Apollo 360 GPS Receiver
User's Guide

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Notice regarding 8-channel receiver added to page 3-6

Ordering Information

To receive additional copies of this publication, order part #560-0123, *Apollo 360 GPS User's Guide*.

About This Manual

This manual is divided into seven sections, each contains information of a specific type. This information is presented in a logical order such that the best understanding of unit operation can be had by reading this manual in its entirety from front to back. The five appendices at the back of this manual contain information helpful, but not critical to operation of the Apollo 360.

Those who are familiar with GPS navigation devices will find that Sections 2 and 3 impart a good understanding of unit operation, although it is recommended that a more thorough knowledge of how to use the Apollo 360 is gained before using it as a navigation aid.

Here is a brief summary of information presented in each section and appendix.

Section 1
- An explanation of basic concepts of the Global Positioning System (GPS) and how a GPS receiver works.

Note

Those familiar with GPS navigation may wish to skip Section 1 and proceed to Section 2 to begin using the Apollo 360.

Section 2
- An introduction to operating the Apollo 360 GPS receiver with a description of the function keys, knobs, and useful features

Section 3
- A listing of the steps necessary to begin navigating using the Apollo GPS receiver

Section 4
- Information on using the unit to navigate a trip and a description of navigation options

Section 5 ■ An explanation of each main menu option

Section 6 ■ A description of the waypoint database and information it contains

Appendix A ■ A glossary of navigation and GPS terms

Appendix B ■ A listing of map datums included with the Apollo 360

Appendix C ■ A tutorial containing instructions on how to “fly” the Apollo 360 GPS receiver using the built-in simulator

Appendix D ■ A troubleshooting guide explaining what to do if the receiver fails to operate properly

Appendix E ■ Summary of features

Welcome...

Welcome to the ever-growing family of II Morrow customers using Apollo products around the world to navigate with a high degree of accuracy. We at II Morrow are proud of our reputation as a leading manufacturer of navigation equipment. Your Apollo model 360 GPS receiver is an advanced navigation device built with quality and pride. We are certain you will find it to be a versatile and valuable navigation instrument.

Contacting the Factory

Our staff of service technicians is available to assist you with any operational difficulties you may experience or to answer questions about your Apollo 360. Contact the factory anytime from 8:00 A.M. until 5:00 P.M. Pacific time Monday through Friday (excluding holidays).

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Caution

The Apollo 360 is a powerful navigation tool, but you should never rely solely on any one piece of navigation equipment. It is important to maintain a constant awareness of the navigation picture by using all appropriate resources.

This device should be installed only by an FAA certified facility. Certified avionics technicians will properly install and checkout your Apollo 360, ensuring trouble free operation when you fly with the unit.

Federal Aviation Administration regulations require pilots to practice SEE and AVOID. Do not study this manual while flying. Make your first flight using the Apollo 360 during good weather in a low traffic area. Read at least Sections 2 and 3 of this manual before you fly.

The Apollo 360 is equipped with a built-in simulator to allow you to practice navigating without actually flying. Appendix C at the back of this manual contains a tutorial section explaining how to use the simulator. Try this helpful tool to familiarize yourself with operating the unit before navigating with the Apollo 360.

Remember, use the Apollo 360 for VFR operation only.

Table of Contents

Appendices

Section 1

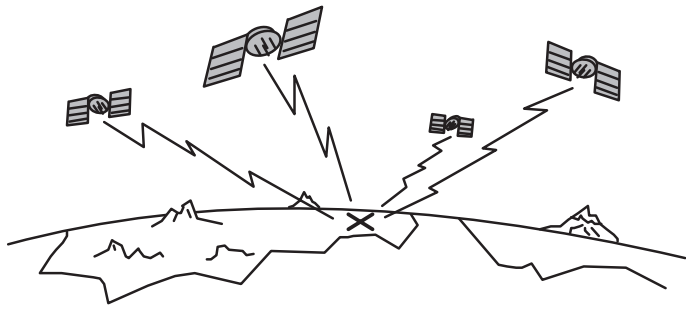
Introduction to GPS Navigation

GPS Overview

The Global Positioning System (GPS) is a constellation of 24 satellites in six orbit lanes 10,898 nautical miles above the earth at an inclination angle of about 55 degrees from the equator. Each satellite orbits the earth twice in 24 hours.

The GPS was developed and the satellites launched by the U.S. Department of Defense with the original intent of supplying highly accurate position fix information for military applications. In recent years, commercial applications for the information provided by this system have steadily increased in the civilian sector. Some of the more popular civilian uses of the system include surveying and position fix data recording for civil engineering applications, and a broad range of marine, aviation, and terrestrial navigation applications.

While orbiting the earth, each GPS satellite transmits complex streams of data containing the operational status and orbital location of all the satellites in the system. The Apollo 360 receives this data stream and processes the information to determine which satellites are “visible” to the receiver’s antenna. With this determination made, the



receiver chooses satellites to calculate a position fix. Using information transmitted from three or more satellites, the unit can calculate latitude and longitude (usually abbreviated lat/lon); with four or more satellites, GPS altitude can also be calculated.

GPS System Accuracy

The GPS allows a high degree of position fix accuracy. The system can produce a position fix accurate to within less than one meter. Due to concern for national security, the U.S. Department of Defense introduces constant errors to the transmitted satellite data to degrade the accuracy of the system. Called Selective Availability, this practice limits GPS position fix accuracy to about 100 meters, although the relative position of the satellites to one another, their elevation above the horizon, and other factors can also affect accuracy of the position fix. Under optimal conditions, accuracy can improve to within 10 meters. GPS position fix accuracy is not affected by atmospheric conditions.

