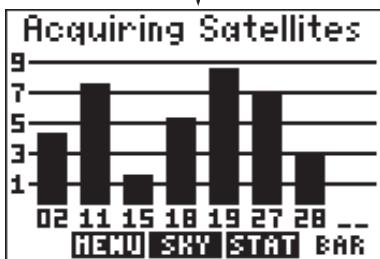
After you turn your GPS 95 on, it will conduct a series of self tests and display the following notice:



AMERICAS SUA
Cycle 9407
Effective
23-JUN-94
Expires
21-JUL-94

DBX

ENT



TRK ____ ° GS 0.0 ft
N 38° 56.990'
W 094° 44.771'
Time 15:56:22
CFG MAP NAV POSH

Following completion of the tests, the Database Page will display the effective date, cycle and expiration date of the database. The GPS 95 will still function with an expired database; however, you must exercise extreme caution and always verify that the database information is correct before use. (WARNING: The accuracy of the data is assured only if current. Pilots using an out-of-date database do so entirely at their own risk.)

Press ENT to approve the Database Page.

The Satellite Bar Graph Page will be displayed, and the GPS 95 will begin acquiring satellites.

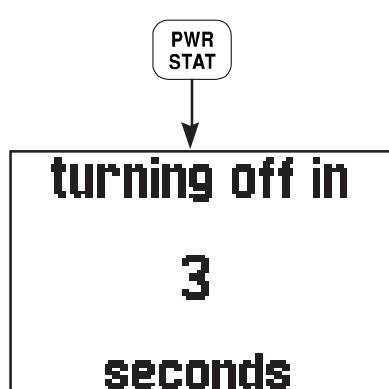
After a position is found (and if no keys have been pressed), the Position Page will be displayed and the unit is ready for normal operation. The process of satellite acquisition is fully automatic and, under normal circumstances, will take approximately 2-3 minutes to obtain navigation information. (If the unit has been used in the past hour, it may take as little as 15 seconds. If the GPS 95 has been moved several hundred miles or more since it was last used, you may want to select AutoLocate mode to determine your new location. Refer to Section 8.5 for more information on selecting AutoLocate mode.)

When four or more satellites with good geometry are available, the GPS 95 will automatically operate in the 3D mode in which latitude, longitude and altitude are computed. If only three satellites are available, the unit will operate in 2D mode in which only latitude and longitude are computed. When operating in the 2D mode, the unit will use the last computed altitude or your last entered altitude. (Section 5.4 describes how you may enter the altitude.)

Your GPS 95 will automatically update satellite orbital data as it operates. If you have not operated your unit for a period of six months or longer, it will take approximately 15 minutes to search the sky and collect new orbital data. You will be informed when your unit is searching the sky with the message "Searching the Sky." Once satellite orbital data is collected, it will be stored in memory. The memory is maintained by an internal battery, therefore the data will not be lost when you turn your GPS 95 off or remove the battery pack.

If the GPS 95 cannot acquire enough satellites for 2D or 3D navigation, you will be informed with the message "Poor GPS coverage". If this situation occurs, make sure the antenna is properly connected and not obstructed by nearby buildings or other structures.

2.8 TURNING THE GPS 95 OFF



To turn the GPS 95 off, press and hold the PWR/STAT key.

The Off Page will be displayed, the GPS 95 will perform a countdown and, after a brief delay, will shut off. All user waypoints, routes, and setup information that you have entered will be maintained while the unit is off – even if the battery pack is removed.

2.9 LEARNING TO USE THE GPS 95

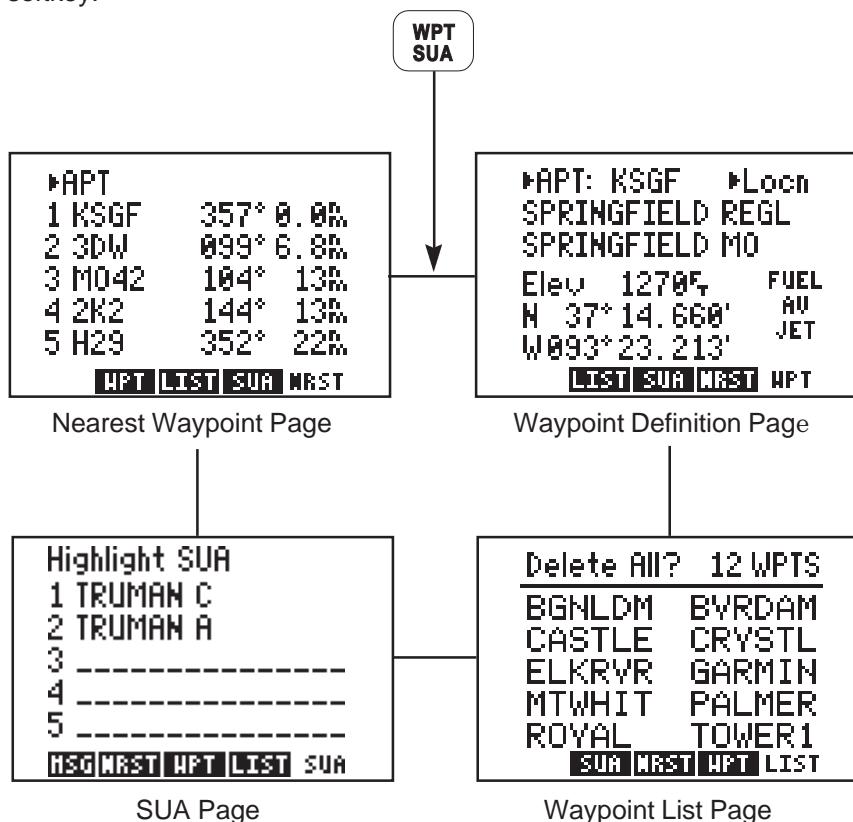
If you are using the GPS 95 for the first time, you are encouraged to read Chapter 3 which introduces the GPS 95's waypoint, airspace and database features, Chapter 4 on the use of the GOTO key, and Chapter 5 for navigating to a waypoint. A sample trip is included in Chapter 5 to get you started on the use of the GOTO key and the various navigation pages available on your GPS 95. You may also want to read Chapter 8 on custom setups to configure the GPS 95 to your preferences. Afterward, you may want to read through the rest of this manual and make further use of the built-in simulator to practice with the advanced features.

CHAPTER 3

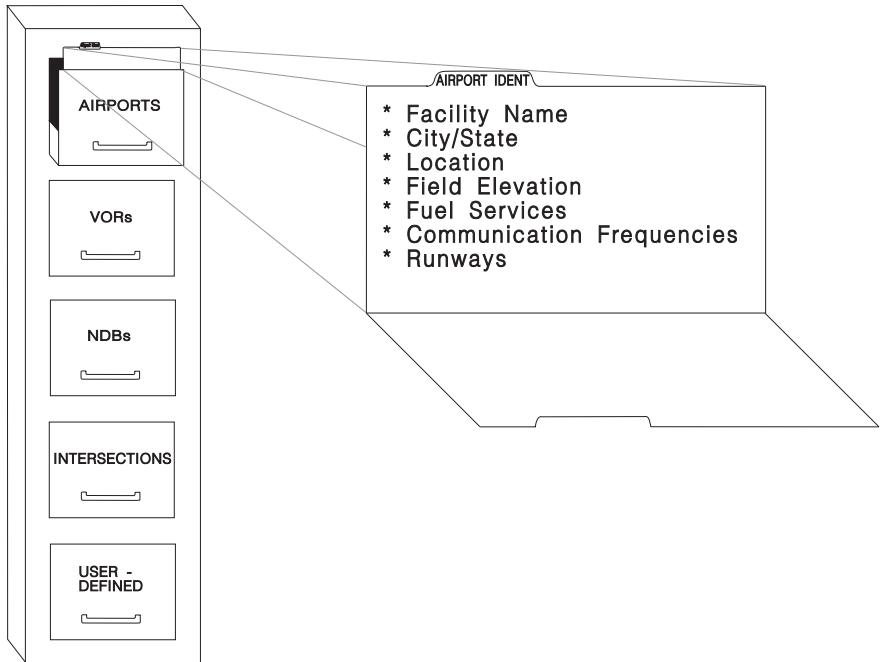
WAYPOINTS AND AIRSPACES

The GPS 95 features a Jeppesen database providing Americas or International navigation information. (Refer to Section 1.2 for a specific description of information provided in the database.) The database contains information about waypoints and airspaces. A basic waypoint consists of an identifier (up to six letters and/or numbers) and its location. You can navigate to waypoints, you can perform trip/fuel planning using waypoints, and you can even calculate the time of sunrise and sunset for a waypoint of interest. Airspace boundaries are provided for special-use and controlled airspaces. Messages are provided to alert you of these nearby airspaces.

The GPS 95 features four primary waypoint and airspace pages. You may select the desired page by pressing WPT/SUA and, if needed, the appropriate softkey.

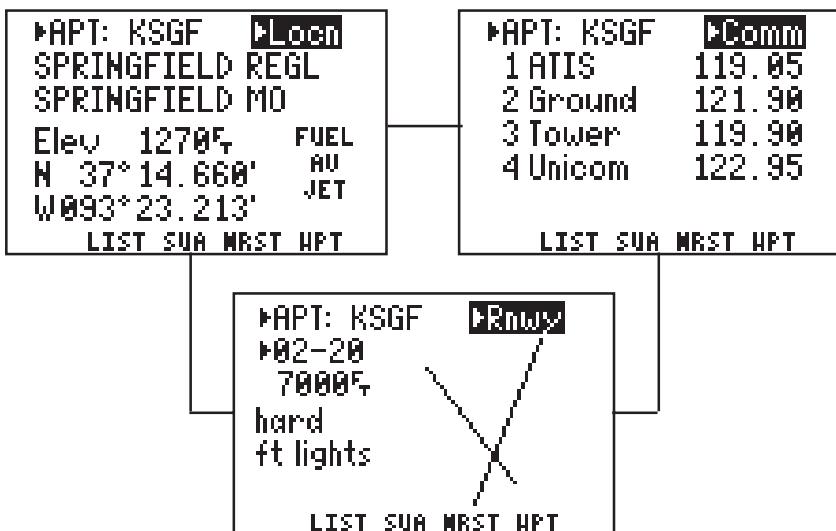


3.1 WAYPOINT CATEGORIES



The GPS 95 organizes waypoints into one of five different categories: airports, VORs, NDBs, intersections and user waypoints. This organization is much like that of a file cabinet in which each drawer represents a different type of information. For example, the airport drawer contains information on airport locations, communication frequencies, runways, etc. In order to view the information stored in a given drawer, the drawer must be opened or selected. When using waypoints on the GPS 95 the "drawer", or category, is selected on a cyclic field. The following sections describe procedures used to view information for each category of waypoint.

3.2 AIRPORT INFORMATION



The GPS 95 features extensive information on airports:

- Identifier, facility name, city and state
- Position and elevation
- Fuel Services
- Communication frequencies
- Runway information with graphic configuration

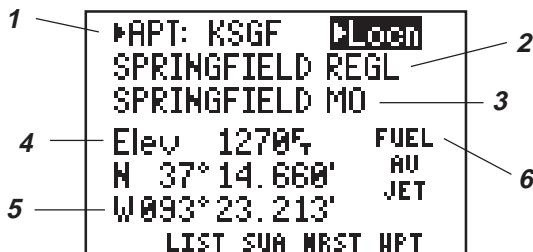
The airport information pages may be displayed from the Waypoint Definition Page. You may select the desired airport by its identifier, facility name or city/ state. (Refer to Section 3.10 for more information on selecting airports by facility name or city/state.)

To view airport information...

- Press WPT/SUA and, if needed, the WPT softkey to display the Waypoint Definition Page.
- Notice the cyclic field in the upper left corner of the page. This field will indicate the category of waypoint that will be displayed. If "APT", for airport, is not currently displayed: press the right arrow key, then press CLR (repeatedly) until "APT" is shown. (HINT: You may also select the waypoint category by pressing the corresponding alphanumeric key. In this case the "A" key, for airport.)

- Press the right arrow key to move the cursor to the right of "APT".
- Enter the identifier of the desired airport using the alphanumeric and arrow keys. Press ENT. (Note: The airport identifiers in the GPS 95 database follow the standards set by the International Civil Aviation Organization [ICAO].)
- With "APT" selected, a second cyclic field will appear that allows you to view location (Locn), communication (Comm), or runway (Rnwy) information. Highlight this second field by pressing the right arrow key and press CLR to select the desired information page.

Airport Location Information



The airport location information includes the following

- 1) Airport identifier (selectable)
- 2) Airport facility name
- 3) City/state
- 4) Elevation (feet or meters)
- 5) Location

latitude/longitude -decimal degrees, degrees/decimal minutes, degrees/minutes/decimal seconds

grid systems -UTM/UPS, British grid, Irish grid

- 6) Fuel services available

- mo - Mogas
- av - 80/87 octane, 100LL, 100/130 octane
- jet - Jet A, Jet A-1 or Jet A+

Airport Communication Information

APT: KSGF	Comm
1 ATIS	119.85
2 Ground	121.90
3 Tower	119.90
4 Unicom	122.95

LIST SUN MRST HPT

The airport communication information includes identifier (selectable), ATIS, ground, tower and unicom (or multicom) frequencies for the selected airport. Up to five communication frequencies may be displayed at a time. Additional frequencies may be viewed by scrolling.

To scroll through available frequencies...

- With the frequency information displayed, press the right arrow key repeatedly to view additional frequencies.
- To return to the beginning of the list, press the left arrow key repeatedly until the first frequency is displayed.

Airport Runway Information



1	APT: KSGF	Rwy
2	02-20	
3	7000F	
4	hard	
5	ft lights	

LIST SUN MRST HPT

The airport runway information includes the following:

- 1) Airport Identifier (selectable)
- 2) Runway designation (cyclic field)
- 3) Runway length (feet or meters)

4) Runway surface

- hard - Hard (asphalt, concrete, etc.)
- turf - Turf (grass)
- sealed - Sealed surface
- gravel - Gravel surface
- dirt - Dirt surface
- soft - Unknown soft surface
- unkwn - Unknown surface
- water - Water landing site

5) Lighting

- no lights - No runway lighting is available
- pc lights - Pilot controlled lighting with frequency
- pt lights - Part time lighting
- ft lights - full time lighting
- unknown - Availability/type of lighting unknown

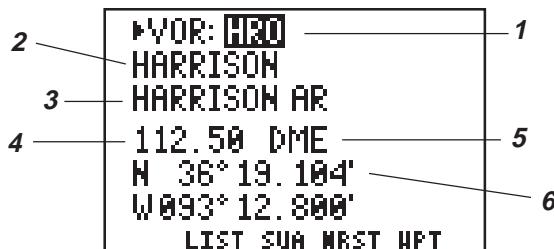
6) Graphic runway configuration, if available

The graphic runway configuration will display the layout of available runways. For the selected airport, information for each runway is available from the cyclic field for runway designation.

To view additional runway information...

- Using the arrow keys, place the cursor over the runway designation field.
- Press CLR to cycle through the available runways.

3.3 VOR INFORMATION



The GPS 95 also features considerable information on VORs:

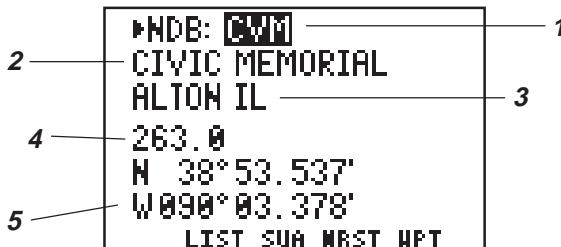
- 1) Identifier (selectable)
- 2) Facility name
- 3) City/state
- 4) Frequency
- 5) DME indication, if applicable, for co-located DME or TACAN
- 6) Location (latitude/longitude or grid system)

You may select the desired VOR by its two-to-three-character identifier, facility name or city/state. (See Section 3.10 for information on selecting VORs by facility name or city/state.)

To select a VOR by identifier...

- Press WPT/SUA and, if needed, the WPT softkey to display the Waypoint Definition Page.
- If "VOR" is not currently displayed in the upper left corner: press the right arrow key to place the cursor on the cyclic field, then press CLR (repeatedly) until "VOR" is shown.
- Press the right arrow key to move the cursor to the right of "VOR".
- Enter the identifier of the desired VOR using the alphanumeric and arrow keys. Press ENT. The information for the selected VOR is displayed.

3.4 NDB INFORMATION



The GPS 95 displays the following information on NDBs:

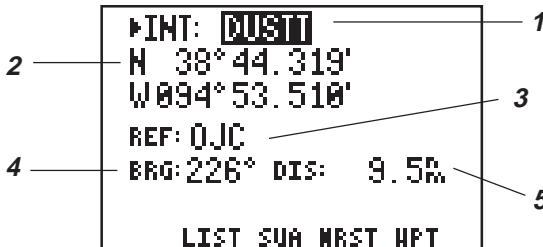
- 1) Identifier (selectable)
- 2) Facility name
- 3) City/state
- 4) Frequency
- 5) Location (latitude/longitude or grid system)

You may select an NDB by its one-to-three-character identifier, facility name or city/state. (See Section 3.10 for information on selecting NDBs by facility name or city/state.)

To select an NDB by identifier...

- Press WPT/SUA and, if needed, the WPT softkey to display the Waypoint Definition Page.
- If "NDB" is not currently displayed in the upper left corner: press the right arrow key to place the cursor on the cyclic field, then press CLR (repeatedly) until "NDB" is shown.
- Press the right arrow key to move the cursor to the right of "NDB".
- Enter the identifier of the desired NDB using the alphanumeric and arrow keys. Press ENT. The information for the selected NDB is displayed.

3.5 INTERSECTION INFORMATION



The GPS 95 features the following information on intersections:

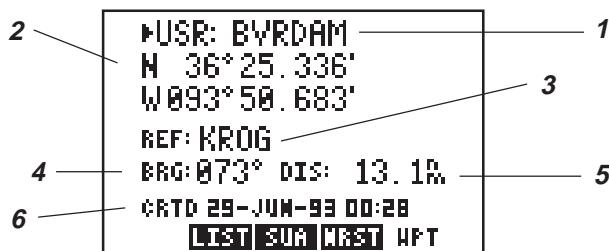
- 1) Identifier (selectable)
- 2) Location (latitude/longitude or grid system)
- 3) Reference VOR identifier
- 4) Bearing from reference VOR to selected intersection
- 5) Distance from reference VOR to selected intersection

Intersections are only selected by identifier. Once an intersection is selected, the identifier of, bearing from, and distance from the nearest VOR will be displayed. (NOTE: The VOR is simply the nearest facility and is not necessarily the VOR used to define the intersection.)

To select an Intersection...

- Press WPT/SUA and, if needed, the WPT softkey to display the Waypoint Definition Page.
- If "INT" for intersection, is not currently displayed in the upper left corner: press the right arrow key to place the cursor on the cyclic field, then press CLR (repeatedly) until "INT" is shown.
- Press the right arrow key to move the cursor to the right of "INT".
- Enter the identifier of the desired intersection using the alphanumeric and arrow keys. Press ENT. The information for the selected intersection is displayed.

3.6 USER WAYPOINT INFORMATION



In addition to the airport, VOR, NDB and intersection information that is already stored in your GPS 95, you may enter an additional 500 locations as user waypoints.

The GPS 95 will display the following user waypoint information:

- 1) Waypoint identifier
- 2) Location (latitude/longitude or grid system)
- 3) Reference waypoint identifier
- 4) Bearing from reference waypoint to selected user waypoint
- 5) Distance from reference waypoint to selected user waypoint
- 6) User comments

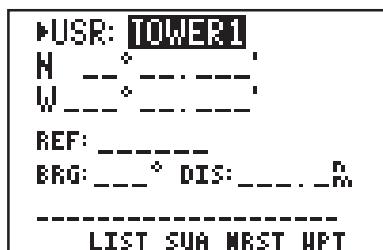
User waypoints are only selected by the identifier that you assign.

To select a user waypoint...

- Press WPT/SUA and, if needed, the WPT softkey to display the Waypoint Definition Page.
- If “USR”, for user waypoint, is not currently displayed in the upper left corner: press the right arrow key to place the cursor on the cyclic field, then press CLR (repeatedly) until “USR” is shown.
- Press the right arrow key to move the cursor to the right of “USR”.
- Enter the identifier of the desired user waypoint using the alphanumeric and arrow keys. Press ENT. The information for the selected user waypoint is displayed.

You may select a reference waypoint by moving the cursor to the reference waypoint identifier field and entering the desired waypoint identifier (airport, VOR, NDB, intersection or user waypoint).

3.7 CREATING USER WAYPOINTS



When a waypoint identifier has been entered that does not exist in memory the GPS 95 will assume you wish to create a new waypoint. You may create a new waypoint using one of two methods: direct position entry (latitude/longitude or grid system) or relative to an existing waypoint.

In order to create a waypoint by direct position entry the coordinates for the new waypoint must be known and entered directly into the unit.

To enter the waypoint position directly...

- With the Waypoint Definition Page displayed (and user waypoint information shown), press the right arrow key until the cursor is over the waypoint identifier field.

- Enter the identifier of the new waypoint using the alphanumeric and arrow keys. Press ENT when complete. The cursor will move to the position coordinates.
- Enter the position of the new waypoint. Press ENT after data is entered into each field. The number of fields required for position entry will depend on the position coordinate option selected. (See Section 8.6.) If latitude and longitude coordinates are selected there will be four fields if decimal degrees are used - two to define the hemispheres ("N" or "S", "E" or "W") and two to enter the latitude and longitude degrees. If latitude and longitude coordinates are selected with degrees, minutes and decimal seconds, there will be eight data entry fields to define the position since degrees, minutes and seconds are each divided into their own field. If a grid system is selected it will have a different number of fields depending on the format of the selected grid.

A new waypoint can be defined relative to another waypoint already contained within the GPS 95's memory. When creating a new waypoint relative to an existing waypoint, you will define a distance and bearing from the existing waypoint to the new waypoint location.

To create a waypoint referenced from an existing waypoint...

- With the Waypoint Definition Page displayed (and user waypoint information shown), press the right arrow until the cursor is over the waypoint identifier field.
- Enter the identifier of the new waypoint using the alphanumeric and arrow keys. Press ENT when complete.
- Press the right arrow key until the cursor is over the reference waypoint identifier field.
- Enter the identifier of the desired reference waypoint (airport, VOR, NDB, intersection or user waypoint) and press ENT.
- Enter the bearing **from** the reference waypoint to the new waypoint and press ENT. The bearing will be true or magnetic depending on the unit setups. (See Section 8.6.)
- Enter the distance from the reference waypoint to the new waypoint and press ENT. The distance will be in nautical miles, statute miles or kilometers depending on the unit setups. (See Section 8.6.)

Once the waypoint location is created, the user comment field will automatically be filled with the date and time the waypoint was created. You may enter a different user comment by placing the cursor over this field and entering the new comment with the alphanumeric and arrow keys, followed by ENT when complete.

You may also modify the position of an existing user waypoint from the Waypoint Definition Page. A user waypoint may be changed using the same procedures described above for creating a user waypoint, by direct position entry (latitude/longitude or grid system) or relative to an existing waypoint. When modifying an existing waypoint, the new position data is entered directly over the old data. For a given data field, once the ENT key is pressed the position data is updated. (NOTE: If a waypoint is being used for navigation, its position cannot be modified. An attempt to modify the position of such a waypoint will result in the message "Cannot change active waypoint".)

3.8 WAYPOINT LIST

Delete All? 12 WPTS	
BGNLDM	BVRDAM
CASTLE	CRYSTL
ELKRVR	GARMIN
MTWHIT	PALMER
ROYAL	TOWER1
SUA	WPT
	LIST

The Waypoint List Page allows you to view all stored user waypoints in your GPS 95. The list may be scrolled, with the arrow keys, to view all the waypoints. From this page, waypoints may be selected for deletion, renaming or to activate a GOTO. (See Chapter 4 for information on the GOTO function.)

To delete a user waypoint...

- Select the Waypoint List Page by pressing WPT/SUA and the LIST softkey, if needed.
- With the arrow keys, place the cursor on the desired waypoint.
- Press CLR and ENT.
- A confirmation page is displayed. Press ENT to confirm or CLR to cancel.

NOTE: If you attempt to delete a GOTO or route waypoint, a message will be displayed. You must cancel the GOTO or delete the route before you can delete the waypoint. (See Chapter 4 and Section 6.5.)

The Waypoint List Page also gives you the option of deleting **all** user waypoints at one time.

To delete all user waypoints...

- Select the Waypoint List Page by pressing WPT/SUA and the LIST softkey, if needed.
- With the arrow keys, place the cursor over "Delete ALL?" and press ENT.
- A confirmation page is displayed. Highlight "yes" and press ENT to confirm the deletion of all waypoints or press CLR to cancel.

NOTE: The "Delete All?" selection will delete all routes as well.

From the Waypoint List Page you may also change the name of any user waypoint.

To rename a user waypoint...

- Select the Waypoint List Page by pressing WPT/SUA and the LIST softkey, if needed.
- With the arrow keys, place the cursor on the desired waypoint.
- Type in a new name for the waypoint and press ENT.
- A confirmation page is displayed. Press ENT to confirm the name change or CLR to cancel.

3.9 USING WAYPOINTS

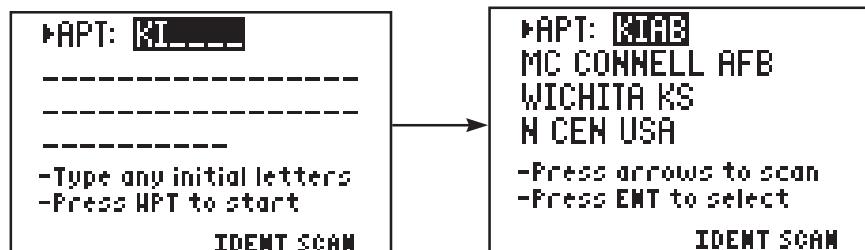
You may use waypoints on many GPS 95 pages. A waypoint is selected by entering its identifier and pressing ENT. Some waypoints in the database may have the same identifier. When you have entered a waypoint name that is not unique, the Duplicate Waypoint Page will be displayed for you to select the desired waypoint.

3 Duplicate IA
1 NDB NW USA
2 NDB GR LKS USA
3 NDB ME USA

The waypoint identifier and number of duplicates are displayed on the first line of the Duplicate Waypoint Page. On the following lines, the waypoint type and region for each duplicate waypoint is displayed, sorted by distance from present position. From this list you may select the desired waypoint by placing the cursor on the desired waypoint, using the arrow keys, and pressing ENT.

3.10 USING WAYPOINTS BY SCANNING

The GPS 95 offers a waypoint scanning feature which will simplify waypoint entry. Airports, VORs and NDBs may be scanned by identifier, city or facility name. Intersections and user waypoints can only be scanned by identifier.



To select a waypoint by scanning identifiers...

- On a blank waypoint identifier field press the WPT/SUA key. (If the identifier field is not blank, press CLR first.) The Scan Page will be displayed and the cursor will be on a cyclic field.
- Select the desired waypoint category (airport, VOR, NDB, intersection or user) by pressing CLR (repeatedly).
- Press the right arrow key once to place the cursor on the waypoint identifier field.
- Enter the starting letter, or letters, of the waypoint identifier. You may limit the scan to the level that you desire. For example, if you enter "K" the GPS 95 will scan through all waypoints (for the selected category) that begin with the letter "K"; but, if you enter "KIA" the GPS 95 will display only those waypoints that begin with "KIA".

- Press WPT/SUA to begin scanning.
- Press the right arrow key to sequence through the available waypoints. If you pass the desired waypoint, you may press the left arrow key to scan backwards through the list.
- Once the desired waypoint is selected, press ENT to accept the waypoint and complete the scan. The GPS 95 will revert to the page that you were on prior to scanning. The selected waypoint will be displayed on the waypoint identifier field.

To select a waypoint by scanning city names...

- On a blank waypoint identifier field press the WPT/SUA key. (If the identifier field is not blank, press CLR first.) The Scan Page will be displayed and the cursor will be on a cyclic field.
- Select the desired waypoint category (airport, VOR or NDB only) by pressing CLR (repeatedly).
- Press the right arrow key three times to place the cursor on the city/state field.
- Enter the starting letter, or letters, of the desired city. You may limit the scan to the desired level by designating the number of starting letters (as described above when scanning by identifier). There is no need to designate the state. Once the scan begins the appropriate state will be displayed automatically.
- Press WPT/SUA to begin scanning.
- Press the right arrow key to sequence through the available waypoints. If you pass the desired waypoint, you may press the left arrow key to scan backwards through the list.
- Once the desired waypoint is selected, press ENT to accept the waypoint and complete the scan. The GPS 95 will revert to the page that you were on prior to scanning. The selected waypoint will be displayed on the waypoint identifier field.

To select a waypoint by scanning facility names...

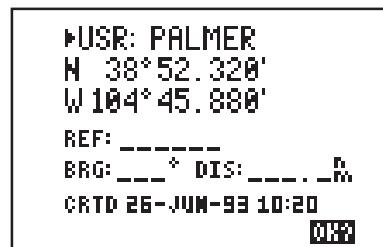
- On a blank waypoint identifier field press the WPT/SUA key. (If the identifier field is not blank, press CLR first.) The Scan Page will be displayed and the cursor will be on a cyclic field.

- Select the desired waypoint category (airport, VOR or NDB only) by pressing CLR (repeatedly).
- Press the right arrow key twice to place the cursor on the facility name.
- Enter the starting letter, or letters, of the facility name. You may limit the scan to the desired level by designating the number of starting letters (as described previously when scanning by identifier).
- Press WPT/SUA to begin scanning.
- Press the right arrow key to sequence through the available waypoints. If you pass the desired waypoint, you may press the left arrow key to scan backwards through the list.
- Once the desired waypoint is selected, press ENT to accept the waypoint and complete the scan. The GPS 95 will revert to the page that you were on prior to scanning. The selected waypoint will be displayed on the waypoint identifier field.

NOTE: When duplicate entries exist for the selected item (identifier/city/facility name), the additional entries may be viewed by continuing to press the arrow keys until the desired waypoint is selected.

3.11 REVIEWING WAYPOINTS

The GPS 95 allows you to quickly review waypoint information without entering the waypoint identifier. For example, you may review information regarding the waypoints in a route, or review the definition of the nearest waypoints. In general, if the cursor is over a waypoint identifier, you may quickly review the information about that waypoint.



To review a waypoint definition...

- Place the cursor over a waypoint identifier (using the arrow keys) and press ENT. The Waypoint Definition Page is displayed indicating the category of waypoint shown.

- If the waypoint is an airport, a second cyclic field will appear in the upper right corner of the page. You may select between location (Locn), communication (Comm) or runway (Rnwy) information by highlighting this cyclic field and pressing CLR until the desired information is displayed.
- With the cursor over “OK?”, press ENT to exit the review process and return to the previous page.

3.12 NEAREST WAYPOINTS

APT	
1 KSGF	357° 0.0M
2 3DW	099° 6.8M
3 MD42	104° 13M
4 2K2	144° 13M
5 H29	352° 22M
WPT	LIST
SUA	NRST

An important feature on the GPS 95 is the ability to display up to nine nearest waypoints (of each category) within 200 nautical miles of your present position. The bearing and distance to each nearest waypoint is also displayed. The nearest waypoint feature can be critical in finding a safe landing location in the event of an in-flight emergency.

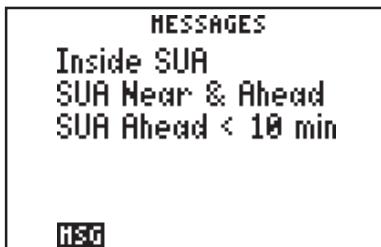
To view nearest waypoint information...

- Select the Nearest Waypoint Page by pressing WPT/SUA and the NRST softkey, if needed.
- Place the cursor key on the cyclic field in the upper left corner of the page using the arrow keys.
- Select the desired waypoint category by pressing CLR. The five nearest waypoints for that category will be displayed, along with the bearing and distance to each.
- Use the arrow keys to scroll through the list and view additional nearest waypoints (up to nine).

Keep in mind that you may view additional information for any nearest waypoint by placing the cursor on the waypoint identifier and pressing ENT. In the case of a nearest airport; facility name, elevation, fuel services, communication frequencies, and runway information are all instantly available. (See Section 3.11.)

The nearest waypoint feature can be used in conjunction with the GOTO key to provide instantaneous navigation information to a nearby waypoint. Simply place the cursor over the desired nearest waypoint identifier and press GOTO, followed by ENT. The GPS 95 will immediately plot a course from your present position to the nearby waypoint. (See Chapter 4 for more information on the GOTO key.)

3.13 SUA PAGE AND MESSAGES



The GPS 95 provides four different SUA messages (alerts) depending on your location relative to a special-use airspace. These SUA messages are only given when the SUA alarms are on and when your ground speed exceeds 30 knots. (See Section 8.10 for more information on SUA alarms.)

First, if your projected course will place you in an SUA within the next ten minutes, you will be alerted with an “SUA Ahead < 10 min” message.

Second, if you are within two nautical miles of an SUA and projected to enter it, an “SUA Near & Ahead” message will appear. If an SUA is within two nautical miles of your position, but you are not projected to enter it, an “SUA Near < 2 nm” message is provided.

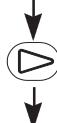
Finally, when entering an SUA, the GPS 95 will alert you with an “Inside SUA” message.

NOTE: The term “SUA” is used to describe both special-use and controlled airspaces.

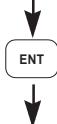
You may view additional information for each SUA / controlled airspace for which a message is provided by utilizing the SUA Page. The SUA page lists any SUA you are within, near or that lies ahead (less than ten minutes away). For SUAs that lie ahead of you, the estimated time en route (ETE) before entry may also be displayed. Additional information, such as airspace type, floor/ceiling limits and controlling agency, may be displayed by selecting the desired airspace.

To view additional SUA information...

Highlight SUA
1 SEATTLE
2 RAINIER THREE
3 RAINIER TWO
4 R-6703C
5 _____
MSG MRST WPT LIST SUA



Near & Ahead 0:22
1 **SEATTLE**
2 RAINIER THREE
3 RAINIER TWO
4 R-6703C
5 _____
MSG MRST WPT LIST SUA



Near & Ahead 0:10
SEATTLE
Class B Airspace
SEATTLE APP
10000 MSL
MSG 6000 MSL 089

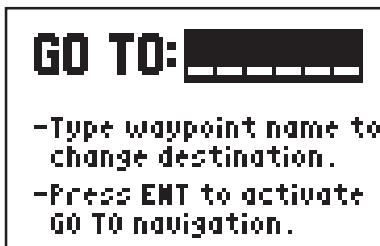
- Press the WPT/SUA key to select the SUA Page.
- Using the arrow keys, highlight the desired SUA. The top line of the SUA Page will change from "Highlight SUA" to "Inside", "Ahead", "Near" or "Near & Ahead". If the SUA lies "Ahead", estimated time en route to that SUA's boundary will appear in the upper right corner of the page.
- Press ENT. Additional information appears describing the type of airspace, controlling agency and floor/ceiling limits.
- Press ENT again to return to the SUA page.

NOTE: For Class B / CTA and Class C / TMA airspaces, the SUA Page provides additional information for each sector you are in, near, or that lies ahead.

CHAPTER 4

GETTING THERE FAST - GOTO

The GOTO function allows you to quickly set a course from your position to any waypoint.



To activate the GOTO function...

- Press GOTO. The GOTO Page will be displayed with the cursor on the GOTO waypoint field. If the GPS 95 is currently navigating to a waypoint, that waypoint will be offered as the default GOTO waypoint.
- Enter the name of the destination waypoint. If a waypoint is shown and it is not the desired destination, type the new name right over the old name. (NOTE: If a non-existent waypoint name is entered, the GPS 95 will assume that this is a new user waypoint and will display a blank Waypoint Definition Page where you may enter the new waypoint's coordinates.)
- Confirm the GOTO waypoint by pressing ENT. The Navigation Summary Page will be displayed with the D-bar on the CDI centered. (See Section 5.1 for more information on the Navigation Summary Page and the CDI.)

You may also select the desired GOTO waypoint identifier by scanning. If the desired waypoint is an airport, VOR or NDB; you may scan by city or facility name (as well as identifier) to select the desired GOTO waypoint identifier. (See Section 3.10 for more information on waypoint scanning.)

Alternatively, the GOTO function may be quickly activated from any page (e.g., the Nearest Waypoint Page or the Waypoint List Page) by placing the cursor over the desired waypoint name and pressing GOTO. The GOTO Page will be displayed with the cursor on the GOTO waypoint name. The GOTO function will be activated when the ENT key is pressed.

You may cancel the GOTO function at any time.

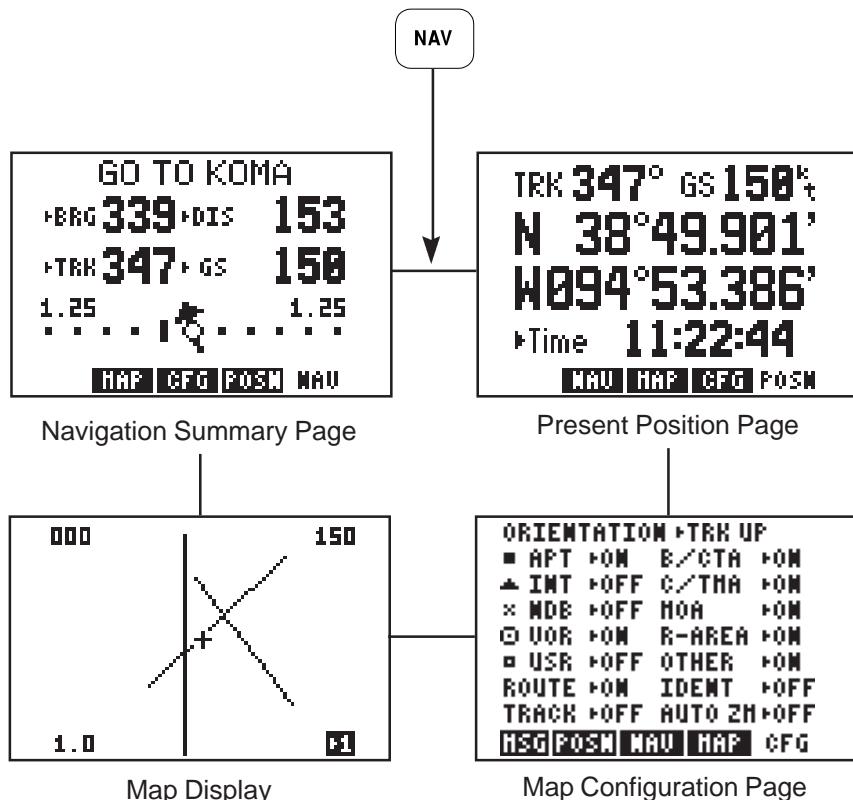
To cancel the GOTO function...

- Press GOTO. The GOTO Page will be displayed.
- Press CLR. The GOTO waypoint name will become blank.
- Press ENT. The GPS 95 will start to navigate using the active route, if it has been programmed. (See Chapter 6.) Otherwise, the GPS 95 will stop computing waypoint navigation data.

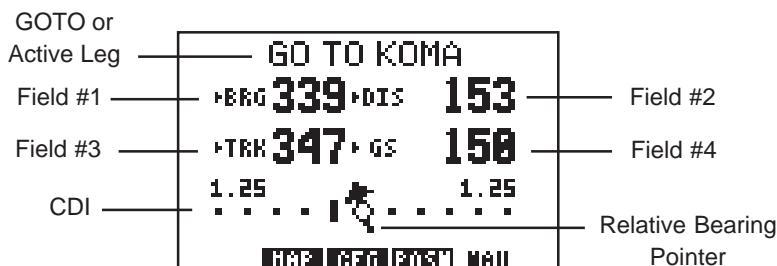
CHAPTER 5

NAVIGATION INFORMATION

The GPS 95 features four navigation pages. You may select the desired page by pressing NAV and, if needed, the appropriate softkey.

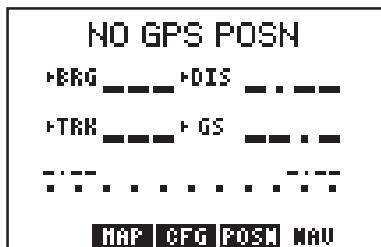


5.1 NAVIGATION SUMMARY PAGE



The Navigation Summary Page displays direction, distance and speed information to guide you along a route or to a GOTO destination. Included is a graphic course deviation indicator (CDI), at the bottom of the page, which illustrates your position relative to the course. The current CDI scale setting is shown at each end of the CDI scale. (See Section 8.11 for information on setting the CDI scale.) A relative bearing pointer at the center of the CDI indicates the bearing to the waypoint relative to the current ground track (TRK). In the example shown, the current ground track is 347 degrees and the bearing to our destination is 339 degrees. The relative bearing pointer points slightly to the left indicating that our destination is ahead, but slightly to the left of our current direction of travel.

At the top of the Navigation Summary Page the current GOTO destination is displayed, or the “active leg” of a route when using the GPS 95’s route navigation features. (See Chapter 6 for information on route navigation.) During the process of acquiring satellites, the GPS 95 will not provide navigation data. The top line of the Navigation Summary Page will indicate this condition, as illustrated below.



If the GPS 95 has acquired satellites, but is not navigating to a waypoint (i.e., no GOTO destination or route has been activated), the top line of the Navigation Summary Page will indicate that no destination has been defined, as illustrated below.



Notice that the Navigation Summary Page has four cyclic fields. With these cyclic fields you may configure your GPS 95 to display navigation information according to your preferences. (See Appendix B for a description of navigation terms.) The field options are as follows:

Field #1 (top left)

- Bearing to destination waypoint (BRG)
- Course to steer (CTS)
- Desired track (DTK)
- Ground track (TRK)
- Off course error, or turn angle (TRN)

Field #2 (top right)

- Distance to destination waypoint (DIS)
- Cross track error (XTK)
- VNAV altitude (V)

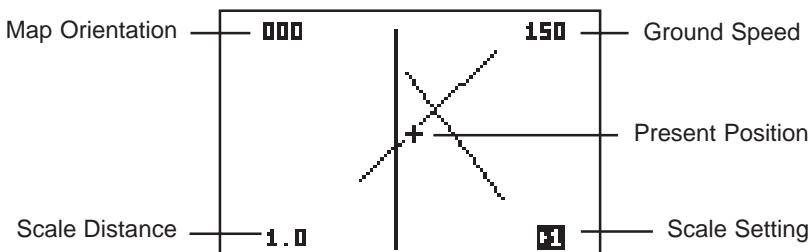
Field #3 (bottom left)

- Ground track (TRK)
- Ground speed (GS)

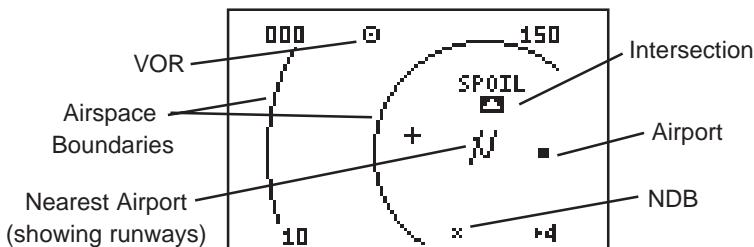
Field #4 (bottom right)

- Ground speed (GS)
- Estimated time of arrival (ETA)
- Estimated time enroute (ETE)

5.2 MAP DISPLAY



The GPS 95 also features a Map Display which shows a graphic top view of your location. The current ground speed is indicated at the top right corner of the display. The top left corner defines the orientation of the Map Display: "North up", "Track up", or "Desired track up." If "000" is shown, the Map Display is oriented "North up." (See Section 5.3 for selection of Map Display orientation.) Your present position is shown in the middle of the display. If the Map Display is oriented "Track up" your present position is indicated by an aircraft symbol. If either "North up" or "Desired track up" orientations are selected, the present position is indicated by a crosshair ("+").



You may select which items you wish to display. The Map Display can provide the fifteen nearest waypoints of each category: airport, VOR, NDB, intersection, and user. GOTO or route waypoints which are not part of the fifteen nearest waypoints will also be displayed. The Map Display can draw the boundaries of nearby special-use / controlled airspaces. The track history and/or the active route may also be shown as solid lines on the display. Selection of which items to display is performed on the Map Configuration Page. (See Section 5.3.)

You may view the identifier for any waypoint on the Map Display by moving the cursor over that waypoint (with the arrow keys). By moving the cursor around the page you can identify each waypoint shown. Keep in mind that when the cursor is over a given waypoint you may review information about that waypoint by pressing ENT, or plot a course to that waypoint by pressing GOTO. (HINT: When viewing waypoint identifiers you may quickly return the cursor to the lower right corner by pressing CLR.)

The scale distance for the screen (distance represented by the height of the screen) is at the lower left corner of the screen. The scale setting number (bottom right corner) may be changed to select the desired scale distance. You may zoom in to a .5 nautical mile scale, or out to a maximum scale of 240 nautical miles.

To set the Map Display scale...

- With the cursor on the scale setting number, press CLR to sequence through the available scale settings. (HINT: The scale setting may also be selected by pressing the alphanumeric key that corresponds to the desired scale.)

5.3 MAP CONFIGURATION



The Map Configuration Page allows you to tailor the GPS 95's Map Display to your preferences. As previously stated, the Map Display can show airports, NAVAIDs, user waypoints, airspace boundaries, the active route, your track history and/or waypoint identifiers. Any of these items may be turned on or off according to your preferences. For example, when the Map Display is zoomed out to its maximum levels the screen may appear too cluttered to be easily read. In this case, you could turn off the information not needed to create a more legible display.

NOTE: The "Other" airspaces selection includes Alert, Caution, Danger, Training and Warning areas.

To turn display information on/off...

- Press NAV and the CFG softkey, if needed, to select the Map Configuration Page.
- Place the cursor on the desired item using the arrow keys.
- Press CLR to toggle between "on" and "off".
- If you wish to return to the Map Display: place the cursor on the page options using the arrow keys, then press the MAP softkey.

An auto zoom feature is provided for automatic scaling of the Map Display. With this feature on, the scale setting will automatically adjust as you approach your destination. Starting at 80 nautical miles during en route flight, the Map Display will zoom in progressively, stopping at a one nautical mile scale as you arrive at your destination. (When navigating via a route, the scale will begin at a maximum 80 nautical miles en route setting and zoom in to one nautical mile at each waypoint along the route. As you cross over each interim waypoint, the Map Display will zoom back out to no more than 80 nautical miles.)

The Map Display orientation is also selected from the Map Configuration Page. The Map Display may be oriented as follows:

- North up - The Map Display will always be displayed with north as the top of the page.
- TRK up - Track up. The Map Display will be oriented such that your current ground track direction is at the top of the page.
- DTK up - Desired track up. The Map Display will be oriented along the course between the “active from” and “active to” waypoints.

5.4 PRESENT POSITION



As mentioned earlier, the Present Position Page is automatically displayed when the GPS 95 is turned on and a position is obtained. The top line of this page displays your ground track (TRK) and ground speed (GS). The next two lines indicate your current position according to the coordinate format and map datum selected. In the example shown above, the position is displayed in degrees and decimal minutes of latitude/longitude. (See Section 8.6 for more information on coordinate format selections and Section 8.7 for more information on map datum selections.)

The bottom line of the Present Position Page is a cyclic field which can display either altitude above mean sea level (MSL) or current time (UTC or local). Select the desired option by placing the cursor on this field and pressing CLR.

When the GPS 95 is performing 2D navigation, the last known altitude will be used to calculate a present position. If the altitude is not accurate within a few hundred feet you should manually enter your altitude.

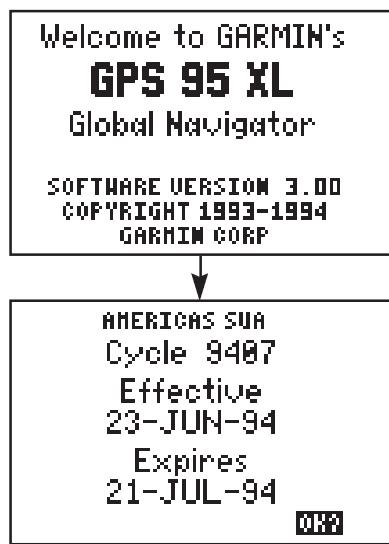
To enter the altitude (2D only)...

- Use the arrow keys to place the cursor to the right of "Altitude".
- Enter the correct altitude and press ENT.

During the initial satellite acquisition, the displayed position is the last known position stored in the GPS 95. If your position has moved over one thousand miles since the unit was last used, you may want to select AutoLocate mode. (See Section 8.5.) Alternatively, you may enter a more accurate initial position directly on the Present Position Page to speed up the acquisition process. (You may also change the position at any time while you are in simulator mode.)

5.5 SAMPLE TRIP

Your new GPS 95 is really very simple to operate. For the purpose of this demonstration it is assumed that the factory default settings, including the selection of nautical units (knots, nautical miles, feet), have not been changed. If these settings have been changed, the unit may display different data than that presented here. (See Chapter 8 on unit setups.)

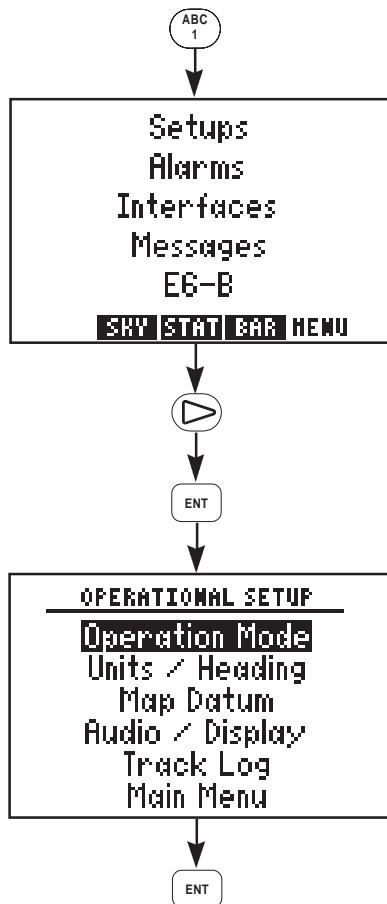


Turn the GPS 95 on. The unit will display the welcome screen and perform several diagnostic checks to ensure that proper operation will occur.

The Database Page will be displayed showing the cycle, effective date and expiration date of the database. Review the database information and press ENT to approve the information.

Since this is a simulated trip, you will select the simulator mode and indicate a starting location for the trip. Your simulated trip will begin at an intersection called LENEX in Lenexa, Kansas. (NOTE: This sample trip assumes that the Americas database is used. If you are using the International database follow the general steps outlined in this sample trip, but substitute waypoints from your area of interest.)

To select simulator mode and define a starting location...

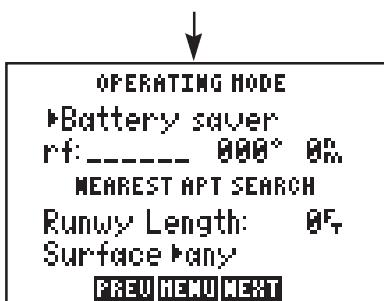


Press the MENU softkey (the “1” key, in this case) to display the Menu Page.

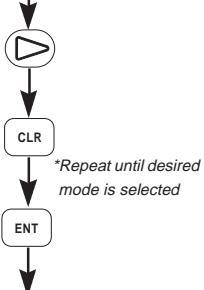
Place the cursor on “Setups” using the right arrow key and press ENT.

The Operational Setup sub-menu is displayed with “Operation Mode” highlighted.

Press ENT to select “Operation Mode”.



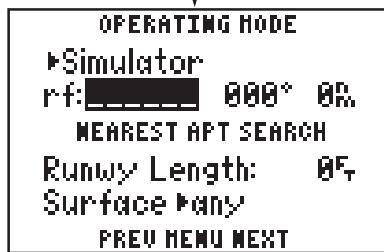
The Operating Mode Page is displayed showing the current operational mode.



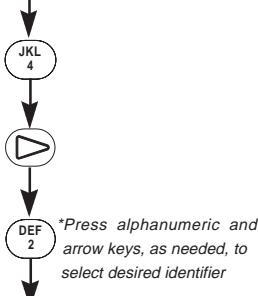
Place the cursor on the operational mode field using the right arrow key.

Press CLR until "Simulator?" is selected.

Press ENT to accept simulator mode.



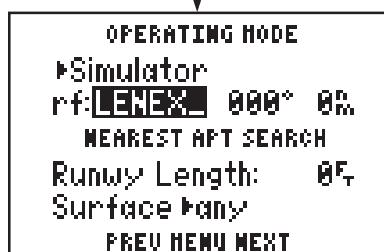
The cursor is now on the reference waypoint identifier. The intersection, LENEX, will be entered here using the alphanumeric keys.

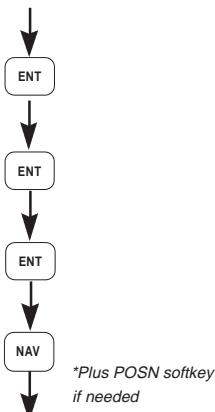


Press the "4" key, followed by the right arrow key to select the letter "L".

Press the "2" key to select the letter "E".

Continue pressing the desired alphanumeric keys and, if needed, the arrow keys to enter the "LENEX" intersection. Press ENT when complete.





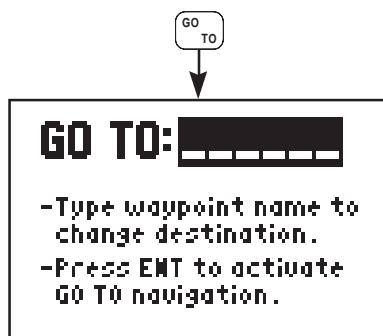
The cursor is over the reference bearing. Since the simulation will begin at LENEX you do not need to define a reference bearing from this point. Press ENT.

The cursor is over the reference distance with zero shown. Press ENT. The initial position is now set at the LENEX intersection.

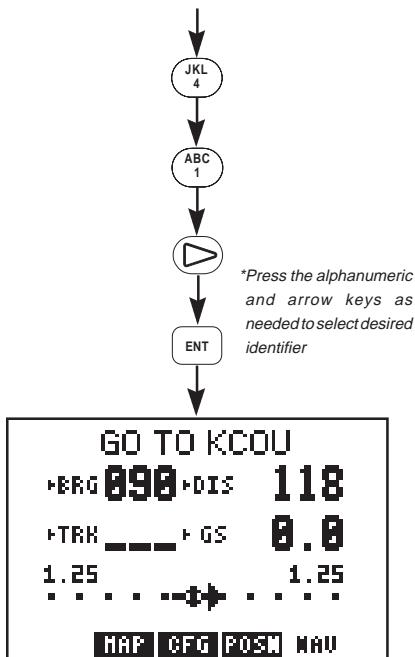
You can view your position coordinates by pressing NAV and the POSN softkey, if needed. The Present Position Page is displayed.

From your starting location at the "LENEX" intersection you may plot a course and navigate to a nearby airport. For this sample trip you will fly to KCOU, Columbia Regional Airport.

To select a destination waypoint...



Navigating to a waypoint is easy. Press GOTO and the GPS 95 will display the GOTO Page, as illustrated. Notice that the cursor is to the right of "GOTO". On this field you will enter the identifier of your destination waypoint, KCOU.



Press the “4” key to select the letter “K”.

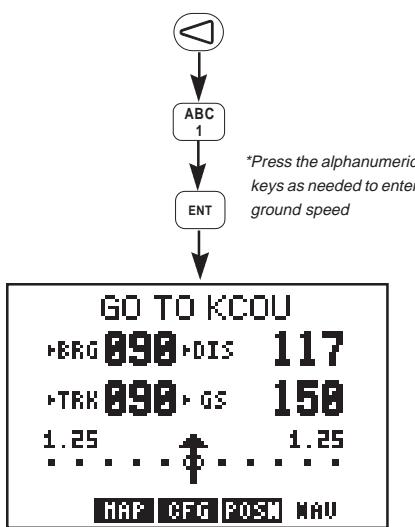
Press the “1” key followed by the right arrow key to select the letter “C”.

Continue pressing the desired alphanumeric keys and, if needed, the arrow keys to enter the KCOU airport identifier. Press ENT when complete.

The Navigation Summary Page is displayed showing navigation information for your trip to KCOU.

The GPS 95's simulator mode allows you to enter a ground speed which is used to animate the navigation displays.

To enter a simulated speed...



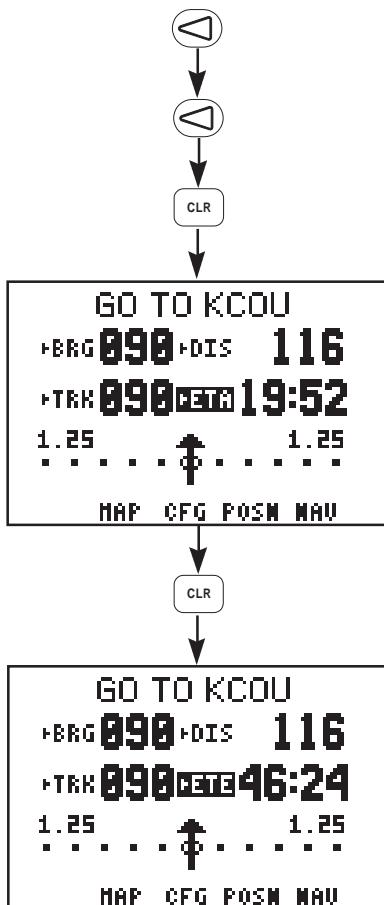
Press the left arrow key to place the cursor on the ground speed field (bottom right).

Enter a ground speed of 150 knots. Begin by pressing the “1” key. Continue pressing the alphanumeric keys until “150” is displayed. Press ENT when finished.

The GPS 95 now displays additional navigation information as it simulates a flight to KCOU. Notice the information changing as the flight progresses.

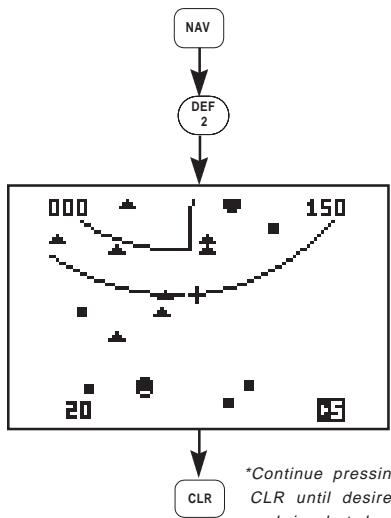
Additional information is available from the Navigation Summary Page. You may recall from Section 5.1 that this information is viewed by highlighting one of the four cyclic fields and pressing CLR. Let's take a look at one of those fields now.

To view additional navigation information...



The GPS 95's Map Display is also useful to help "orient" yourself. The Map Display can show area airports, NAVAIDS, and intersections as points of reference.

To view the Map Display...



Press NAV and the MAP softkey.

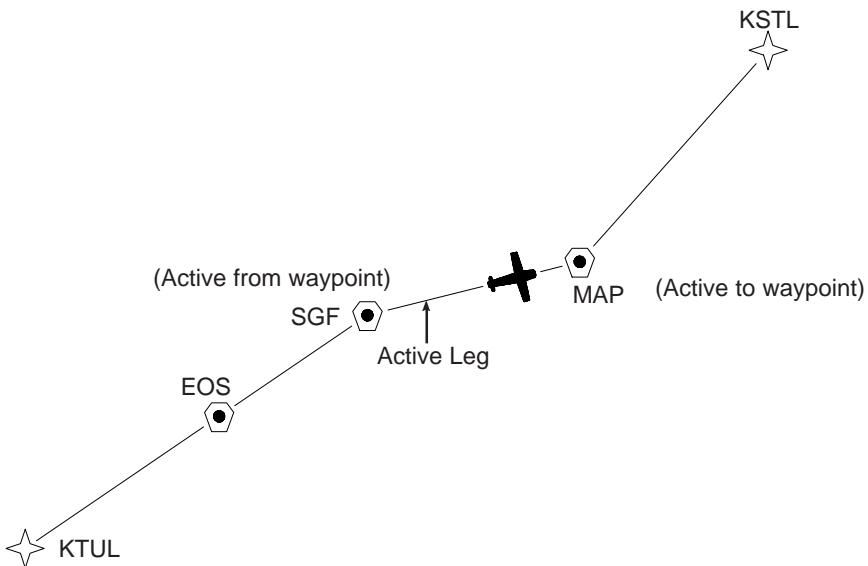
The Map Display is shown indicating your position at the center of the screen and nearby waypoints. (Section 5.3 covers the Map Configuration Page and shows what types of information are available on the Map Display.)

Press CLR (repeatedly) to select the desired scale.

The simulated trip has demonstrated only a small portion of the GPS 95's many features. Take a moment to experiment with your new unit. Review this chapter, covering types of information on the Navigation Summary Page and the Map Display. Look at waypoint and airspace information by taking another glance at Chapter 3. Read Chapter 6 to learn more about routes. Customize the GPS 95 according to your preferences as described in Chapter 8.

CHAPTER 6

ROUTES

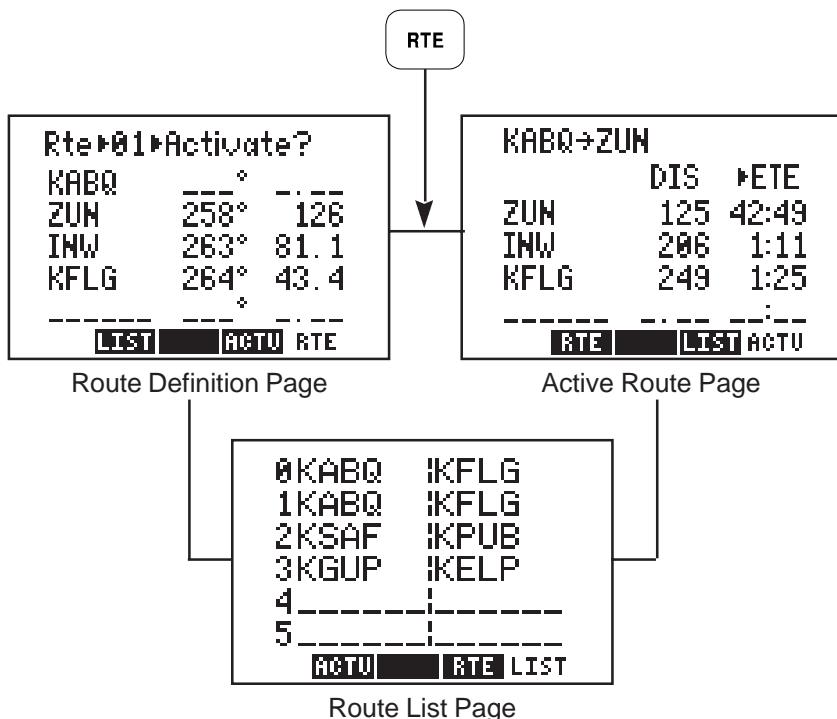


The GPS 95 offers a route navigation feature for you to navigate along a pre-defined sequence of waypoints.

The GPS 95 route capability allows you to create and store twenty routes, numbered 0 through 19, containing up to 30 waypoints each. Routes 1 to 19, the storage routes, can be activated to travel either in the order you entered the waypoints or in reverse order. Route 0, the active route, is the route you are navigating. The waypoint toward which you are navigating is called the "active to" waypoint. The waypoint immediately behind you is called the "active from" waypoint. The line that connects the "active from" and "active to" waypoints is called the "active leg."

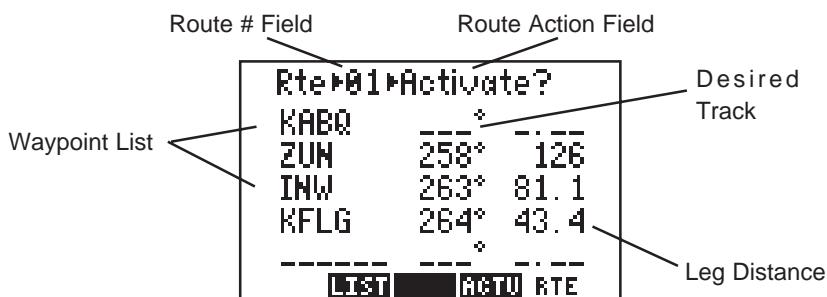
The GPS 95 features automatic leg selection which will select the route segment closest to your position as the active leg. The GPS 95 also features automatic leg sequencing. As you pass a waypoint in the route, the unit will automatically select the next waypoint as the "active to" waypoint.

There are 3 route pages. You may select the desired page by pressing RTE and, if needed, the appropriate softkey.



6.1 ROUTE DEFINITION

The Route Definition page allows you to create, change, review, copy, and activate routes. Remember that route 0 is always the active route. If you create a route in route 0, you should copy it into an empty storage route (1-19). When you activate a storage route, it will be copied to route 0 for activation.

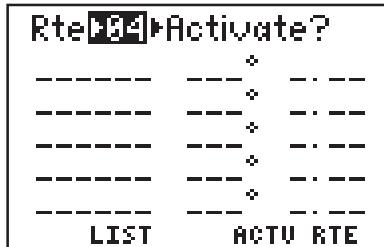


On the route number field, you may choose between routes 0 through 19 with CLR. Next to this is a route action field which allows you to activate the route, clear the route, copy the route to another location, or invert the order of the waypoints in a route and activate it. The arrow keys allow you to scroll through the list of waypoints in a route.

6.2 CREATING AND COPYING ROUTES

The Route Definition Page allows you to create new routes and to copy a route to another location for later reference.

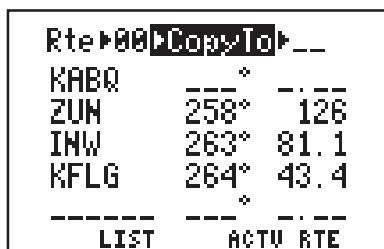
To Create a Route...



- Press RTE and, if needed, the RTE softkey to display the Route Definition Page.
- Move the cursor to the route number field and press CLR until you find an empty route. (HINT: Although the route number field is a cyclic field, to speed selection you may also enter the desired route number using the alphanumeric keys.)

- Place the cursor on the first blank waypoint name field using the arrow keys and type in a waypoint you wish to put in the route.
- Press ENT
- Repeat this process for each waypoint you want to add, up to a total of 30.

To copy a route...



- Press RTE and, if needed, the RTE softkey to display the Route Definition Page.
- Highlight the route number field with the cursor and select the route number to copy from with CLR.

- Highlight the route action field with the arrow keys and press CLR until "Copy To" is displayed.
- A third field now appears in the top right corner. Highlight this field and select the destination route number with CLR.
- Press ENT. The route is now copied.

6.3 ACTIVATING AND INVERTING ROUTES

Routes are also activated on the Route Definition Page. You may activate any route in the displayed order, or in reverse order. (NOTE: Remember, when a new route is activated, the previous contents of route 0 will be overwritten. If you wish to save route 0, be sure to copy it to an empty route first.)

Rte#01>Activate?		
KABQ	258°	126
ZUN	263°	81.1
IHW	264°	43.4
KFLG	258°	126
-----	-----	-----
LIST	ACTV RTE	

To activate a route...

- Press RTE and, if needed, the RTE softkey to display the Route Definition Page.
- Highlight the route number field with the cursor and select the route number to activate with CLR.

- Highlight the route action field, and with CLR select “Activate?”.
- Press ENT to activate the route.

Rte#01>Invert?		
KABQ	258°	126
ZUN	263°	81.1
IHW	264°	43.4
KFLG	258°	126
-----	-----	-----
LIST	ACTV RTE	

To invert a route...

- Follow the same steps as above for activating a route, but select “Invert?” at the route action field.
- Press ENT to activate the route in an inverted order.

6.4 EDITING ROUTES

Existing routes may be edited from the Route Definition Page.

To Edit an Existing Route...

Rte#01>Activate?		
KABQ	258°	126
ZUN	263°	81.1
IHW	264°	43.4
KFLG	258°	126
-----	-----	-----
LIST	ACTV RTE	

- Press RTE and, if needed, the RTE softkey to select the Route Definition Page.
- Highlight the route number field with the cursor and select the route you wish to edit.

Rte #01 Activate?			
KABQ	---	---	+
ZUM	258°	126	
INW	263°	81.1	
FRISY	280°	32.1	
KFLG	229°	15.2	
LIST	ACTV	RTE	

- To insert a waypoint into the route: highlight the waypoint you want to place the new waypoint in front of, type in the new waypoint name and press ENT. The new waypoint is added to the route.
- To delete a waypoint from the route: highlight the waypoint you wish to delete, press CLR and ENT.

- If you attempt to add a waypoint to a route that already contains 30 waypoints, you will be informed with the message, "Route is Full".

NOTE: You may also edit a route from the Active Route Page. (See Section 6.6.)

6.5 DELETING ROUTES

You may delete an unwanted route from the Route Definition Page.

Rte #01 Clear?			
KABQ	---	---	+
ZUM	258°	126	
INW	263°	81.1	
FRISY	280°	32.1	
KFLG	229°	15.2	
LIST	ACTV	RTE	

To delete a route...

- Highlight the route number field and select the route you wish to delete with CLR.
- Highlight the route action field and select "Clear?" with the CLR key.
- Press ENT to delete the route.

6.6 ACTIVE ROUTE

Active Leg	KABQ → ZUM		Distance
Waypoint List	ZUM	DIS 125	ETE 42:49
	INW	206	1:11
	KFLG	249	1:25
		-----	-----
	RTE	LIST	ACTV

The Active Route Page displays the waypoints of the active route starting with the "active from" and "active to" waypoints on the top line. Press the ACTV softkey to select this page.

The waypoint list displays route waypoints starting with the “active to” waypoint. For each waypoint, additional information is available. The first column displays Distance (DIS). The second column is a cyclic field that displays Estimated Time Enroute (ETE, in hours/minutes or minutes/seconds, as appropriate), Estimated Time of Arrival (ETA), or Desired Track (DTK). You may scroll through the waypoint list with the arrow keys.

To edit the active route...

- To insert a waypoint: highlight the waypoint you want to place the new waypoint in front of, type in the new waypoint name and press ENT. The new waypoint is added to the route.
- To delete a waypoint: highlight the waypoint you wish to delete, press CLR and ENT.

6.7 ROUTE LIST

0	KABQ	IKFLG
1	KABQ	IKFLG
2	KSAF	IKPUB
3	KGUP	IKELP
4	-----	-----
5	-----	-----
	ACTU	RTE LIST

The Route List Page displays a list of all routes currently stored in memory. Press the LIST softkey to select this page. The Route List Page displays the route numbers (far left), beginning waypoint, and final destination waypoint. You may also activate or delete a route from the Route List Page.

To Activate a Route...

- Highlight the route you wish to activate with the arrow keys.
- Press ENT. The Route Definition Page is displayed with the “Activate?” action highlighted.
- Press ENT to activate the route.

To Delete a Route...

- Highlight the route you wish to delete using the arrow keys. Press CLR. The Route Definition Page is displayed with the “Clear?” action highlighted.
- Press ENT to delete the route.

CHAPTER 7

AUTOSTORE™

The AutoStore function allows you to capture your position at the touch of a button for future reference. This function saves your current position as a waypoint. Additionally, you may record your navigation path by inserting the captured waypoints directly into a route.



The AutoStore Page displays the waypoint identifier, captured position and optional storage route. An AutoStore waypoint name is pre-assigned as a three digit number. You may change this to any name you desire. AutoStore waypoints may be used for any waypoint operation and will be part of the 500 available user waypoints.

7.1 CREATING WAYPOINTS WITH AUTOSTORE



You may capture and save your position as a waypoint, without adding it to a route, by leaving the route storage number field blank.

To capture present position ...

- Press AUTOSTO. The pre-assigned waypoint identifier and captured position are displayed. (NOTE: The AutoStore location is captured as soon as you press AUTOSTO. This allows you all the time you need to change the waypoint name and/or confirm the AutoStore operation.)
- If you wish to assign a different identifier to the waypoint: move the cursor to the waypoint name field, enter the name of your choice and press ENT. If you enter a waypoint name already used, you will be informed with the message, "WPT Exists _____" (where the blank will be filled in with the waypoint identifier). Enter a different identifier if this occurs.
- Press ENT on a blank route storage number field to save the waypoint. (If the route storage number field is not blank, the waypoint will also be added to the route shown.)

7.2 BUILDING ROUTES WITH AUTOSTORE



The GPS 95's AutoStore feature may also be used to build a route as you are flying. During your flight; as you reach each airport, NAVAID, landmark, or turn to a new heading; you may capture your position and add it to a route. Once you reach your destination you can then invert the route and follow the same course back to where you started. Or, you may want the route for future reference if you wish to make the same flight again.

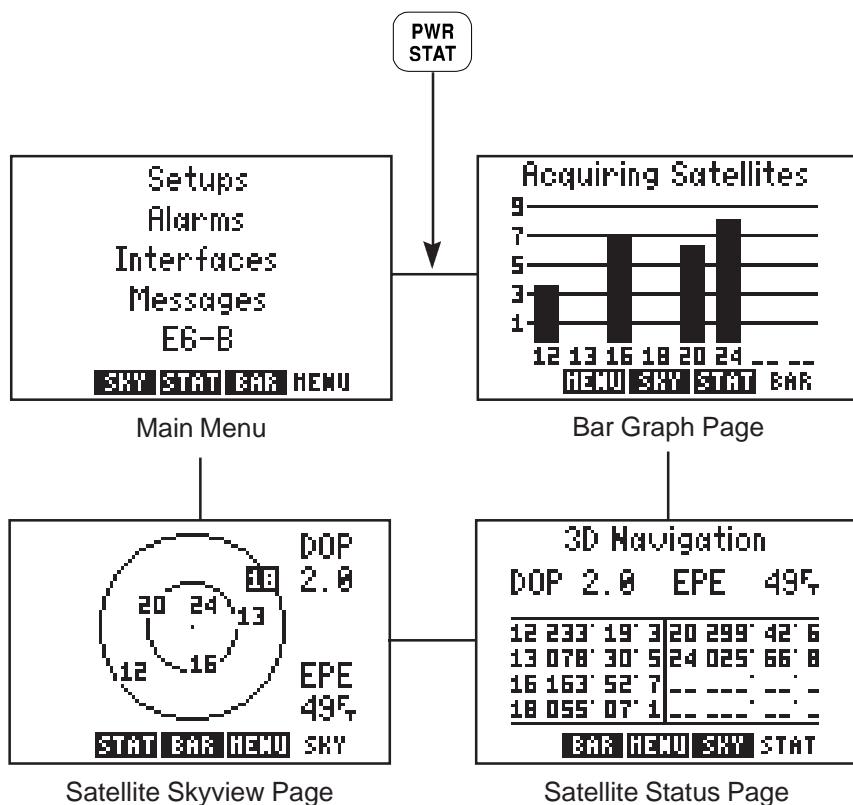
To build a route with AutoStore...

- From the starting location, press AUTOSTO to capture the position. (NOTE: The unit must be in 2D or 3D navigation mode when capturing your starting position. If the unit is still acquiring satellites, and you press AUTOSTO, the last known position will be captured and saved.)
- If you wish to assign a different identifier to the waypoint: move the cursor to the waypoint name field, enter the name of your choice and press ENT. If you enter a waypoint name already used, you will be informed with the message, "WPT Exists _____" (where the blank will be filled in with the waypoint identifier). Enter a different identifier if this occurs.
- Select a route to store the waypoint in by highlighting the route storage number field and pressing CLR until the desired route number is displayed. If the selected route is not empty, the AutoStore waypoint will be added to the end of the existing route. (HINT: Although the route storage number field is a cyclic field, to speed selection you may also enter the desired route number using the alphanumeric keys.)
- Press ENT to add the waypoint to the selected route.
- Repeat these steps each time you arrive at a location you wish to add to the route, up to a total of 30 waypoints per route.

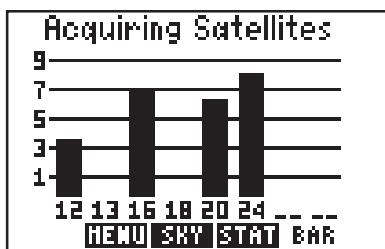
CHAPTER 8

GPS STATUS AND MENU PAGES

The GPS 95 contains a vast array of functions, many of which you may custom tailor to your preferences. Additionally, the unit can provide current status information regarding the satellites being received and display messages relevant to your current operations. You may select the desired page by pressing PWR/STAT and, if needed, the appropriate softkey.



8.1 BAR GRAPH PAGE



The GPS 95 continually monitors the status of the satellites it tracks and shows that information graphically on a Bar Graph Page. Satellite numbers (1-32) are represented along the bottom of the graph; signal strength (1 to 9, weakest to strongest) is represented along the side. Once a satellite is received, a bar is displayed showing

signal strength for that satellite. If a satellite is visible, but not being received, the signal strength will be blank.

The receiver status is also shown at the top of the page. In this example, the unit is acquiring satellites. The following is a list of possible receiver status messages:

“Searching the Sky”

The GPS 95 is in the process of searching the sky for visible satellites. You will also be informed of this condition with a “Searching the Sky” message.

“Acquiring Satellites”

The GPS 95 is in the process of acquiring visible satellites.

“2D Navigation”

The GPS 95 is in the 2D navigation mode. The unit will calculate a horizontal position, but not altitude.

“3D Navigation”

The GPS 95 is in the 3D navigation mode and will calculate altitude

“Simulating Navigation”

The GPS 95 is in the simulator mode. This mode should be used only for practice and trip planning. Never use this mode for actual navigation.

“Poor Coverage”

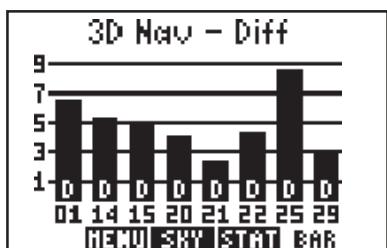
The GPS 95 is unable to acquire sufficient satellites for navigation.

“Need Altitude”

The GPS 95 needs altitude in order to start and/or continue 2D navigation. Go to the Present Position Page and enter the altitude. (See Section 5.4.)

“Not Usable”

The GPS 95 is unusable (possibly due to incorrect initialization data or abnormal satellite conditions). Turn the unit off and back on.



page. There are two additional receiver status messages available when using an RTCM input:

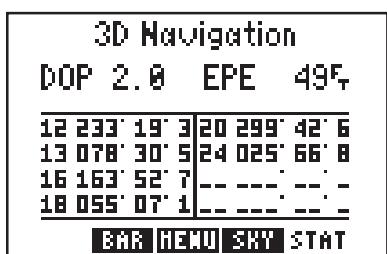
“2D Nav - Diff”

The GPS 95 has calculated a differentially-corrected horizontal position. Altitude has not been corrected.

“3D Nav - Diff”

The GPS 95 has calculated a differentially-corrected position, including altitude.

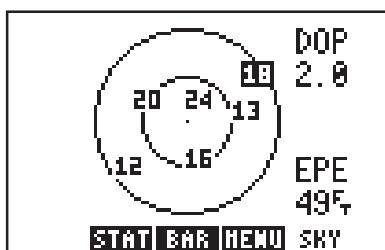
8.2 SATELLITE STATUS PAGE



The Satellite Status Page shows the ID, azimuth, elevation, and signal quality of each visible satellite in a table format. The receiver status, again, is displayed at the top of the screen. The second line displays two system quality values - dilution of precision (DOP) and estimated position error (EPE). EPE and DOP are advisory information only and are not to

be used as absolute measures of accuracy. (See Appendix B for definitions of these terms.)

8.3 SATELLITE SKYVIEW PAGE



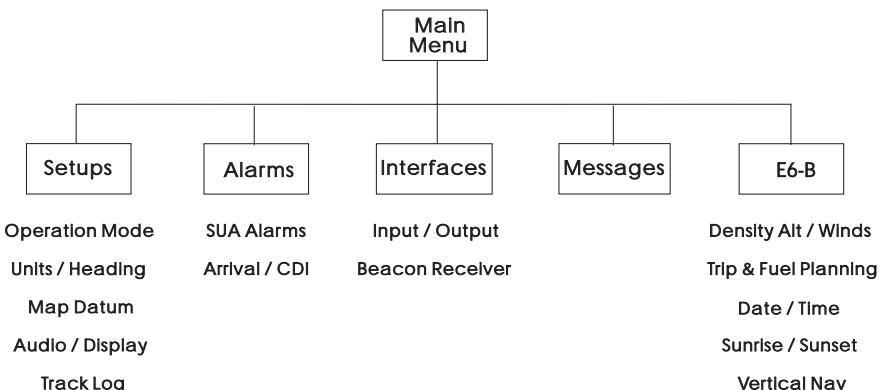
mountains, or other obstructions. Satellite elevation is indicated by the distance (of a given satellite) from the center of the display. The center represents directly overhead, or 90° elevation. The inner ring represents 45° elevation and the outer ring is the horizon, or 0° elevation. If a satellite is not currently being received, it will be highlighted on the display.

8.4 MENU PAGES



The GPS 95's menu pages allow you to do setup functions to customize your unit and E6-B calculations to plan your flight. The Main Menu lets you select from five functional categories: Setups, Alarms, Interfaces, Messages and E6-B calculations. Selecting "Messages" lets you view the Message Page. Selecting one of the other items

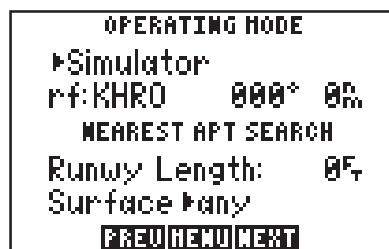
reveals a sub-menu allowing you to perform the functions under that category. The diagram below shows the organization of the Main Menu and sub-menu pages.



Once an item is selected PREV, MENU, and NEXT page options will be displayed. The softkeys allow changing to the previous (PREV) and next (NEXT) pages for that category. The MENU softkey takes you back to the sub-menu page. (HINT: The PREV and NEXT softkeys will only select the pages within that category. To change between categories you must return to the Main Menu first.)

The following sections describe the function of each item provided under the Main Menu and sub-menu pages.

8.5 OPERATING MODE/NEAREST AIRPORT SEARCH (SETUPS)



From this page, you may change between various operating modes by highlighting the operating mode field and pressing CLR. You may select simulator mode, normal mode, battery saver mode or AutoLocate mode. (See Section 1.5 for a description of each mode.)

Below the operating mode field is a reference waypoint field to define an initial position. In simulator mode you may designate a starting point from which the simulation will begin. In normal and battery saver modes, the initial position may be defined to reduce satellite acquisition time.

To define an initial position...

- Select the desired operating mode by placing the cursor on the operating mode field and pressing CLR.
- Press ENT to select the desired mode.
- Enter the identifier of the desired reference waypoint (airport, VOR, NDB, intersection or user waypoint) and press ENT.
- Enter the bearing from the reference waypoint to the desired location and press ENT. The bearing will be true or magnetic depending on the unit setups. (See Section 8.6.)
- Enter the distance from the reference waypoint to the desired location and press ENT. The distance will be in nautical miles, statute miles or kilometers depending on unit setups. (See Section 8.6.) (HINT: If a distance of zero is entered, the initial position will be at the selected reference waypoint.)

The Operating Mode/Nearest Airport Search Page also allows you to select the characteristics of the GPS 95's nearest airport function. Pilots of large, high-performance aircraft may direct the nearest airport function to ignore those airports at which it would be difficult, if not impossible, to land their aircraft. You may set the minimum runway length and the surface type for airports selected by the nearest airport function.

To set the minimum runway length...

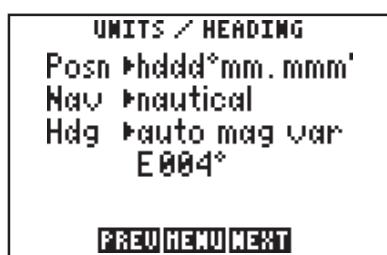
- Place the cursor on the runway length field using the arrow keys.
- Enter the minimum runway length using the alphanumeric keys.
- Press ENT.

To set the desired runway surface...

- Place the cursor on the runway surface field using the arrow keys.
- Select the desired surface type by pressing CLR. You may select from any surface (any), hard surface only (hard only), soft/hard surface only (soft/hard), or water surface only (water only).

WARNING: Be extremely cautious when selecting the nearest airport search characteristics, particularly if you select a large runway length and/or water surface type. These selections are designed for specialized aircraft operations and will tend to eliminate many available airports from the nearest airport list which might otherwise be useful in the event of an emergency.

8.6 UNITS/HEADING SETUP (SETUPS)



The Units/Heading Page is used to select the units to display for position, distance, speed and heading information. Select the desired position units by highlighting the "POSN" field and pressing CLR. You may choose between decimal degrees (hddd.dddd°); degrees and decimal minutes (hddd°mm.mmm'); degrees, minutes and decimal seconds (hddd°mm'ss.s"); UTM/UPS coordinates; or various other regional grids.

minutes and decimal seconds (hddd°mm'ss.s"); UTM/UPS coordinates; or various other regional grids.

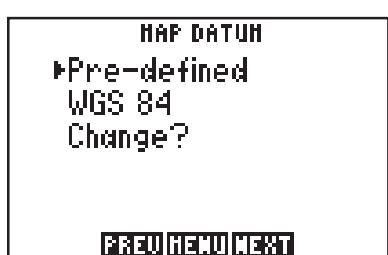
Select the desired distance, speed and altitude units by highlighting the “NAV” field and pressing CLR. You may choose between nautical (nautical miles/knots/feet), statute (miles/miles per hour/feet), or metric (kilometers/kilometers per hour/meters) units. (NOTE: The NAV units setting also defines the pressure, temperature and vertical speed units that will be used for E6-B calculations.)

Heading information can be displayed referencing magnetic north (automatically calculated or user-defined), referencing true north or referencing calculated grid headings. Select the desired heading reference by highlighting the “HDG” field and pressing CLR. When the “auto mag var[iation]” option is selected, heading information will reference the automatically calculated magnetic variation shown. For most applications, the “auto mag” feature will provide accurate heading information. If the auto-magnetic variation is not correct, you may define the magnetic variation by selecting “user mag var”. If the “user mag var” option is selected, the magnetic variation is then entered.

To enter a user-defined magnetic variation...

- Highlight the “HDG” field and select “User Mag Var” with CLR.
- Press the right arrow key.
- The variation direction is highlighted. To change the direction, press CLR.
- Press ENT.
- Enter the variation degrees and press ENT.

8.7 MAP DATUM SELECTION (SETUPS)

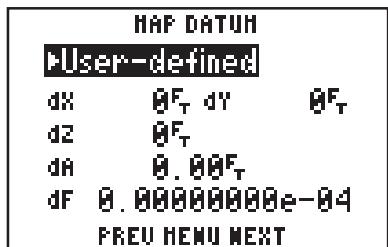


Select the desired map datum reference from the Map Datum Page. You may choose from 102 pre-defined map datums, or you may define your own. If the sectional/chart you are using specifies a reference datum, select that datum on your GPS 95. If the sectional/chart does not specify a reference datum, you may select each

datum applicable to your region until you find the datum that provides the best positioning at a known point. (NOTE: The GPS 95 is shipped from the factory with the WGS 84 datum selected.)

To change the pre-defined datum...

- Highlight the “Change?” field and press ENT.
- With the arrow keys, find the desired datum and highlight it.
- Press ENT. The new datum is selected.



The user-defined datum option allows you to custom-tailor a datum reference from which all position coordinates are calculated. All entries are defined as differences from the WGS 84 standard datum. (CAUTION: Selection and use of the user datum function is for individuals experienced in the use of map datums. If the pre-defined map datums do not correspond to the chart you are using and you are unsure of the correct entries required to correspond to that chart, contact the chart manufacturer. Incorrect entries for a user-defined datum may result in substantial position errors.)

To define a user datum...

- Place the cursor over the cyclic field on line one.
- Press CLR to select “User-defined”.
- Enter the 5 parameters of the user map datum. The sign of the parameters should follow the convention: WGS 84 - local geodetic system.

8.8 AUDIO AND DISPLAY SETUP (SETUPS)



From the Audio/Display Page you can turn the message and/or keypad tones on and off, change the display contrast and change the time-out for the display backlighting.

The tone option allows you to turn the GPS 95's audio tone on or off as desired. You may turn the keypad feedback tone off, but leave the message tone on; have both tones on; or have both tones off.

To turn audio tones on/off...

- Highlight the tone option field.
- Press CLR to select the desired option.

You may also adjust the contrast of the GPS 95 display to your preferences.

To change the display contrast...

- Highlight “Change Contrast?” and press ENT.
- The contrast bar is highlighted. Press the left or right arrow key to change the contrast level.
- When the desired contrast level is reached, press ENT.

The backlighting time-out determines the length of time the display and keypad backlighting will remain on. If no keys are pressed for the specified time, the backlighting will automatically shut off to conserve battery power.

To set the backlighting time-out...

- Highlight the backlighting time-out field.
- Enter the desired time for backlighting to remain on. If you wish to have the backlighting on at all times, enter zero.
- Press ENT.

8.9 TRACK LOG SETUP (SETUPS)



The Track Log Setup Page is used to configure the track log function. A track log is a record of your flight path showing where you have been up to your present position. The cyclic fields on line one allow you to turn the track storage on or off, and determine how the track log will be stored in memory.

The track storing function may be turned on and off by highlighting the first status field and pressing CLR. From the next field, the track may be set to “wrap” around through available memory (deleting the oldest track information and using the memory to store the new track position), or to “fill” available memory and then stop. The amount of memory used at any given moment is also displayed. When available memory is filled or the track is no longer

needed, it may be cleared by highlighting “Clear Track Log?” and pressing ENT. If the “fill” option is selected, a “memory full” message will be displayed when all available memory has been used and you must clear the track log to store additional track information.

The ground track is stored at a frequency that you define either by: Time “Interval”, “Resolution”, or “Distance”. Select the desired frequency option by highlighting this field and pressing CLR.

To store the Ground Track at selected time Intervals...

- Highlight the recording criteria field (third line) and select “Interval” with CLR.
- Press ENT.
- Enter the time interval between stored positions starting with hours, then minutes, then seconds. Press ENT after entering data in each numeric field.

To store the Ground Track by Distance...

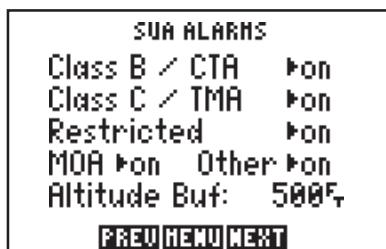
- Highlight the recording criteria field and select “Distance” with CLR.
- Press ENT.
- Enter the distance, and press ENT. When your position moves this distance, in any direction, a new position is added to the stored ground track. (NOTE: “Distance” storage may be preferable to “Resolution” storage if the ground track will include a large number of turns.)

If the planned course will be primarily straight line travel, you should select “Resolution” storage. In this application, considerably less memory is used for the same distance traveled.

To store the Ground Track by Resolution...

- Highlight the recording criteria field and select “Resolution” with CLR.
- Press ENT.
- Enter the resolution range, and press ENT. When your position moves this defined range off a projected course line, a new position is added to the stored ground track.

8.10 SUA ALARMS (ALARMS)



From the SUA Alarms Page you may define which types of special-use / controlled airspaces you wish to be alerted of. Selections are provided for Class B / CTA, Class C / TMA, Restricted, MOA and Other airspaces. "Other" airspaces include Alert, Caution, Danger, Training and Warning areas.

NOTE: The GPS 95 always provides alerts for Prohibited areas. No selection is provided for this feature.

To turn an SUA alarm on or off...

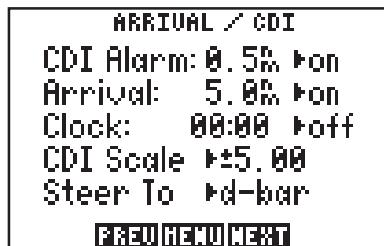
- Using the arrow keys, highlight the on/off cyclic field beside the desired airspace type.
- Press CLR to turn the airspace alarm on or off.
- To return to the Main Menu, press PWR/STAT.

SUA altitude limits are stored in the GPS 95's database as altitude above mean sea level (MSL) if the actual limits are charted in the same manner. The SUA Alarms Page provides an altitude buffer which is used to define at what vertical distance from an SUA the messages (alerts) will be displayed. For example, if you enter 500 feet and are flying above Class B airspace, the GPS 95 will provide SUA messages when you are less than 500 feet vertically (plus the current position error) from the Class B ceiling.

CAUTION: If you fly above or below an SUA, then enter the SUA, the "Inside SUA" message may be the only message provided! The "SUA Ahead" and/or "SUA Near" messages will not occur if you are outside the vertical limits defined by the airspace floor/ceiling plus the altitude buffer setting.

Some SUA altitude limits may be charted in terms of altitude above ground level (AGL). If the actual lower limit of an SUA is charted in terms of AGL, then the GPS 95 will alert you at any altitude below the upper limit. However, if the actual upper limit is also charted as an AGL altitude, the GPS 95 will provide the alert at all altitudes.

8.11 ARRIVAL ALARM / CDI SETUP (ALARMS)



From the Arrival/CDI Page, you may define three alarms (and turn them on or off) and configure the graphic CDI to your preference. Alarms are available for course deviation, arrival at a destination waypoint, and an alarm clock.

The CDI alarm will notify you with an alarm tone and the message "CDI Alarm" if you have deviated off course beyond the limit that you set. (This can be useful while flying on an airway or navigating a narrow corridor.)

To set the CDI alarm...

- Highlight the CDI alarm distance field.
- Enter the maximum allowable course deviation distance.
- Press ENT.
- The on/off cyclic field is highlighted. If the alarm is not turned on, press CLR.

The arrival alarm will inform you with an alarm tone and the message "Arrival at ____" (where the blank is filled in with a waypoint identifier) when you reach your destination. The alarm distance will also be used to inform you when you approach a route waypoint with the message "Approaching ____" (again, with the blank filled in by a waypoint name).

To set the arrival alarm...

- Highlight the arrival alarm distance and enter the distance from a destination at which you want the alarm to sound.
- Press ENT.
- The on/off cyclic field is highlighted. If the alarm is not turned on, press CLR.

The GPS 95 also features an alarm clock which can provide an alarm tone and the message “Alarm Clock” at a time that you specify.

To set the alarm clock...

- Highlight the alarm clock time and enter the desired alarm time. NOTE: The alarm time may be either UTC or local time depending on the setting on the Date/Time Page. (See Section 8.17)
- Press ENT.
- The on/off cyclic field is highlighted. If the alarm is not turned on, press CLR.

The graphic CDI may be configured to the desired scale and steering orientation. Scale setting of ± 0.25 , 1.25 or 5.00 units (nautical miles, statute miles or kilometers) are available. The scale setting represents the distance from the center of the CDI to either end.

To set the CDI scale...

- Highlight the CDI scale field.
- Press CLR to select the desired scale.

The CDI “Steer To” orientation determines how you interpret the “D-Bar” when it moves. You may select a “Steer to >Center” or “Steer to >D-Bar” orientation. A “Steer to Center” orientation, in effect, displays your position as the D-Bar and the center of the CDI is the desired track. Thus, when you are off course, you would steer towards the center of the scale. A “Steer to D-Bar” orientation is just the opposite. The D-Bar represents the desired track and the center of the scale represents your position. When you are off course, you then steer towards the D-Bar. A “Steer to D-Bar” orientation is the typical setting for aviation use and will make the GPS 95’s graphic CDI respond much like the CDI on your instrument panel.

To set the CDI orientation...

- Highlight the “steer to” field.
- Press CLR to select the desired orientation.

8.12 INPUT/OUTPUT SETUP (INTERFACES)



From the Input/Output Page, you may select the input and/or output format needed to connect your GPS 95 to other equipment: PC, NMEA device, etc. You may select no input/output (NONE/NONE), GARMIN input/output (GARMIN/GARMIN), NMEA output (NONE/NMEA), RTCM input/NMEA output (RTCM/NMEA) or RTCM input (RTCM/NONE).

When the NMEA output is selected a second cyclic field appears. From this second field you may select the desired NMEA format: NMEA 0180, NMEA 0182, NMEA 0183 Version 1.5 or NMEA 0183 Version 2.0.

To select a NMEA output...

- Place the cursor on the input/output format field.
- Press CLR until the desired NMEA output option (NONE/NMEA or RTCM/NMEA) is displayed.
- Press the right arrow key.
- Select the desired NMEA format by pressing CLR.



A second cyclic field also appears when the GARMIN input/output is selected. The GARMIN option allows you to exchange data such as waypoints, routes, track logs and satellite almanac data with another GPS 95 or with a PC-compatible computer. You may select between

acting as a HOST to data exchanges (HOST), requesting data (REQUEST) or sending data (SEND). During the data transfer process the number of data packets being exchanged will be displayed.

To select GARMIN input/output...

- Place the cursor on the input/output format field.
- Press CLR until the GARMIN input/output option is selected.
- Press the right arrow key.
- Select “HOST”, “REQUEST”, or “SEND” by pressing CLR. (NOTE: You should select the “HOST” option when using the GPS 95 with a PC. When exchanging data between two GPS 95s, one should be set to “HOST” and the second should be set to the desired data transfer option - “REQUEST” or “SEND”.)



The GPS 95 can use Differential GPS (DGPS) corrections in RTCM SC-104 version 2.0 format. DGPS corrections in this format can be received from an external device (capable of output in 6 to 8 byte format as specified by RTCM SC-104 version 2.0) by connecting the device to the input port on the back of

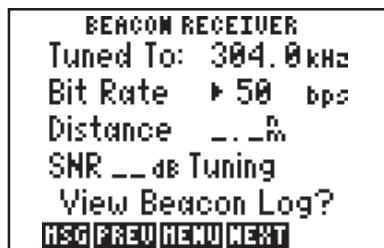
the GPS 95 and selecting an RTCM input interface mode. Two RTCM input modes are available; one which allows no output and another which allows NMEA output in 0180, 0182, or 0183 format.

To select an RTCM input...

- Place the cursor on the input format field.
- Press CLR until the desired RTCM input option (RTCM/NONE or RTCM/NMEA) is displayed.
- Press the right arrow key.
- If RTCM/NONE is selected: Press CLR to select the appropriate baud rate.
- If RTCM/NMEA is selected: Press CLR to select the desired NMEA output format. (NOTE: With RTCM/NMEA selected the RTCM baud rate is automatically set to 1200 or 4800.)

If the RTCM input is selected, but the GPS 95 is not connected to an RTCM device, the unit will alert you with the message “No RTCM Input”. If the GPS 95 does not receive sufficient data to compute a DGPS-corrected position, the message “No DGPS Position” will appear.

8.13 BEACON RECEIVER SETUP (INTERFACES)



The Beacon Receiver Setup Page allows the GPS 95 to control GARMIN's GBR 21 differential beacon receiver. In order to use the beacon receiver, the "RTCM/NMEA" and "NMEA 0183" settings must be selected. If these interface settings are not selected, the GPS 95 will only display the message

"No RTCM/NMEA 0183 interface selected" on the Beacon Receiver Setup Page.

The "Tuned To:" field is the frequency, in kilohertz (kHz), to which the beacon receiver is currently tuned or is attempting to tune. Below this field is a bit rate cyclic field which allows you to choose between bit rates of 25, 50, 100 and 200 bps (bits per second) by pressing CLR while the "Bit Rate" cyclic field is highlighted.

When you first select the Beacon Receiver Setup Page, the GPS 95 and GBR 21 will automatically try to tune the last frequency and bit rate which you selected. You may enter your own frequency (between 283.5 kHz and 325.0 kHz in 0.5 kHz increments) and bit rate if desired. A message of "Tuning" will then be displayed near the bottom of the page, directly after the "SNR" field. You must provide the unit with another frequency and bit rate before it will attempt to tune again.

If the beacon receiver receives the selected frequency at the chosen bit rate, the "SNR" field will display the received signal-to-noise ratio and the status message will be one of the following:

Receiving - The GPS 95 is receiving status and DGPS correction information from the beacon receiver.

No Data - The GPS 95 is receiving status information from the beacon receiver, but not DGPS correction information.

When a chosen frequency and bit rate result in a status of "Receiving", the GPS 95 will use the DGPS corrections from the beacon receiver to calculate differential positions. Also, the "Distance" field will show the distance to the beacon being received.

Freq	Stn ID	Dist
304.07	0001	4.00
-----	-----	-----
-----	-----	-----
-----	-----	-----
-----	-----	-----
MSG	Press CLR to cancel	

The last field on the Beacon Receiver Setup Page is the “View Beacon Log?” confirmation field. Pressing ENT on this field will display the Beacon Log Page which lists the last five frequencies you have attempted to tune.

The most recently tuned frequency is at the top of the list. If the tuned frequency, station identifier and position were available when the frequency was last tuned, the list will also display the “Stn ID” number and the distance to the transmitting beacon. You can tune any frequency on this list by highlighting the desired frequency and pressing ENT. The display will immediately return to the Beacon Receiver Setup Page with the selected frequency from the Beacon Log Page as the “Tuned To.” frequency, and the bit rate as the last bit rate used with the selected frequency. To return to the Beacon Receiver Setup Page without selecting a frequency, press CLR.

8.14 MESSAGES

MESSAGES
SUA Ahead < 10 min
MSG

You may recall from Section 2.6 that some messages will remain on the Message Page after being viewed. When this occurs, the “MSG” annunciator remains on (but does not flash) in the lower left corner. To view these messages, select “Messages” from the Main Menu. (See Appendix A for a description of available messages.)

8.15 DENSITY ALTITUDE / TRUE AIRSPEED / WINDS ALOFT(E6-B)

DENSITY ALT / WINDS
IAlt: 3500 CAS: 125
Prs: 29.83 TAT: 88
DAlt 5938 TAS: 137
Hdg: 169° Head 12
Wind frm 172° at 12
PREV MENU NEXT

The GPS 95 provides density altitude, true airspeed (TAS) and winds aloft calculators for your convenience. The density altitude and TAS calculations will help you determine critical aircraft performance data.

To calculate density altitude and true airspeed...

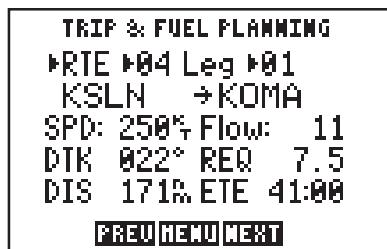
- Place the cursor on the indicated altitude (IAlt) field.
- Enter the indicated altitude from your altimeter and press ENT.
- Enter your calibrated airspeed (CAS) and press ENT. If you do not know your calibrated airspeed, use indicated airspeed instead.
- Enter your current altimeter setting and press ENT.
- Enter the total air temperature (TAT). The GPS 95 will display the resulting density altitude and true airspeed. (NOTE: TAT is the temperature of the air including the heating effect caused by speed. The temperature read on a standard outside air temperature gauge found in most piston aircraft is TAT.)

The winds aloft calculation determines the direction (true) and speed of the wind. This calculation requires TAS and heading information. If you have already calculated density altitude and TAS, the TAS value will be used for the winds aloft calculation; otherwise you may enter the correct TAS value.

To calculate winds aloft...

- If you have not already calculated TAS: place the cursor over the TAS field, enter the correct true airspeed and press ENT.
- Place the cursor over the heading (Hdg) field.
- Enter the current heading (magnetic) from your heading indicator and press ENT. The GPS 95 will display the wind direction, speed, and the head/tail wind you are encountering.

8.16 TRIP AND FUEL PLANNING (E6-B)



The Trip and Fuel Planning Page allows you to calculate time and fuel requirements between any two waypoints or for any programmed route. On the first cyclic field, you will choose between waypoint (WPT) or route (RTE) planning by highlighting and pressing CLR. If route planning is

selected, you would then select the desired route number and the portion of the route (a given leg or all of the route) to calculate for.

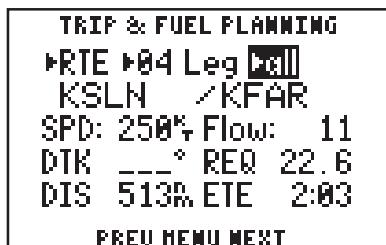
The final step is to enter speed and fuel flow rates. The GPS 95 will then calculate the desired track (DTK), fuel requirements (REQ), distance (DIS), and estimated time enroute (ETE).

To perform a trip and fuel plan, waypoint to waypoint...



- Highlight the first cyclic field (top left), and press CLR to select “WPTS:”.
- Highlight the waypoint name field (second line), and enter the first waypoint name followed by ENT.
- The second waypoint name field is now highlighted. Enter the second waypoint name followed by ENT.
- The speed (SPD) field is highlighted. Enter the planned speed, and press ENT.
- The fuel flow (Flow) field is highlighted. Enter the estimated fuel flow followed by ENT.
- The GPS 95 will now display the calculated figures.

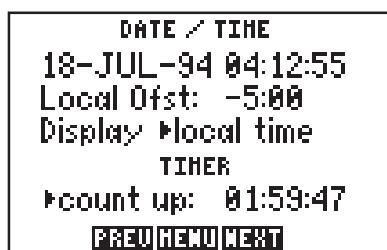
To perform a trip and fuel plan for a route...



- Highlight the first cyclic field (top left) and select “RTE” with CLR.
- Highlight the next cyclic field and select the desired route number by pressing CLR.
- Highlight the “Leg>” field and select the desired leg, or select “All” for the entire route, using CLR.
- Highlight the “SPD:” field and enter the planned speed, followed by ENT.
- Highlight the “Flow:” field and enter the estimated fuel flow followed by ENT.
- The GPS 95 will now display the calculated figures.

NOTE: When “all” is selected, no desired track (DTK) will be shown since this value only applies to an individual leg.

8.17 DATE/TIME SETTINGS (E6-B)



The Date/Time Page displays the UTC (Coordinated Universal Time, Greenwich Mean Time or Zulu Time) date and time. The local offset, or time difference, is shown on the next line. For time zones in the Western Hemisphere, enter a negative offset. (HINT: The minus sign is on the "9" key.) Appendix E contains a list of time offsets.

The cyclic field for "Display" options determines which time, UTC or Local, will be displayed on all other GPS 95 pages.

To display UTC or local time...

- Highlight the time display field.
- Press CLR to select the desired time reference.

The timer field can be selected as "count up" or "count down" by highlighting and pressing CLR. This timer is useful for measuring the elapsed time since a certain event, or it can tell you when a specific amount of time has expired.

To set the count up timer...

- Place the cursor on the timer option field.
- Press CLR to select "count up".
- Press the right arrow key.
- Press CLR and ENT to clear the hours field.
- Press CLR and ENT to clear the minutes field.
- Press CLR and ENT to clear the seconds field. The count up timer will begin counting the elapsed time.

To set the count down timer...

- Place the cursor on the timer option field.
- Press CLR to select “count down”.
- Press the right arrow key.
- Enter the number of hours to count down from and press ENT.
- Enter the number of minutes to count down from and press ENT.
- Enter the number of seconds to count down from and press ENT. The count down timer will begin counting down from the selected time.

8.18 SUNRISE/SUNSET PLANNING (E6-B)

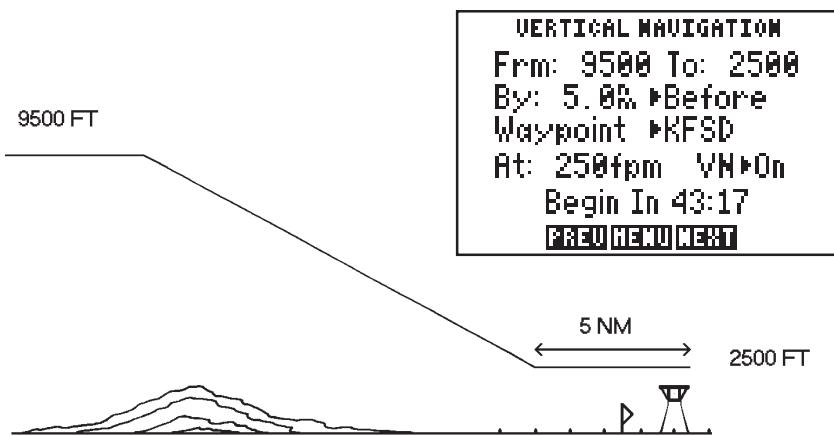
SUNRISE / SUNSET
WPT: GARMIN
Date: 18-JUL-94
Rise 06:07:17
Set 20:42:56
PREV NEXT

The Sunrise/Sunset Page allows you to calculate the sunrise and sunset times for a given waypoint location on a selected date (from the year 1990 through 2089).

To calculate the sunrise/sunset times for a waypoint...

- Highlight the waypoint name field and enter the desired waypoint name.
- Press ENT.
- The date field is highlighted. Enter the day, then month, then year to calculate the sunrise/sunset times for. Press ENT on each alphanumeric field.
- Once the year is selected and ENT is pressed, the calculated sunrise and sunset times will be shown. Please note that the times shown will be either UTC or local depending on the selection made on the Date/Time Page. (See Section 8.17.)

8.19 VERTICAL NAVIGATION PLANNING (E6-B)



Pilots will find the GPS 95's vertical navigation (VNAV) function useful for calculating vertical speed requirements. In order to use the VNAV feature, aircraft ground speed must be greater than 35 knots.

To calculate vertical speed requirements...

- Place the cursor on the initial (Frm) altitude field.
- Enter the initial altitude and press ENT.
- Enter the final (To) altitude and press ENT.
- Enter the offset distance, from the desired waypoint, at which you will reach your final altitude. Press ENT.
- Select "Before" if the offset is before the waypoint, or "After" if the offset is beyond the waypoint, by pressing CLR.
- If an active route is being used: press CLR to select the route waypoint to which the offset applies.
- You now have defined how far before, or after, the indicated waypoint you wish to be at the final altitude. The GPS 95 will display the required vertical speed.

To activate the VNAV function...

- Review the calculated vertical speed. If you wish to change the vertical speed: place the cursor on the vertical speed (At) field, enter the desired vertical speed and press ENT.
- Place the cursor over the “VN” field.
- Press CLR to turn the VNAV function on. The VNAV status on the bottom line will change from “Enter VNAV Profile” to “Begin at _____” (with the blank indicating how long before the maneuver should begin), or “Navigating” if the VNAV maneuver is already in progress. You will be informed with the message “Start Altitude Change” when you are less than 15 seconds from the point at which the VNAV maneuver is to begin.

When VNAV is active, this page will recommend the altitude and vertical speed required to complete the maneuver. Remember that these are only recommendations. You will be informed with the message “Final Altitude Alert” when the recommended altitude is within 1000 feet of the final altitude. The VNAV function will be cancelled automatically if the active route (or GOTO) is changed in any way (e.g., setting a new GOTO destination or adding a waypoint to a route). You will be informed with the message “VNAV Cancelled” if this occurs. If the aircraft ground speed does not exceed 35 knots, or a route waypoint that has already been passed is selected, the GPS 95 will display an “Invalid profile” status on the bottom line. The GPS 95 will display “No Active Waypoint” on the bottom line if no route, or GOTO destination, has been activated.

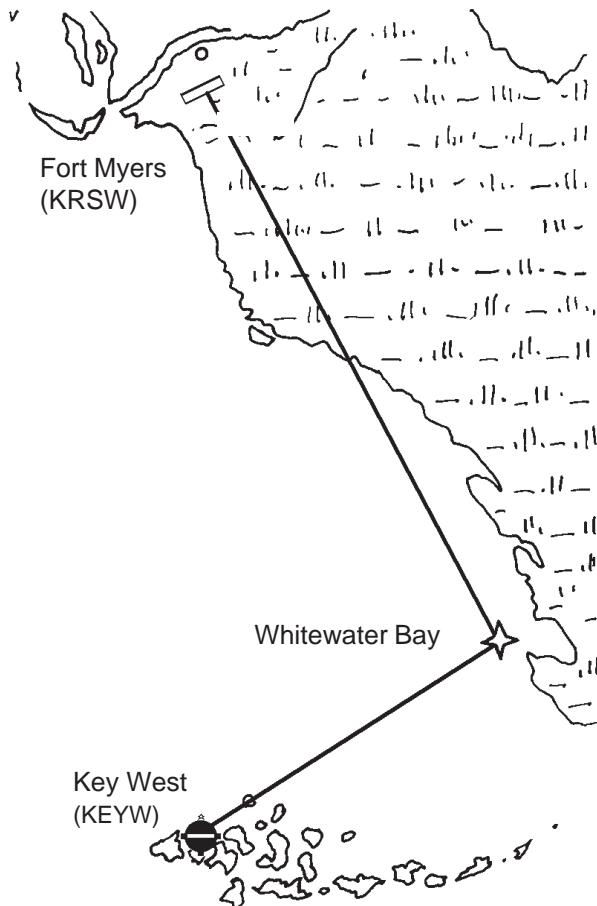
WARNING: Altitude and climb rate should be controlled only by the pilot in command with due regard for airspeed and other aircraft performance limitations.

CHAPTER 9

SAMPLE TRIP USING ROUTES

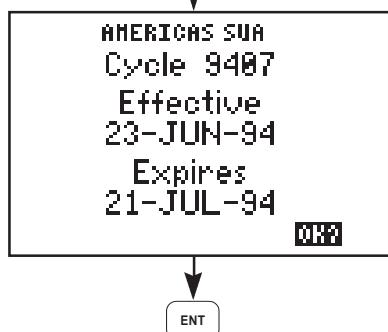
Now that you have gained a basic understanding for your GPS 95, you are ready to explore the route capabilities of this unit. The sample illustrations in this chapter assume that the factory default settings have not been changed. If you have changed these parameters the unit may display slightly different data than presented here.

You are planning a trip from Ft. Myers, Florida (Southwest Florida International) to the Whitewater Bay (a user waypoint) and then on to Key West, Florida (Key West International). Turn on the GPS 95 and we'll begin this sample trip.





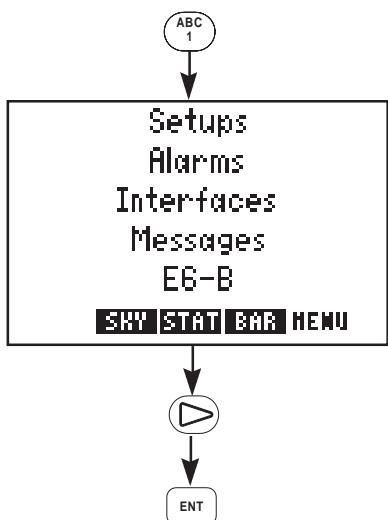
The welcome screen is displayed and the GPS 95 performs several selftests.



After about five seconds the Database Page is displayed. Review the page to see if the database is current and press ENT to confirm the page.

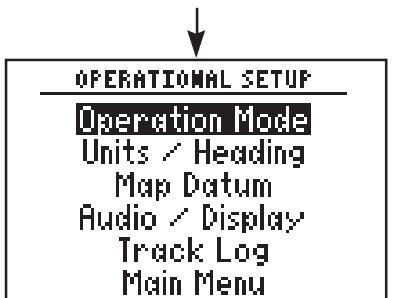
ENT

Setting the simulator mode and initial position...

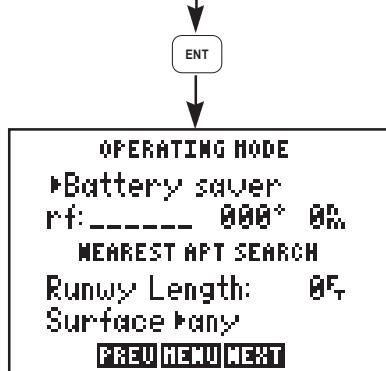


Select the Main Menu by pressing the MENU softkey (the "1" key in this case).

Press the right arrow key to place the cursor over "Setups" and press ENT.

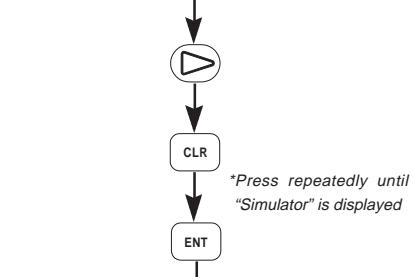


The Operational Setup sub-menu is displayed with “Operation Mode” highlighted.



Press ENT to select “Operation Mode”.

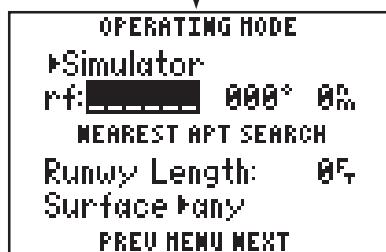
The Operating Mode Page is displayed showing the current operational mode.



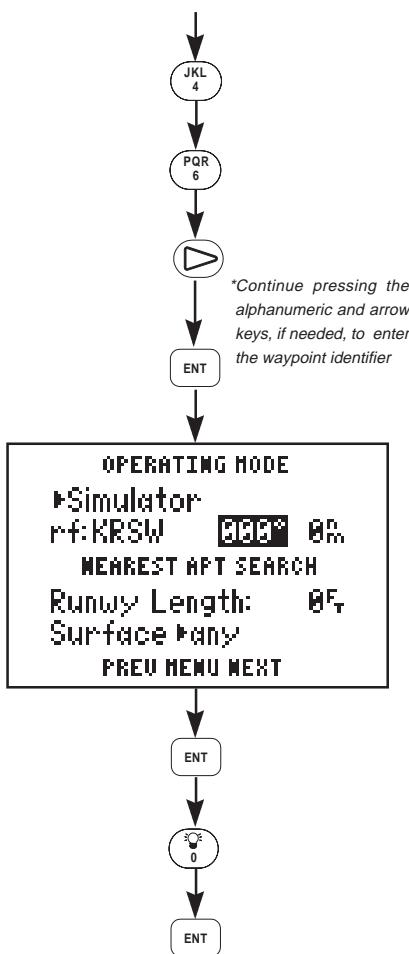
Press the right arrow to place the cursor on the operational mode field.

Press CLR (repeatedly) until “Simulator?” is displayed.

Press ENT to select simulator mode.



The cursor is on the reference identifier field. Set the initial position by entering the identifier for Ft. Myers - Southwest Florida International Airport (KRSW). (NOTE: This sample trip assumes that the Americas database is used. If you are using the International database you may create user waypoints using the coordinates given below, or you may follow these general steps, but substitute waypoints from your area of interest.)



Press the “4” key to select the letter “K”.

Press the “6” key followed by the right arrow key to select the letter “R”.

Continue pressing the alphanumeric and, if needed, arrow keys until the waypoint identifier has been entered. Press ENT when complete.

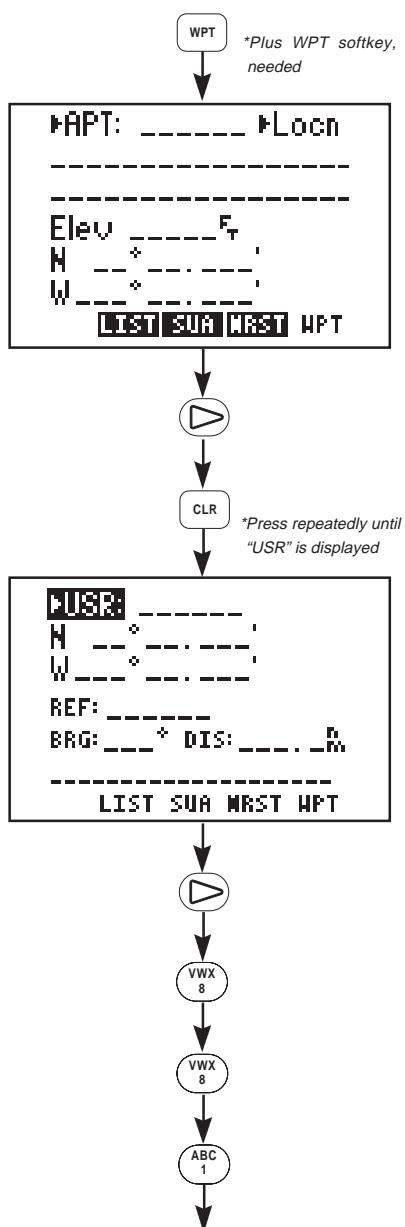
Since the trip will begin at the airport there is no need to define a reference bearing from this waypoint. Press ENT.

Enter a distance of zero and press ENT.

Before you begin the trip, all waypoints used along the route should be in memory. If you are using the Americas Database, only the location for the Whitewater Bay area needs to be entered into memory. If you are using the International Database, all waypoints for this trip must be entered as user waypoints. (Alternatively, if you are using the International Database, you may follow the general steps outlined in this sample trip, but substitute waypoints for your area of interest.) Below are the identifiers and locations for waypoints used in this sample trip:

Indent	Latitude	Longitude
KRSW	N26°32.187'	W081°45.275'
WWBAY	N25°19.500'	W081°10.500'
KEYW	N24°33.370'	W081°45.574'

Creating the “WWBAY” user waypoint...



Press WPT and the WPT softkey, if needed, to select the Waypoint Definition Page.

Press the right arrow key to place the cursor on the waypoint category field.

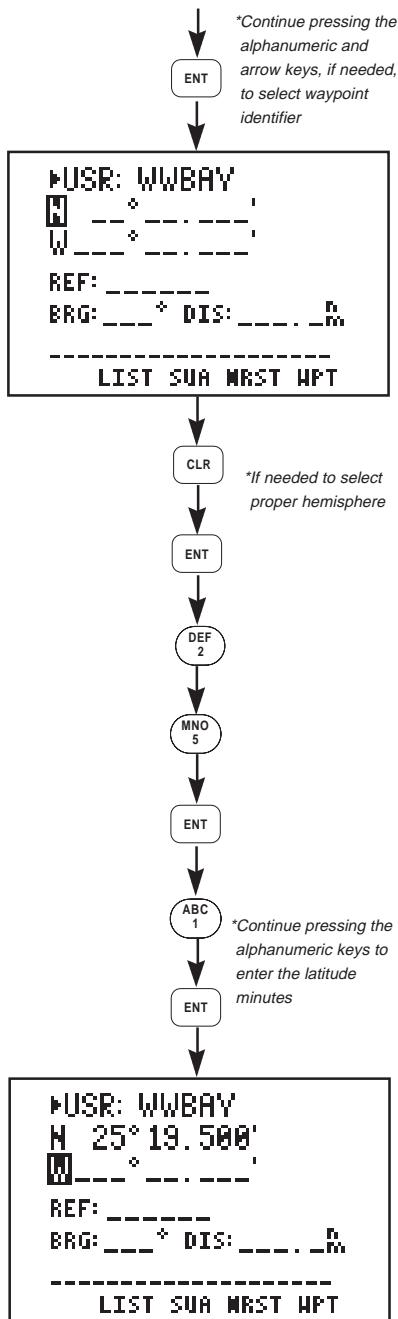
Press CLR (repeatedly) until “USR” is displayed. The Whitewater Bay area will be added to memory as a user waypoint.

Press the right arrow key to place the cursor on the waypoint identifier field.

Enter the waypoint identifier, WWBAY, using the alphanumeric and arrow keys. Begin by pressing the “8” key to select the letter “W”.

Press the “8” key again to select the second “W”.

Press the “1” key to select the letter “B”.



Continue pressing the alphanumeric and, if needed, arrow keys until the waypoint identifier has been entered. Press ENT when complete.

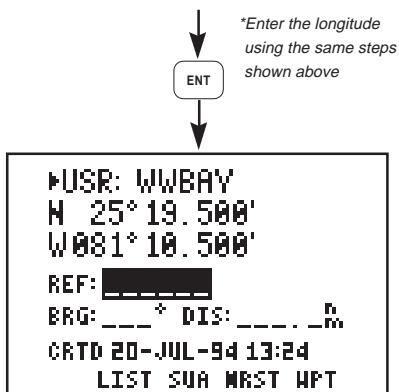
Enter the latitude of Whitewater Bay (N 25°19.500'). Begin by selecting the proper hemisphere. If "N" for north is not displayed, press CLR.

Press ENT when the proper hemisphere is selected.

Enter the latitude degrees. Press the "2" key and the "5" key. Press ENT when complete.

Enter the latitude minutes. Begin by pressing the "1" key.

Continue pressing the alphanumeric keys until the latitude minutes have been entered. Press ENT when complete.

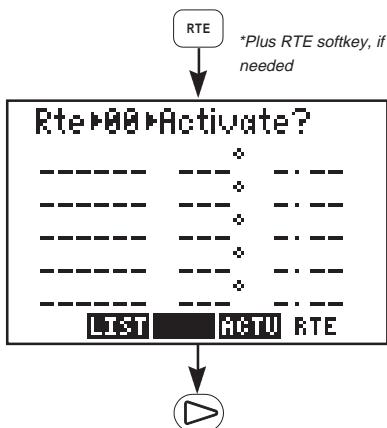


Enter the longitude of Whitewater Bay (W 081°10.500') in the same manner as was used for the latitude.

Press ENT when you are finished. (NOTE: You do not need to enter the leading zero for degrees. Instead, you may begin by pressing the "8" key.)

This trip will take you to an intermediate destination (Whitewater Bay) and then a final destination (Key West). You could go to each destination using the GOTO function as described in Chapter 4. (Select GOTO WWBAY, then, upon reaching WWBAY, select GOTO KEYW.) However, for this sample trip, the route capabilities of the GPS 95 will be utilized.

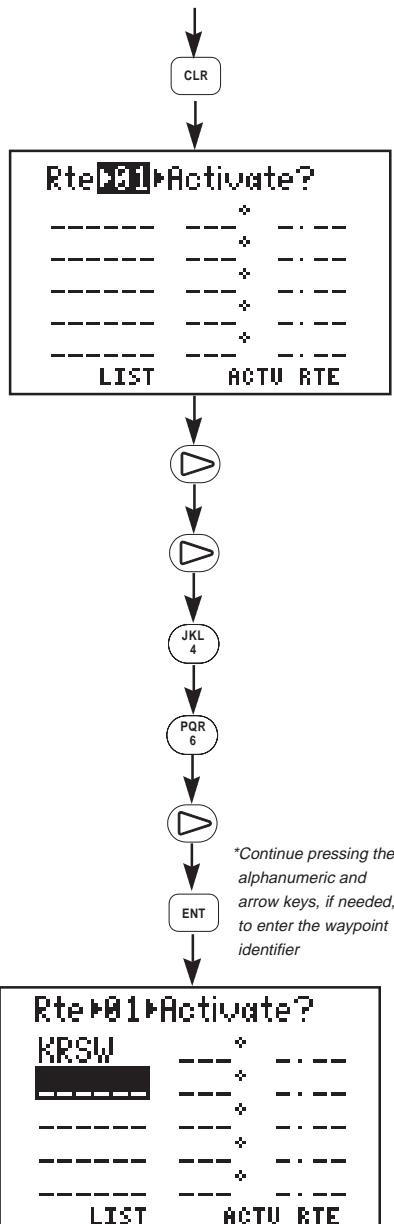
To create the sample route...



Press RTE and the RTE softkey, if needed, to select the Route Definition Page.

Press the right arrow to place the cursor on the route number field.

Press CLR to select route 1. Notice



that the route is empty; it does not contain any waypoints. (If route 1 is not empty, select a different route.)

Press the right arrow key twice to place the cursor on the first waypoint identifier field.

Enter the identifier for Ft. Myers - Southwest Florida International Airport (KRSW). Begin by pressing the "4" key to select the letter "K".

Press the "6" key, followed by the right arrow key, to select the letter "R".

Continue pressing the alphanumeric and, if needed, arrow keys until the waypoint identifier is added to the route. Press ENT when complete. The cursor is on the second waypoint identifier field.

↓

ENT

*Enter the next
waypoint identifier
using the alphanumeric
keys

Rte 01 Activate?

KRSW	---	---
WWBAY	160°	79.0
-----	-----	-----
-----	-----	-----
-----	-----	-----

LIST ACTU RTE

↓

ENT

*Enter the last waypoint
identifier using the
alphanumeric and arrow keys

Rte 01 Activate?

KRSW	---	---
WWBAY	160°	79.0
KEYW	219°	56.0
-----	-----	-----
-----	-----	-----

LIST ACTU RTE

As you can see, you have just created a route that will take you from Fort Myers, over Whitewater Bay and on to Key West. Once activated, the GPS 95 will calculate navigation data based on the route.

To activate the sample route...

↓

►

*Continue pressing
until "Activate" is
highlighted

Rte 01 Activate?

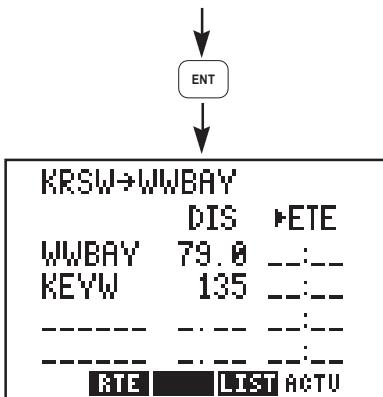
KRSW	---	---
WWBAY	160°	79.0
KEYW	219°	56.0
-----	-----	-----
-----	-----	-----

LIST ACTU RTE

Enter the identifier for the Whitewater Bay user waypoint (WWBAY) using the alphanumeric and arrow keys. Press ENT when complete. The cursor is now on the third waypoint identifier field.

Enter the identifier for Key West International Airport (KEYW) using the alphanumeric and arrow keys. Press ENT when complete. The Route Definition Page should now appear as illustrated.

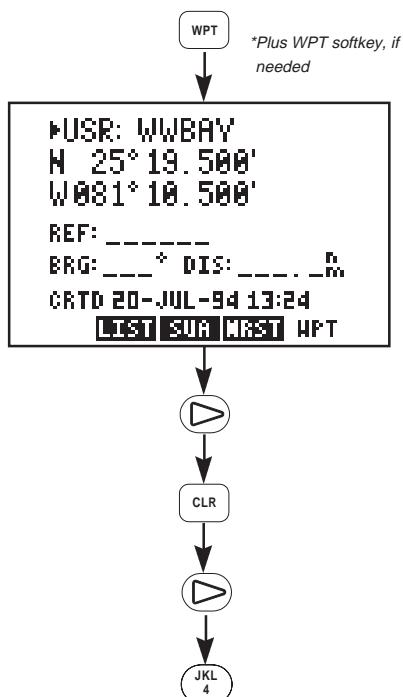
Press the right arrow key until "Activate?" is highlighted. (If "Activate?" is not displayed on this field, you may select it by pressing CLR.)



Press ENT to activate the route. The Active Route Page is displayed. This page displays the “active from” and “active to” waypoints on line one, as well as distance and time information to each waypoint on the following lines. The time information is blank since you are not moving yet.

Before you take off, you may want to view communications frequencies and runway layout for Fort Myers - Southwest Florida International.

To view airport information...



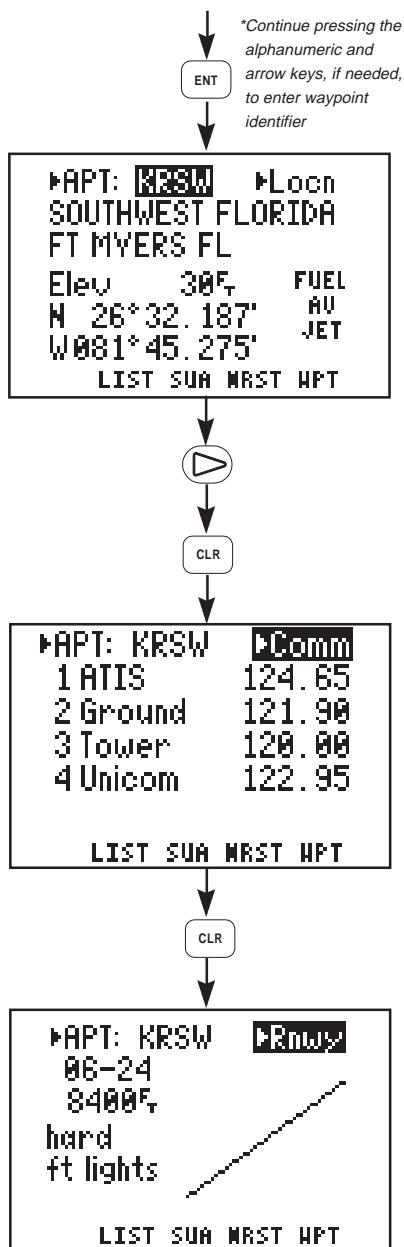
Press WPT and the WPT softkey, if needed, to select the Waypoint Definition Page.

Press the right arrow key to place the cursor on the waypoint category field.

Press CLR to select “APT”, for airport.

Press the right arrow key to highlight the waypoint identifier field.

Enter the identifier for Fort Myers - Southwest Florida International Airport (KRSW). Begin by pressing the “4” key to select the letter “K”.



*Continue pressing the alphanumeric and arrow keys, if needed, to enter waypoint identifier

Continue pressing the alphanumeric and, if needed, arrow keys until the waypoint identifier has been entered. Press ENT when complete. Location information will be displayed for the airport (as well as available fuels).

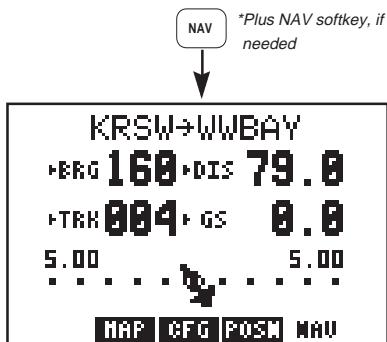
Press the right arrow key.

Press CLR to view the communication frequencies.

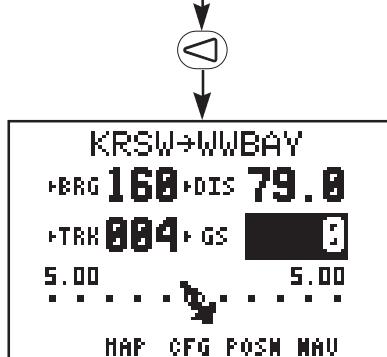
Press CLR to view the runway information. A runway diagram is shown along with runway orientation, length, surface type, and lighting. (For airports with more than one runway a third cyclic field will appear, allowing you to view information for each runway.)

In order to animate the GPS 95's displays you will need to enter a simulated speed.

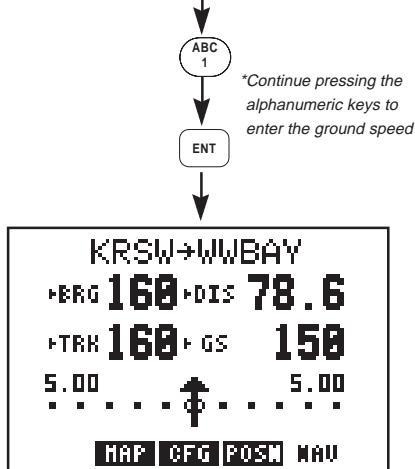
To set the simulated speed...



Press NAV and the NAV softkey, if needed, to select the Navigation Summary Page.



Press the left arrow key to highlight the ground speed field.



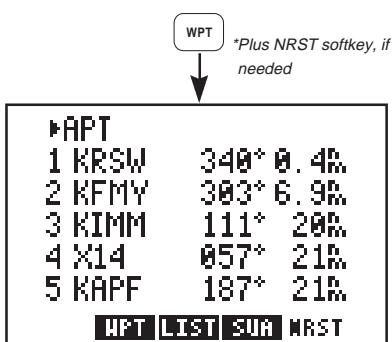
Enter a ground speed of 150 knots. Begin by pressing the "1" key.

Continue pressing the alphanumeric keys until the ground speed has been entered. Press ENT when complete.

The simulation velocity is now set. The Navigation Summary Page will indicate distance, speed, track, bearing and CDI information. Notice the distance is now decreasing as you fly towards Whitewater Bay!

As your flight progresses, you can monitor the nearest airports at any time. This feature can be particularly valuable in the event of an in-flight emergency.

To view the nearest airports...



Press the WPT key and the NRST softkey, if needed, to select the Nearest Waypoint Page.

The five nearest airports are instantly displayed along with bearing and distance to each airport.

In an actual emergency you could instantly plot a course to a nearest airport by highlighting the desired airport (using the arrow keys), pressing GOTO and ENT. The GPS 95 would override the route and provide navigation information to direct you to the selected airport.

Experiment with your GPS 95!

- Now that you have started on a trip to Whitewater Bay, why don't you take some time to experiment with the GPS 95? Press each function key to get familiar with the available pages. Examine the Active Route Page and the Navigation Summary Page as the simulation progresses. If you want, change the simulator speed. You won't break the GPS 95 even if you enter a speed of 999 knots!
- As you progress through the simulation, the GPS 95 will alert you with a message when you are within one minute of reaching Whitewater Bay. When passing WWBAY, the GPS 95 will automatically sequence to the next waypoint, KEYW.
- At some point during the simulation you may wish to try the GOTO function. Suppose severe weather was reported in the Whitewater Bay area. You wish to shorten your trip by heading directly to Key West. Simply press the GOTO key and enter KEYW. The GPS 95 will set an instantaneous course and you are on your way to Key West!
- If you have not customized your unit, this may be a good time to review Chapter 8 for information concerning custom settings. Doing so will help you understand what each setting will do.

- If you wish to stop the simulation, simply turn the GPS 95 off. We recommend that you delete the route and waypoint created in this simulation prior to using your unit again. (See Section 3.8 for information on deleting waypoints and Section 6.5 for information on deleting routes.)

CHAPTER 10

SUA FEATURES EXPLAINED!

By now, the operation of the GPS 95's SUA features should seem easy:

- Messages are provided to alert you of nearby special-use and controlled airspaces.
- The SUA Page provides additional information about each of the airspaces.
- The Map Display graphically depicts the boundaries of these areas.

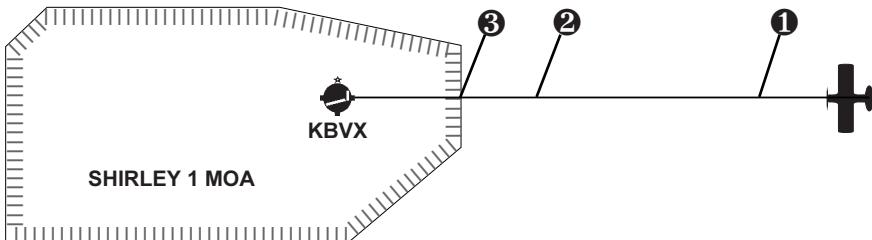
In this section we will examine the operation of the SUA features in more detail by using actual examples. Beginning with a very basic example, we'll look at progressively more complex scenarios to further your understanding of these features. Remember, if you're in doubt about any SUA message, crosscheck that information using the SUA Page and the Map Display (and appropriate navigation charts!).

10.1 FLYING TOWARD AND ENTERING AN SUA

This first example is provided to review the function of the various SUA messages. Referring to the figure on the following page, assume you are heading due west toward Shirley 1 MOA. Shirley 1 extends from 10,000 feet MSL to FL180 and you are currently at 10,500 feet. As you approach the MOA at Location #1, a message appears, "SUA Ahead < 10 min". This means you are within ten minutes, based on your current ground speed and track (projected course), of reaching the MOA's boundary. The SUA Page indicates the estimated time en route before entering the MOA.

At Location #2 the message, "SUA Near & Ahead", is provided, indicating you are within two nautical miles of the MOA boundary and the MOA lies ahead based on your current ground track. Again, the SUA Page indicates the estimated time before entering Shirley 1.

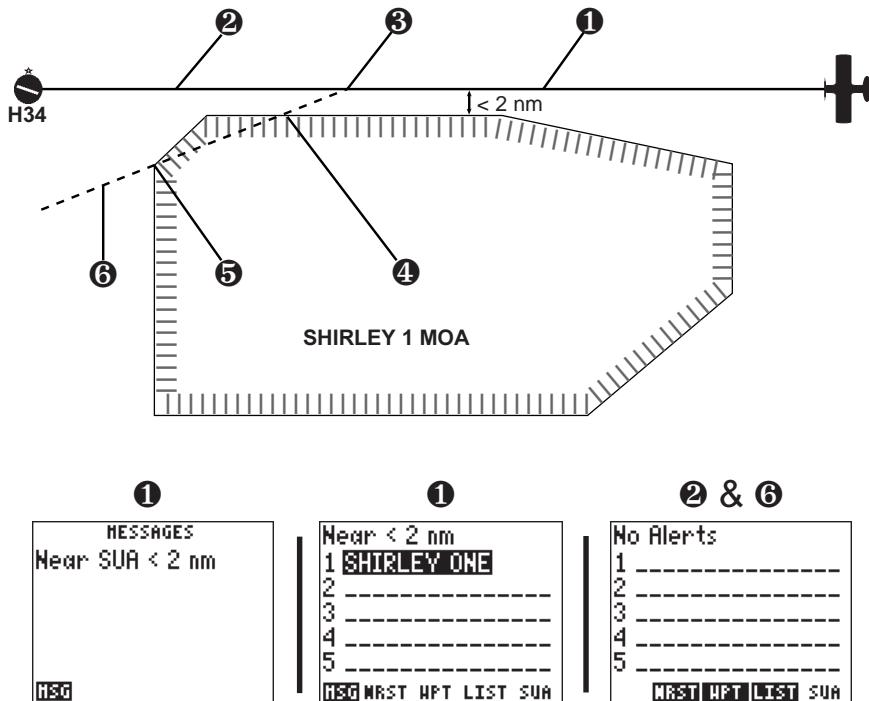
Finally, at Location #3 you are alerted with the message "Inside SUA". This message confirms that you are now inside the boundaries of Shirley 1 MOA. The SUA Page also indicates you are inside Shirley 1.



①	②	③
MESSAGES SUA Ahead < 10 min MSG	MESSAGES SUA Near & Ahead MSG	MESSAGES Inside SUA MSG
Ahead 9:11 1 SHIRLEY ONE 2 _____ 3 _____ 4 _____ 5 _____ MSG MRST WPT LIST SUA	Near & Ahead 1:11 1 SHIRLEY ONE 2 _____ 3 _____ 4 _____ 5 _____ MSG MRST WPT LIST SUA	Inside 1 SHIRLEY ONE 2 _____ 3 _____ 4 _____ 5 _____ MSG MRST WPT LIST SUA

Your destination airport is Batesville Regional (KBVX), inside the MOA. As you descend toward the airport the "Inside" indication on the SUA Page disappears once you are below the floor of Shirley 1, plus any altitude buffer setting (and position error) you may have entered. For example, if you enter 500 feet for an altitude buffer setting, the "Inside" indication will disappear below approximately 9,500 feet. (Depending on the current position error, you may be below 9,000 feet before "Inside" is no longer displayed.)

10.2 FLYING NEAR AN SUA's BOUNDARY

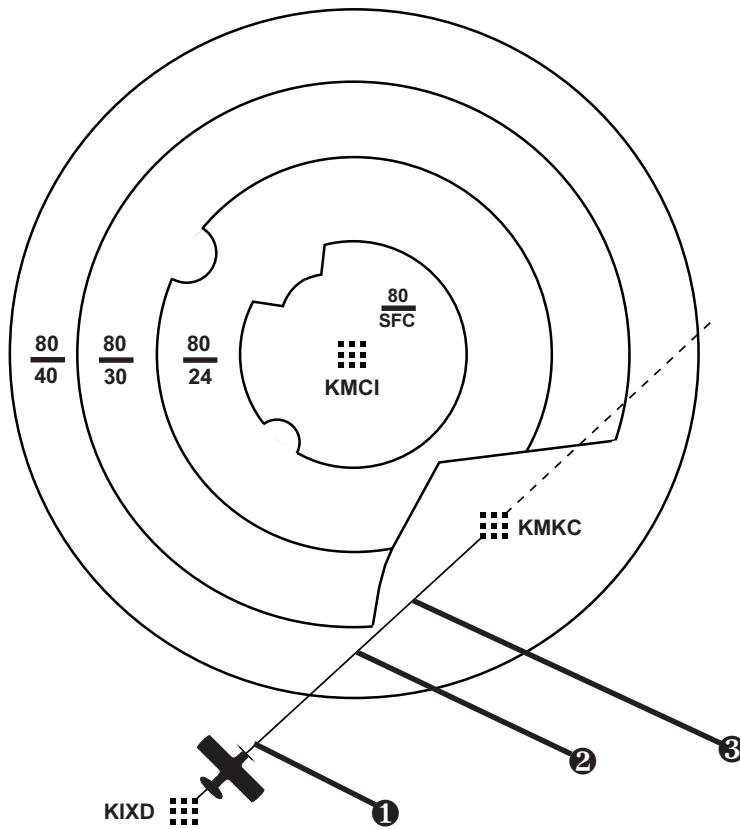


In our second example, you are again flying due west at 10,500 feet, but this time your planned course is parallel to the northern boundary of Shirley 1 MOA and less than two nautical miles away. When you reach Location #1 the "SUA Near < 2 nm" message warns you that the SUA is less than two nautical miles away. This is different from the "SUA Near & Ahead" message in that you are not projected to enter the SUA. Therefore, the SUA Page does not indicate an estimated time before entry.

Your destination is Huntsville-Madison County Regional (H34). As long as you remain on course the "SUA Near < 2 nm" message is the only message you'll see and it will eventually disappear when you reach Location #2. However, at Location #3 you decide(?) to change course to the southwest. Shortly after you change course, the GPS 95 provides a new message, "SUA Near & Ahead". This message indicates that, not only are you less than two nautical miles from the MOA, but you are also projected to enter the MOA based on your new course. The SUA Page now indicates your estimated time before entering Shirley 1 MOA.

As you continue on this new course an "Inside SUA" message occurs at Location #4. No further messages are provided, but at Location #5 the SUA Page will indicate "Near" for Shirley 1. At Location #6, over two nautical miles away from the MOA, Shirley 1 will no longer appear on the SUA Page.

10.3 SECTORIZED AIRSPACE - NEAR VERSUS AHEAD



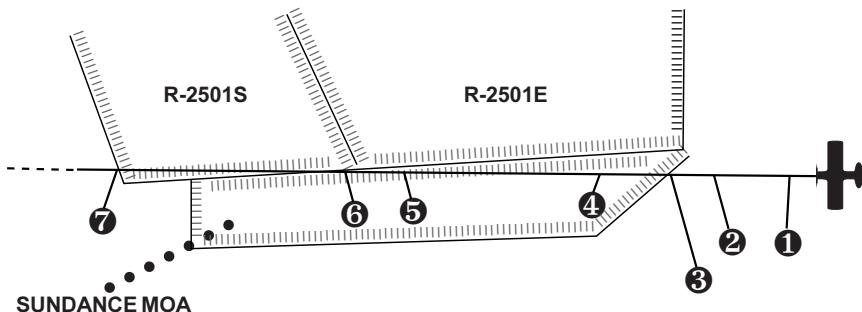
This third example is a little more complicated, but illustrates one of the more unusual circumstances you may encounter. You are en route on a flight from Johnson County Industrial (KIXD) to Kansas City - Downtown (KMKC), which lies under the Class B airspace of Kansas City International (KMCI).

At Location #1 you reach your en route altitude of 3,000 feet and the GPS 95 alerts you of the controlled airspace ahead with, "SUA Ahead < 10 min". The outer ring of the Class B airspace only extends down to 4,000 feet MSL. The airspace you are being warned of is the second ring (sector) that extends from 8,000 to 3,000 feet MSL. Projecting your course beyond KMKC, you would enter this sector of the Class B airspace. (This example assumes you have entered an altitude buffer setting of 500 feet.) The SUA Page indicates the estimated time en route before entering this airspace.

The message "SUA Near & Ahead" is provided at Location #2. Although the second ring lies well ahead, beyond KMKC, this same Class B sector is now less than two nautical miles off your left wing as well!

When you reach Location #3 the SUA Page changes from "Near & Ahead" back to "Ahead", indicating you are again more than two nautical miles away from the second ring of the Class B airspace. As you descend toward KMKC, the Class B airspace is removed from the list on the SUA Page and "No Alerts" is displayed at the top of the page.

10.4 MULTIPLE SUAs



Suppose you are flying toward or near more than one SUA. How would the GPS 95 alert you to the presence of each airspace? Messages would be provided for each airspace nearby, ahead or that you are inside of.

In our final example, you are flying westbound toward Sundance MOA. Adjacent to this MOA are two restricted areas: R-2501S and R-2501E. Sundance MOA extends from 500 feet AGL to 10,000 feet MSL. Since the MOA floor is an AGL altitude, the GPS 95 will provide SUA messages for this airspace at all altitudes below 10,000 feet MSL. Both restricted areas have unlimited ceilings extending from ground level. SUA messages for these areas will occur at any altitude.

You have prior authorization to enter R-2501S, but not R-2501E, and have planned your flight accordingly. As you reach Location #1 the “SUA Ahead < 10 min” message appears and the SUA Page displays the estimated time to reach Sundance MOA.

Two messages appear at Location #2: “SUA Near & Ahead” and “SUA Near < 2 nm”. “SUA Near & Ahead” means you are less than two nautical miles from Sundance MOA and projected to enter it. “SUA Near < 2 nm” tells you that R-2501E is less than two nautical miles away to the north. You can confirm this, and identify which message applies to which SUA, by using the SUA Page. Highlight the desired SUA and its status (“Ahead”, “Near & Ahead”, “Near” or “Inside”) is displayed at the top of the page. (With the desired SUA highlighted, using the arrow keys, press ENT to view additional information about it.)

At location #3 the GPS 95 alerts you with “Inside SUA”, indicating you are within Sundance MOA's boundaries. The “SUA Near” message also remains on the Message Page, reminding you that R-2501E is still within two nautical miles.

A third message, “SUA Ahead < 10 min”, is added to the Message Page at Location #4, meaning you'll enter R-2501S in less than ten minutes. This message changes to “SUA Near & Ahead” at Location #5 since R-2501S is now less than two nautical miles off your right wing. (Though you'll actually travel more than two miles ahead before entering this restricted area.)

At Location #6 you leave Sundance MOA and enter R-2501S. The GPS 95 alerts you with “Inside SUA”. The SUA Page now indicates “Inside” for R-2501S and “Near” for Sundance MOA, since it is less than two nautical miles off your tail. Sundance MOA drops from the list (on the SUA Page) once you are over two nautical miles away.

Finally, at Location #7 the SUA Page indication for R-2501S changes from “Inside” to “Near”, then to “No Alerts” once you are over two nautical miles away from the restricted area.

All the examples described in this section are based on real airspaces. If your unit contains the Americas database, you may use the Simulator Mode to duplicate these scenarios and observe how the unit would actually operate when flying near an SUA. (Refer to Section 5.5 for more information on using Simulator Mode.) The table below shows the starting position, altitude, ground track and speed used in each example. Make sure that the SUA alarms are turned on and the altitude buffer is set to 500 feet.

Example #	Starting Position (lat/long)	Altitude (feet)	Ground Track	Ground Speed
1	N 35° 43.5' W 91° 09.0'	10,500	GOTO KBVX	100 KTS
2*	N 36° 02.5' W 91° 25.0'	10,500	269° Mag.	135 KTS
3	At KIXD airport	3,000	GOTO KMKC	125 KTS
4	N 34° 11.45' W 115° 30.00'	4,500	263° Mag.	90 KTS

*At location #3, approximately W 92° 40', ground track changes to 259°.

APPENDIX A

MESSAGES

The GPS 95 uses the Message Page to communicate important information to you. Some messages are advisory in nature, others are warnings that may require your intervention. This appendix provides a complete list of messages and their meanings. Please pay careful attention to all messages.

Alarm Clock - The alarm time for the alarm clock has been reached.

Approaching ____ - You are less than one minute from reaching the indicated waypoint.

Arrival at ____ - Your craft has entered the arrival alarm circle for the indicated destination waypoint.

Battery Low - The battery pack is low on power. AA batteries should be replaced or the rechargeable battery pack should be recharged for continued operation.

Cannot nav lckd rte - An attempt has been made to activate a route containing a locked waypoint. The GPS 95 cannot perform navigation in this situation. (A waypoint may be "locked" when the database is updated if the waypoint does not exist in the new database.)

Can't Chng Activ WPT - An attempt has been made to modify the position of the "active to" or "active from" waypoint. The GPS 95 will not allow the modifications. You must delete the route or cancel the GOTO function first.

CDI Alarm - Your course deviation (distance left or right of course) has exceeded the limit that you specified on the Arrival/CDI Page.

Dbase Mem Failed - The GPS 95 has detected a failure in its flash memory when using the PC Database Update Kit. If this message occurs, the database is unusable and the unit should be taken to an authorized GARMIN service center.

Degraded Accuracy - The accuracy of the GPS 95 position is degraded beyond 500 meters due to satellite geometry or data quality. Additional cross checking should be performed to verify the integrity of the GPS position.

Final altitude alert - The current altitude is within 1000 feet of the final altitude entered on the VNAV Page.

Inside SUA - Your craft has penetrated the boundaries of a special-use or

controlled airspace.

Leg Not Smoothed- The upcoming leg is too short for smooth waypoint transitions. Expect a rapid change in the CDI.

Memory Battery Low - The battery that sustains user memory is low and should be replaced by an authorized GARMIN service center as soon as possible. Failure to do so may result in loss of stored data, including all waypoints and routes.

Need Altitude - The GPS 95 needs altitude to start and/or continue 2D navigation. Press NAV and enter your current altitude. The altitude you enter should be as accurate as possible. An inaccurate altitude will result in an inaccurate position and navigation information.

No DGPS Position - An RTCM input has been selected, but insufficient Differential GPS (DGPS) data is available to calculate a corrected position.

No RTCM Input - The RTCM device (such as a beacon receiver) is improperly connected to the GPS 95, the RTCM device is not transmitting in an RTCM SC-104 version 2.0 format, or the baud rates between the RTCM device and the GPS 95 do not match.

Osc Needs Adjustment - The GPS 95 has detected excessive drift in its internal crystal oscillator which may result in longer acquisition time. The unit should be taken to an authorized GARMIN service center as soon as possible.

Poor GPS Coverage - The GPS 95 cannot acquire sufficient satellites necessary to provide navigation.

Pwr Down and Re-init - The GPS 95 is unable to compute a position due to abnormal satellite conditions. Power down the unit and verify that the position on the Position Page is within a few degrees of your actual position.

Received Invalid Wpt - A waypoint was received in an upload/transfer operation that has an invalid identifier or position.

Receiver Failed - The GPS 95 has detected a failure in the receiver hardware. If the message persists, the GPS 95 is unusable and should be taken to an authorized GARMIN service center.

ROM Failed - The GPS 95 has detected a failure in its permanent memory. If this message occurs, the unit is unusable and should be taken to an authorized GARMIN service center.

Route is Full - An attempt has been made to add more than 30 waypoints to a route. The GPS 95 will not allow more than 30 waypoints per route.

Route Not Empty - An attempt has been made to copy a route to another non-empty route. The GPS 95 will not allow this operation.

Route Waypoint - An attempt has been made to delete a waypoint which is a member of one or more routes. You must remove the waypoint from all routes before the waypoint can be deleted.

Route Wpt Deleted - A waypoint in a uploaded/transferred route does not exist in the database and has been deleted from the route.

RTCM Input Failed - The GPS 95 was receiving RTCM inputs, but the data signal has been interrupted or the connection to the RTCM device was lost.

Searching the Sky - The GPS 95 is in the search-the-sky mode. Allow the unit to complete its data collection before turning it off. This process takes approximately 20-30 minutes.

Start altitude chng - The altitude change entered on the VNAV Page is about to begin.

Steep Turn Ahead - This message appears approximately one minute prior to a turn that requires a bank angle in excess of 25 degrees in order to stay on course.

Stored Data Lost - Stored user data, including waypoints, routes, and satellite orbital data has been lost due to a low memory battery.

SUA Ahead < 10 min - Your projected course will place you in a special-use/controlled airspace within the next ten minutes, based on your current ground track and ground speed.

SUA Near & Ahead - Your current position is within two nautical miles of an SUA boundary and you are projected to enter the SUA, based on your current ground track.

SUA Near < 2 nm - Your current position is within two nautical miles of an SUA boundary, but you are not projected to enter the SUA.

Timer Expired - The count down timer has expired.

Track Memory Full - The track memory is full. Go to the Track Log Setup Page to clear the memory.

Transfer Completed - Data transfer operations are complete.

VNAV cancelled - The VNAV function has been cancelled due to a change in the active route.

WPT Exists ____ - You have entered a waypoint name on the AutoStore™ Page that already exists in memory. Enter a waypoint name that does not exist.

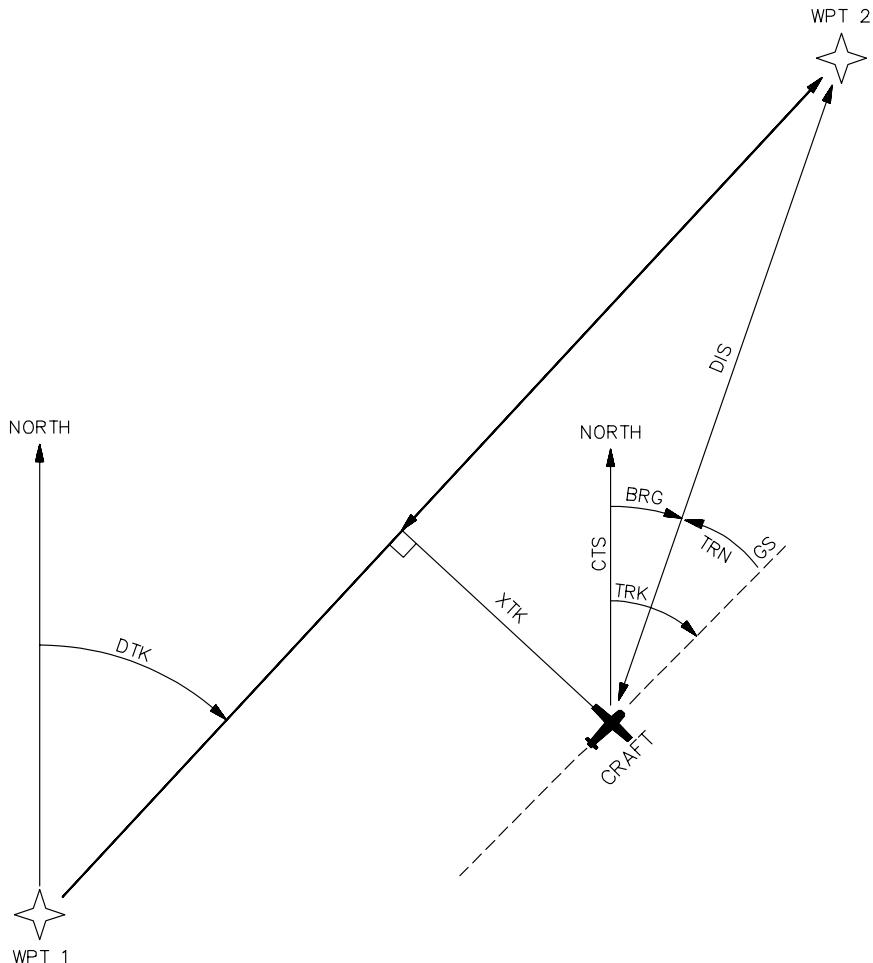
WPT Memory Full - The waypoint memory is full. You should delete unused waypoints to make room for new waypoints.

APPENDIX B

GLOSSARY AND NAVIGATION TERMS

B.1 DEFINITIONS

This section provides an illustration of and definitions for the navigation terms used in this manual.



Velocity/time terms:

GS Ground speed. GS is the speed measured relative to a ground position; also known as velocity over ground (VOG).

ETA Estimated time of arrival. ETA is the estimated time you will reach the “active to” waypoint based on current GS. This time is selectable as either UTC or local.

ETE Estimated time enroute. ETE is the time it will take to reach the “active to” waypoint based on current GS.

Direction terms:

DTK Desired track. DTK is the course between the “from” and “to” waypoints. In the case of the GOTO function, the “from” waypoint is the location at which the GOTO function was activated.

BRG Bearing. BRG is the direction from your present position to the “active to” waypoint.

CTS Course to steer. CTS is the recommended direction to steer in order to reduce cross track error and stay on course. (See Section B.2 for an example using CTS.)

TRK Track. TRK is your direction of movement relative to a ground position.

TRN Turn angle. TRN is the difference between BRG and TRK. “L” indicates you should turn to the left, “R” indicate you should turn to the right. The degrees indicate the angle you are off course.

Distance terms:

DIS Distance. DIS is the great circle distance from your position to the “active to” waypoint.

XTK Crosstrack. XTK is the cross track error, or distance that you are off course. If the crosstrack error exceeds the CDI scale setting, the XTK distance will also be displayed on the appropriate side of the CDI.

V VNAV altitude. V is the recommended altitude at which you should be in order to accomplish a VNAV maneuver. This information is only available when the VNAV function has been activated.

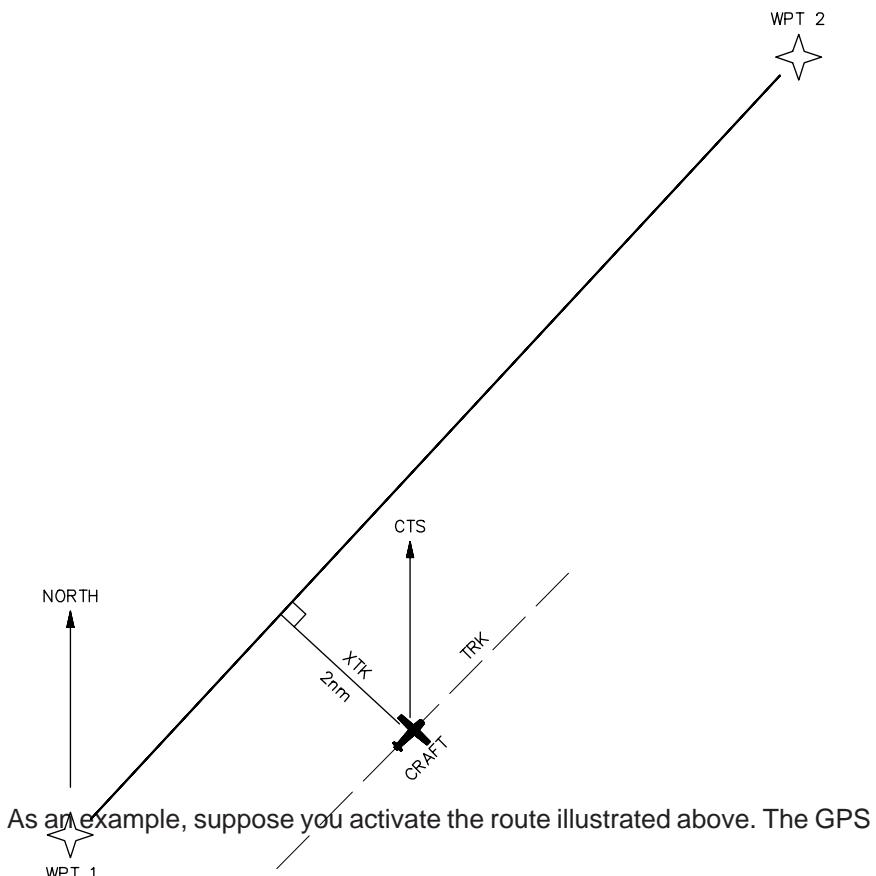
Satellite terms:

DOP Dilution of precision. DOP is a measure of the satellite geometry quality and hence the relative accuracy of your position (one meaning the best and ten meaning poor).

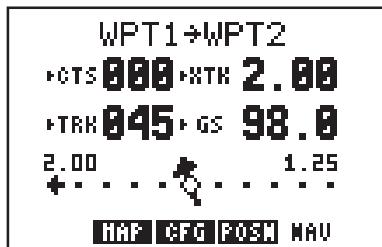
EPE Estimated position error. EPE, which is computed using the satellite geometry (DOP), signal and data quality, receiver tracking status and other factors, is an overall measure of your position accuracy.

B.2 COURSE TO STEER (CTS)

Course To Steer is a GARMIN exclusive that recommends an optimal direction to steer that will guide you to the course and allow you to proceed efficiently along your route.



95 chooses the closest leg with a desired track of 45 degrees but your position happens to be two nautical miles off course. The unit will automatically compute the optimal course to steer (which is due north in this example). Press the NAV key until the Nav Summary Page is displayed, then select "CTS" on the first cyclic field. Using the CTS direction (000°), turn so that the track (TRK) and CTS direction match.



As you approach the course, CTS will slowly change and, once on course, will be identical to the desired track.

APPENDIX C

INSTALLATION AND MAINTENANCE

C.1 SPECIFICATIONS

GPS 95 SPECIFICATIONS*

PHYSICAL

Case:	Waterproof
Size:	w/ Battery Pack - 3.23"w x 6.26"h x 1.46"d (82mm x 159mm x 37mm)
	w/o Battery Pack - 3.23"w x 4.87"h x 1.46"d (82mm x 124mm x 37mm)
Weight:	14 ounces (0.4 kg) without battery pack 19 ounces (0.54 kg) with battery pack

POWER

Input	Alkaline battery pack (4 AA size) Rechargeable battery pack (Optional) 12 or 24 volt DC with power cable (5-40 VDC) 115 or 230 volt AC with A/C Adapter
Consumption	1.6 watts in Normal mode (without backlighting)

ENVIRONMENTAL

Temperature:	-15°C to +70°C (+5°F to +158°F) operating -40°C to +70°C (-40°F to +158°F) storage
Humidity:	95% non-condensing

PERFORMANCE

Receiver:	MultiTrac™, tracking up to 8 satellites
Frequency:	L1, 1.57542 GHz
Acquisition Time: (typical)	2 minutes 2D 2.5 minutes 3D 15 seconds Warm Start (with ephemeris)

Update Rate: Once per second, continuously
Accuracy: Position: 15 meters (49 ft) RMS**
Velocity: 0.1 knots RMS steady state
Dynamics: 999 knots velocity, 3g dynamics

INTERFACES

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 receiver 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)

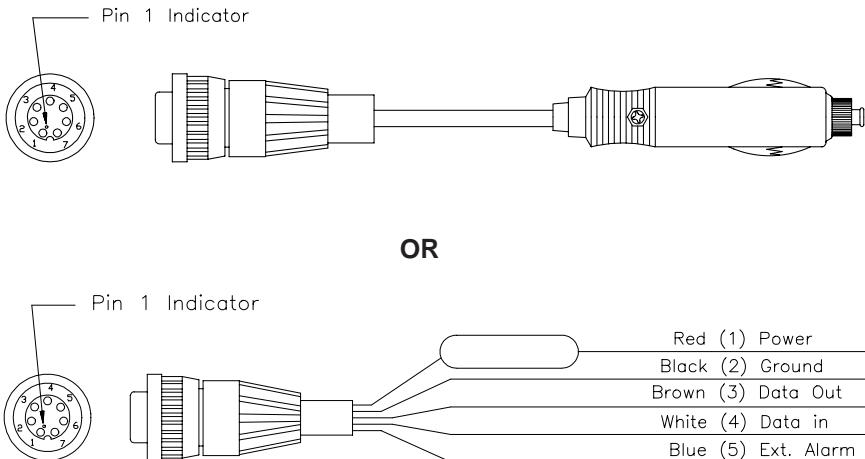
Complete information concerning NMEA formats and sentences is available from: NMEA, P.O. Box 50040, Mobile, AL 36605; PH: (205) 473-1793 or FAX: (205) 473-1669. The cost of these materials is approximately \$35 US, plus shipping and handling.

* All specifications are subject to change without notice.

** Subject to accuracy degradation to 100m 2DRMS under the United States Department of Defense imposed Selective Availability program. (Due to satellite geometry, altitude error is typically two to three times the horizontal position error.)

C.2 ELECTRICAL WIRING

The GPS 95 power/data cable allows you to connect the unit to vehicle power systems, other electronics, and a remote alarm/beeper. The power/data cable has a 7-pin intermediate connector to facilitate quick disconnection of all electrical connections and easy removal of the entire yoke mount from the aircraft. The GPS 95 is supplied with two wire harnesses: one with a cigarette lighter plug for temporary use and the other for permanent wiring. The figures below illustrate the two wiring options.



To connect the permanent wire harness to vehicle power...

- Connect the RED harness lead (with fuse) to the positive (+) side of a 5 to 40 volt DC power source.
- Connect the BLACK harness lead to the negative (-) side of the 5 to 40 volt DC power source.

The GPS 95 will drive a remote alarm or relay that requires no more than 100 millamps of current. (**WARNING:** Devices which draw current in excess of 100 milliamperes may damage your unit and will void your warranty. Consult the instructions included with the remote alarm or relay for current drain information.)

To connect to a remote alarm system...

- Connect the BLUE harness lead to the negative side of a transistor alarm or relay switch.
- Connect the positive side of the alarm or relay to the positive side of the 5 to 40 volt DC power source.

The GPS 95 may be connected to a PC-compatible computer using a NMEA 0183 data interface or to marine electronics such as an autopilot or plotter which use an NMEA 0180, NMEA 0182 or NMEA 0183 data interface. The unit can provide data for up to three NMEA “listeners” simultaneously. Refer to installation instructions of these devices for further information.

To connect the GPS 95 to an NMEA electronic device...

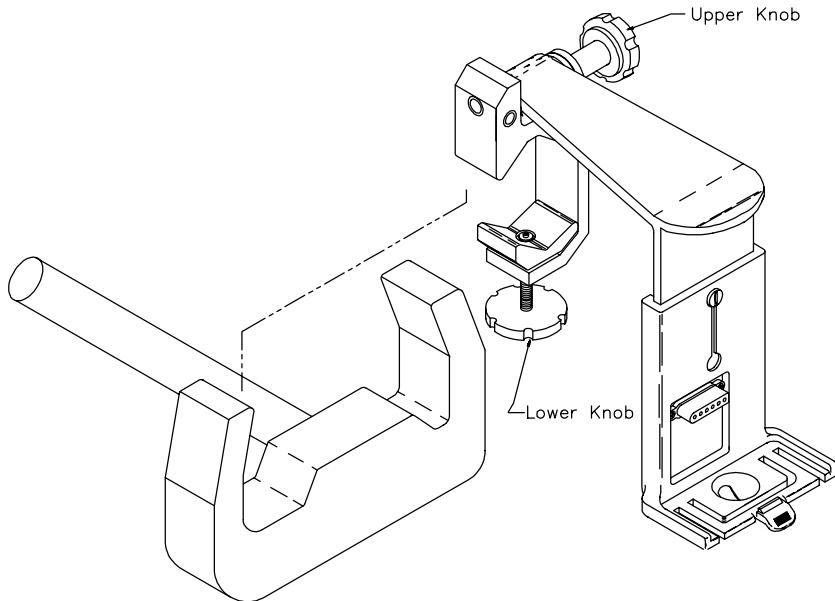
- Connect the BROWN harness lead to the NMEA “A” line of a two-wire, shielded cable.
- Connect the BLACK harness lead to the NMEA “B” line of the shielded cable.
- Connect the BLACK harness lead to the shield of the shielded cable. (The opposite end of the shield should not be grounded.)

C.3 YOKE MOUNT INSTALLATION

The GPS 95 is equipped with a yoke mount which can quickly be attached to the control yoke for easy access and visibility without blocking the view of the instrument panel. The yoke mount can be detached and stowed in the carrying bag along with the GPS 95 and any other accessories you might wish to take with you. The clamp that comes with the standard yoke mount comes in a configuration that will fit the control yoke of more than 90% of general aviation aircraft.

To attach the yoke mount to the control yoke...

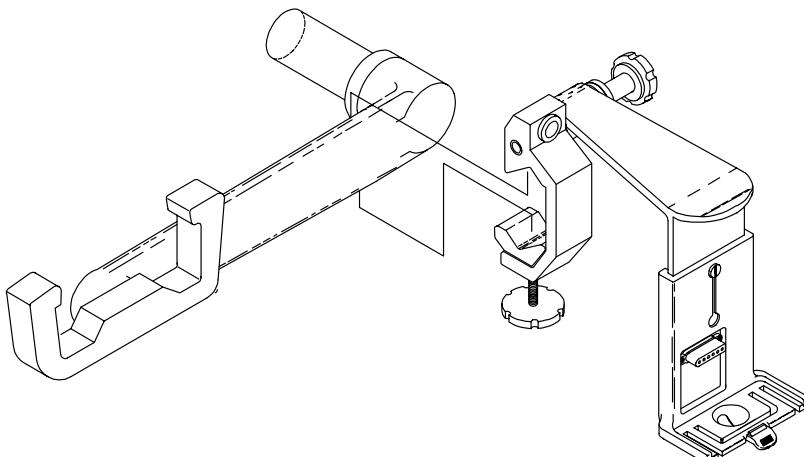
- Loosen the lower knob.
- Slide the clamp over the control yoke shaft just behind the control wheel.
- Tighten the lower knob securely.
- Make sure that the clamp is as close as possible to the control wheel and **check to make sure that the yoke travel is not limited or hindered in any way by the yoke mount.**

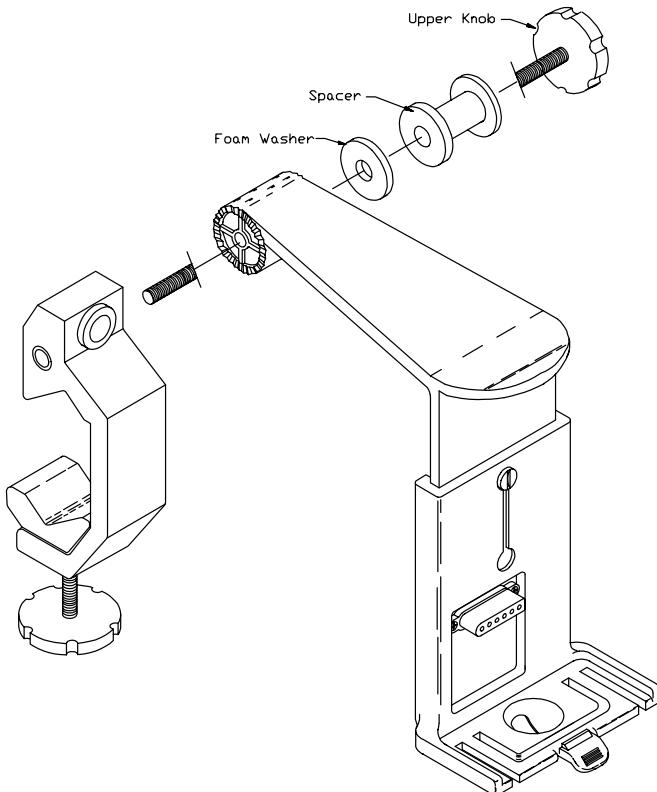


The yoke mount clamp will need to be reconfigured in order to fit the following: Bonanza, Baron and some other Beech models with center column control.

To reconfigure the yoke mount...

- Completely unscrew the upper knob.
- Re-attach the plastic yoke mount bracket to the metal C-clamp assembly using the alternate position as shown.

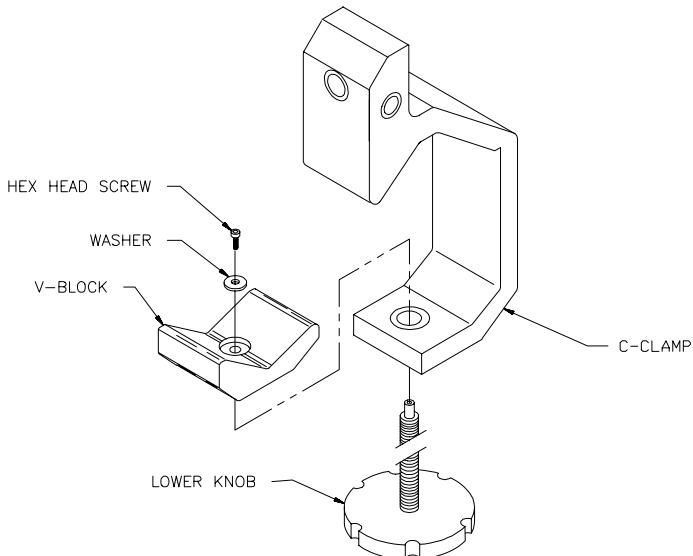




To attach the yoke mount to the control yoke...

- Open the clamp jaw to its widest extent by unscrewing the lower knob.
- Slip the clamp over the horizontal member of the control yoke. Position the clamp as far as possible toward the center column.
- Tighten the lower knob securely.
- **Check to make sure the yoke travel is not limited or hindered in any way by the yoke mount.**

In some large diameter column mounting applications, the threaded portion of the lower knob may extend an excessive distance from the yoke mount, obscuring panel controls. In this case, use the provided lower knob with shortened stud. It can be used interchangeably with the longer stud knob that came installed in the clamp.



To substitute the lower knob with shortened stud...

- Peel back the protective rubber on the V-block.
- Use a 1.5mm hex wrench to remove the M1.7 hex head screw.
- Completely unscrew the lower knob.
- Screw in the alternate lower knob.
- Re-attach the V-block as shown.

NOTE: A shorter V-block is available for Beech models having a dual yoke arrangement with a large rectangular cross-section. If the standard V-block/clamp arrangement does not fit the cross-section, contact our Product Support department to obtain the shorter V-block. (See Section C.9 for Product Support information.)

C.4 YOKE MOUNT OPERATION

Once installed on the yoke, the yoke mount may be adjusted to provide the optimum viewing angle for your GPS 95.

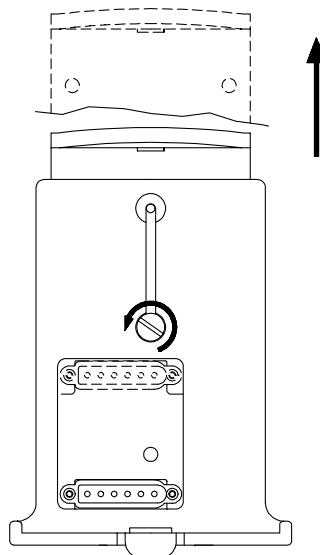
To adjust the yoke mount viewing angle...

- Loosen the upper knob.
- Rotate the bracket up or down on the ratchet.
- Tighten the upper knob securely.

The yoke mount is designed to allow the GPS 95 to be installed either with or without the battery pack attached.

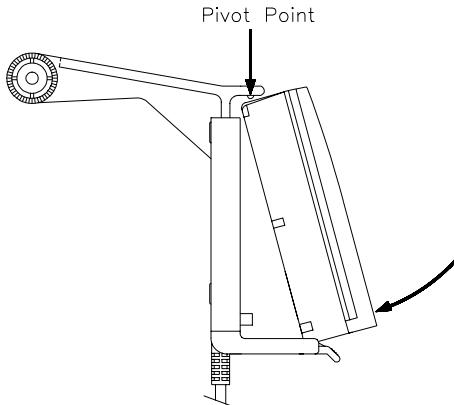
To adjust the yoke mount to accept the GPS 95 with the battery pack attached...

- Loosen the coinslot screw.
- Lower the cradle to its lowest position.
- Tighten the coinslot screw. When adjusted properly, the coinslot screw should fit completely into the counterbore in the cradle so that all surfaces are flush.



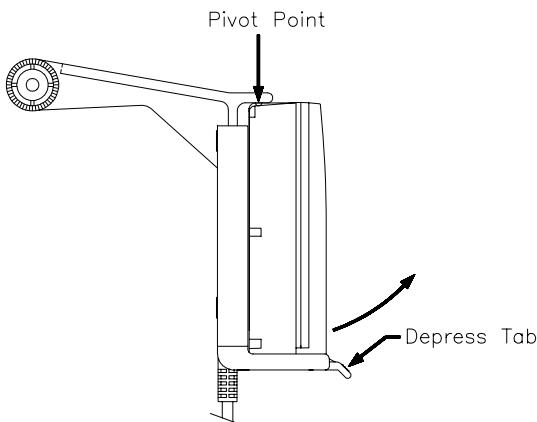
The yoke mount has been designed for easy insertion and removal of your GPS 95 if you wish to use the unit in another airplane or vehicle, to plan at home, or to prevent theft.

To insert the GPS 95 into the yoke mount...



- Tilt the top of the GPS 95 into the yoke mount as shown.
- Engage the slot in the top of the GPS 95 into the raised bump in the yoke mount bracket.
- Rotate the bottom of the GPS 95 into the yoke mount until the unit latches securely into place.
- Connect the antenna or antenna cable. No other electrical connections are required; all power and data connections are made through the 6-pin connector mounted in the yoke mount bracket.

To remove the GPS 95 from the yoke mount...



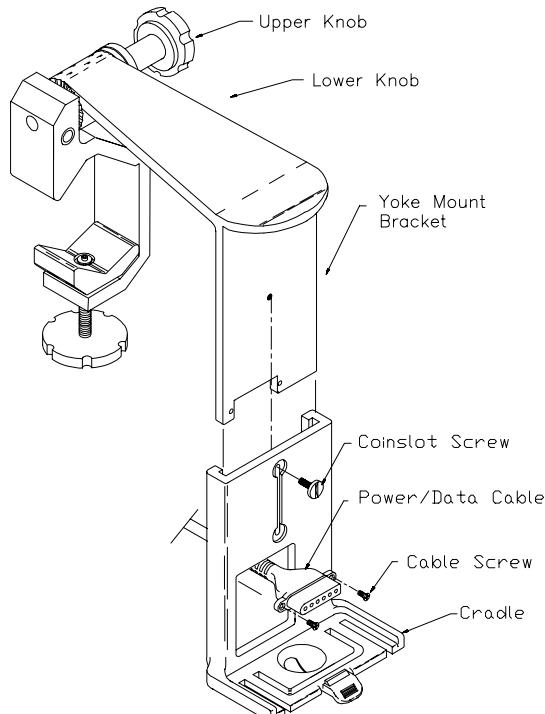
- Disconnect the antenna or antenna cable.
- Apply enough force to the release tab to allow the unit to pass as shown above.
- Pull the bottom of the GPS 95 out. Then rotate the top downward and out.

NOTE: The portable antenna is removed by gripping the antenna at its base (on the knurled knob) and rotating 1/4 turn counterclockwise. The antenna will then pull straight off of the BNC connector on the side of the unit

C.5 SURFACE MOUNTING

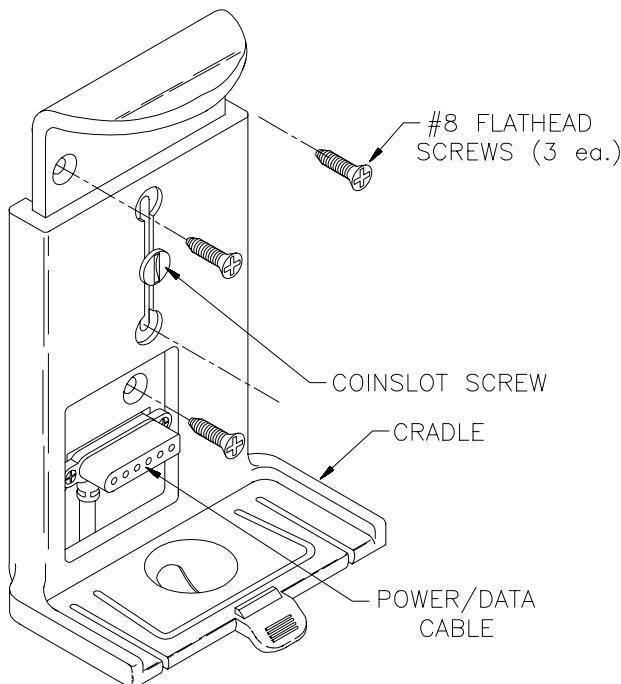
The GPS 95 can also be fix-mounted to a surface using the surface mount. Before permanent mounting, you may wish to apply power to the unit and look at the display in the desired mounting location to ensure you have the desired viewing angle.

To remove the cradle and power/data cable from the yoke mount...



- Remove the power/data cable screws.
- Remove the coinslot screw
- Slide the cradle off of the yoke mount bracket as shown.

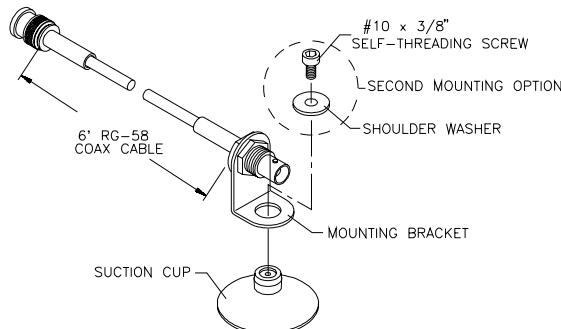
To attach the cradle and power/data cable to the surface mount...



- Slide the connector into the corresponding slot in the cradle as shown.
- Install the coinslot screw.
- Install the cable screws to secure the power/data cable. Make sure the rounded end of the cable connector is to the left side as shown in the drawing above to ensure that the connector will mate properly with the GPS 95.

C.6 PORTABLE ANTENNA INSTALLATION

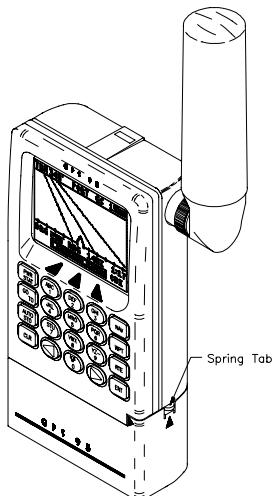
The GPS 95 is supplied with a portable antenna mount that allows the antenna to be affixed to a windshield or any smooth surface using a suction cup mount and a six foot extension cable. As an alternative, the suction cup can be removed and replaced with the plastic shoulder washer and self-threading screw to permanently attach the mounting bracket to the glare shield.



NOTE: The supplied portable antenna mount uses RG-58 coax cable. Modification of this accessory is not recommended, as such modification may adversely affect the shielding capabilities of the cable and cause radio frequency interference. If a substitute cable is desired, standard shielded coaxial cable (RG-58 or RG-59 recommended) should be used.

C.7 BATTERY PACK OPERATION

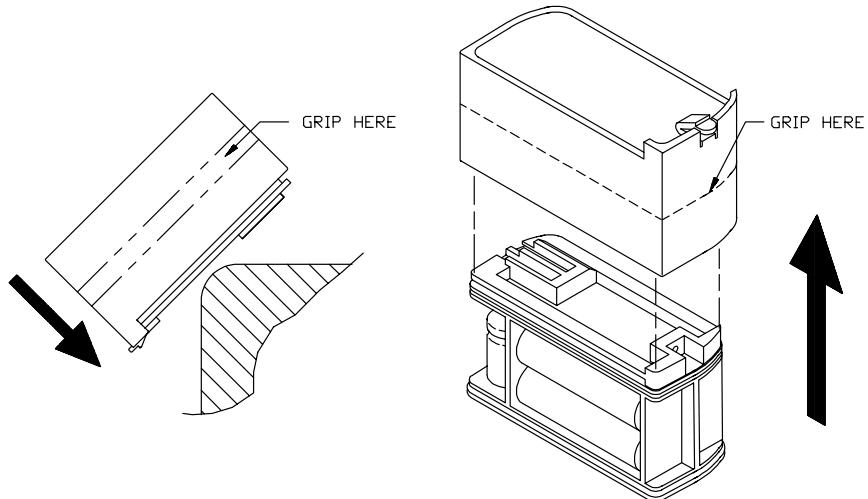
The GPS 95 is supplied with an O-ring sealed, 4-cell alkaline battery pack. The battery pack must be removed from the unit in order to replace the cells.



To remove the battery pack...

- Push down on the spring tab on the right side of the battery pack.
- Pull the battery pack off the right side of the unit.

To replace the alkaline batteries...



- Grip the battery pack around the outside edge (not the bottom).
- Push the top of the battery pack against the edge of a hard surface which will not mar the plastic. The outer sleeve will slide off the cage, revealing the batteries inside.
- Replace the batteries, observing the polarity diagram engraved in the plastic.
- Slide the sleeve over the cage until it snaps into place, taking care that you do not tear the gaskets which seal the battery pack.

C.8 MAINTENANCE

The GPS 95 is constructed of high quality material and should not require user maintenance. Please refer any repairs to an authorized GARMIN service center. (The unit contains no user serviceable parts. Do not attempt repairs yourself.)

Never allow gasoline or solvents to come into contact with your unit. Damage to the case may occur which is not covered by your warranty.

When transporting your GPS 95 in the supplied carrying case, place the unit in the yoke mount, then place this assembly in the carrying case with the unit face down. Place any other items (cables, etc.) on top of the unit/yoke mount. This minimizes the chance that the GPS 95's display will be scratched by sharp edges on the yoke mount or by any loose items packed in the carrying case.

The waypoints, routes, custom settings and other data stored in the GPS 95 are maintained by an internal battery. (This data will not be lost even if you remove the AA or rechargeable battery pack for separate storage.) The internal memory battery should typically last three to five years. If the GPS 95 detects a low memory battery, you will be informed with the message "Memory Battery Low". You should return your unit to an authorized GARMIN service center as soon as possible for service. Failure to do so may result in loss of data each time you turn your unit off (indicated by the message "Stored Data Lost").

Your GPS 95 contains a highly accurate crystal oscillator which should provide many years of reliable operation. If the unit detects excessive oscillator drift, you will be informed with the message "Osc Needs Adjustment". You should return your unit to an authorized GARMIN service center as soon as possible. Failure to do so may result in degraded satellite acquisition performance.

C.9 PRODUCT SUPPORT

Should you require additional assistance, please call our Product Support Department. Customers in the continental United States may use our toll free number: 1-800-800-1020. Customers outside the continental United States may call 1-913-599-1515. Please note the software version of your unit as indicated on the Welcome Page when the unit is first turned on. Also, please have the serial number for your unit available.

APPENDIX D

MAP DATUMS

The following is a list of the GPS 95 map datum selections and the corresponding map datum name (including the area of application):

Adindan	Adindan - Ethiopia, Mali, Senegal, Sudan
Afgooye	Afgooye - Somalia
AIN EL ABD 1970	AIN EL ABD 1970 - Bahrain Island, Saudi Arabia
Anna 1 Astro 1965	Anna 1 Astro 1965 - Cocos Islands
ARC 1950	ARC 1950 - Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe
ARC 1960	ARC 1960 - Kenya, Tanzania
Ascension Island '58	Ascension Island '58 - Ascension Island
Astro B4 Sorol Atoll	Astro B4 Sorol Atoll - Tern Island
Astro Beacon "E"	Astro Beacon "E" - Iwo Jima Island
Astro Dos 71/4	Astro Dos 71/4 - St. Helena Island
Astronomic Stn '52	Astronomic Stn '52 - Marcus Island
Australian Geod '66	Australian Geod '66 - Australia, Tasmania Island
Australian Geod '84	Australian Geod '84 - Australia, Tasmania Island
Bellevue (IGN)	Bellevue (IGN) - Efate and Erromango Islands
Bermuda 1957	Bermuda 1957 - Bermuda Islands
Bogota Obsrvatry	Bogota Obsrvatry - Colombia
Campo Inchauspe	Campo Inchauspe - Argentina
Canto Astro 1966	Canto Astro 1966 - Phoenix Islands
Cape	Cape - South Africa
Cape Canaveral	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 Alegre	Corrego Alegre - Brazil
Djakarta (Batavia)	Djakarta (Batavia) - Sumatra Island (Indonesia)
Dos 1968	Dos 1968 - Gizo Island (New Georgia Islands)
Easter Island 1967	Easter Island 1967 - Easter Island
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 Hayford	Finland Hayford - Finland
Gandajika Base	Gandajika Base - Republic of Maldives

Geodetic Datum '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 1963	Hong Kong 1963 - Hong Kong
Indian Bangladesh	Indian - Bangladesh, India, Nepal
Indian Thailand	Indian - Thailand, Vietnam
Ireland 1965	Ireland 1965 - Ireland
ISTS 073 ASTRO '69	ISTS 073 ASTRO '69 - Diego Garcia
Johnston Island	Johnston Island - Johnston Island
Kandawala	Kandawala - Sri Lanka
Kergulen Island	Kergulen Island - Kerguelen Island
Kertau 1948	Kertau 1948 - West Malaysia, Singapore
L.C. 5 Astro	L.C. 5 Astro - Cayman Brac Island
Liberia 1964	Liberia 1964 - Liberia
Luzon Mindanao	Luzon - Mindanao Island
Luzon Philippines	Luzon - Philippines (excluding Mindanao Island)
Mahe 1971	Mahe 1971 - Mahe Island
Marco Astro	Marco Astro - Salvage Islands
Massawa	Massawa - Eritrea (Ethiopia)
Merchich	Merchich - Morocco
Midway Astro 1961	Midway Astro 1961 - Midway Island
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 (including Newfoundland Island)
NAD27 Canal Zone	NORTH AMERICAN 1927 - Canal Zone
NAD27 Caribbean	NORTH AMERICAN 1927 - Caribbean (Barbados, Caicos Islands, Cuba, Dominican Republic, Grand Cayman, Jamaica, Leeward Islands, Turks Islands)
NAD27 Central	NORTH AMERICAN 1927 - Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua)
NAD27 CONUS	NORTH AMERICAN 1927 - Mean Value (CONUS)
NAD27 Cuba	NORTH AMERICAN 1927 - Cuba
NAD27 Greenland	NORTH AMERICAN 1927 - Greenland (Hayes Peninsula)
NAD27 Mexico	NORTH AMERICAN 1927 - Mexico
NAD27 San Salvador	NORTH AMERICAN 1927 - San Salvador Island
NAD83	NORTH AMERICAN 1983 - Alaska, Canada, Central America, CONUS, Mexico
Nahrwn Masirah IInd	Nahrwn - Masirah Island (Oman)

Nahrwn Saudi Arbia	Nahrwn - Saudi Arabia
Nahrwn United Arab	Nahrwn - United Arab Emirates
Naparima BWI	Naparima BWI - Trinidad and Tobago
Observatorio 1966	Observatorio 1966 - Corvo and Flores Islands (Azores)
Old Egyptian	Old Egyptian - Egypt
Old Hawaian	Old Hawaian - Mean Value
Oman	Oman - Oman
Ord Srvy Grt Britn	Ord Srvy Grt Britn - England, Isle of Man, Scotland, Shetland Islands, Wales
Pico De Las Nieves	Pico De Las Nieves - Canary Islands
Pitcairn Astro 1967	Pitcairn Astro 1967 - Pitcairn Island
Prov So Amricn '56	Prov So Amricn '56 - Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela
Prov So Chilean '63	Prov So Chilean '63 - South Chile
Puerto Rico	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 1943	Sapper Hill 1943 - East Falkland Island
Schwarzeck	Schwarzeck - Namibia
South American '69	South American '69 - Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trinidad and Tobago
South Asia	South Asia - Singapore
Southeast Base	Southeast Base - Porto Santo and Madeira Islands
Southwest Base	Southwest Base - Faial, Graciosa, Pico, Sao Jorge, and Terceira Islands (Azores)
Timbalai 1948	Timbalai 1948 - Brunei and East Malaysia (Sarawak and Sabah)
Tokyo	Tokyo - Japan, Korea, Okinawa
Tristan Astro 1968	Tristan Astro 1968 - Tristan da Cunha
Viti Levu 1916	Viti Levu 1916 - Viti Levu Island (Fiji Islands)
Wake-Eniwetok '60	Wake-Eniwetok '60 - Marshall Islands
WGS 72	WORLD GEODETIC SYSTEM 1972
WGS 84	WORLD GEODETIC SYSTEM 1984
Zanderij	Zanderij - Surinam

APPENDIX E

UTC TIME TO LOCAL TIME OFFSET

Reference the chart below to find the UTC-to-local time offset for your longitude zone. (If you are in a daylight savings time zone, add one hour to the offset.) For example, if you are at longitude W081°00.00' and UTC time is 16:00, local time is 11:00 standard time.

Longitude 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

NOTE: The time zone boundaries given above may be different depending on your area. Consult your charts for more accurate information concerning time zones.

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