GPS altitude is based on a mathematical model of the sphere of the earth. Including intentional degradation, GPS altitude may differ from barometric altitude by several hundred feet.

Summary

Unlike navigation aids providing a position fix with data from land-based sources, the Apollo 360 can provide an accurate position fix over land or sea anywhere in the world. The unit includes an extensive database of useful waypoint information and allows you to create up to 2,000 “customized” waypoints of your own. With the power of this navigation device in the cockpit, you can easily navigate with unsurpassed accuracy.

Section 2

Introduction to the Apollo 360

This section introduces you to the Apollo 360 and explains how to use and switch between the unit's operating functions. A description of information that shows on the display when you use each function is included at the back of this section. Section 3 builds on the introductory information presented here as you switch on and begin using the Apollo 360.

The Operating Functions

There are five main operating functions, each performing a different and unique task while you navigate. Each function also provides one or more screens of information on the display. At least one of these functions is always in use when the unit is on. The functions operate independently of one another, so you can switch between them freely without disrupting navigation.

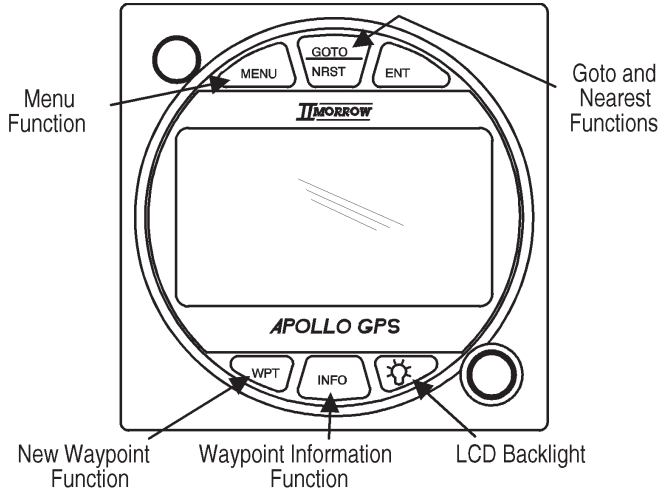
The five operating functions are:

- Navigation (always active)
- Menu
- Goto and nearest
- New waypoint
- Waypoint information

As you set up and navigate a course with the Apollo 360, you will typically use several of these operating functions. During the trip, you will use the navigation function most of the time to monitor your progress. To most effectively use the Apollo 360, become well acquainted with each operating function.

Function Keys

Each of the operating functions is easily accessible from the front panel by using the function keys. Remember, the navigation function is always active -pressing a key is not necessary to enable it.



Navigation Function

This function starts automatically when the unit is switched on and stays active. You will use this function most often while flying. The navigation function provides information about:

- Your current position and navigation progress to a destination
- GPS satellite signals
- Routes, or trips with multiple legs
- Events or conditions important to trip navigation

Navigation function screens show on the display whenever other functions are not in use.

Menu Function

Use this function to access a menu of options that modify the way navigation information shows on the display. In this way, you may customize the Apollo 360 to best suit your navigation requirements. The menu function also controls many other important ways the unit operates.

Goto and Nearest Functions

The goto and nearest functions operate together. Press this key once for the goto function or twice for the nearest function. Use the goto function to assign a destination waypoint, perhaps one you create, or a waypoint from the Apollo 360's built-in database. The nearest function, always available when you use the goto function, provides a list of waypoints nearest to your present position. These two functions allow you to quickly and easily create a flight plan, or change it while navigating.

New Waypoint Function

Use the waypoint function to create your own waypoints and store them in the Apollo 360's memory. You can create up to 2,000 of your own waypoints, each with a name you choose. You can create waypoints based upon your present position, or you can enter latitude and longitude coordinates (usually abbreviated lat/lon) to define the waypoint location.

Waypoint Information Function

Use this function to get information about any waypoint in the Apollo 360's built-in database, including those you have created and stored. Available information includes:

- Waypoint identifier and type (airport, VOR, NDB, or intersection)
- Bearing and distance to the waypoint from your current position
- Lat/lon coordinates of waypoint
- For airports, the elevation, fuel availability and type, radio communication frequencies, runway details, and more

The Display

The display shows information for each operating function. This information typically includes navigation progress, waypoint information, satellite tracking status, and menu options and selections. Display contrast and the display backlight are adjustable to best suit viewing conditions in the cockpit. See "Screen Controls" in Section 5 for details on adjusting the screen.

Display Care and Cleaning Instructions

Your new Apollo 360 GPS has a space-age anti-glare film that has been applied to the display screen. This is the same film that is used on the NASA Space Shuttle windows. The surface of the film has a hard coating that is scratch resistant. Despite this coating, extreme care must be taken when cleaning the display screen. To remove stains, smudges, fingerprints, and so forth, we recommend these cleaning methods (if the first method fails to remove the problem, try the next method):

- Wipe with a clean, dry, non-abrasive fabric (for example, cotton or Handi-wipes)
- Blow on the area to condense moisture on the display and then wipe the area with the clean fabric
- Moisten a clean fabric with a small amount of water and wipe the display area
- Apply a small amount of glass cleaner (without ammonia) to the fabric and wipe the area
- Apply a small amount of isopropyl alcohol and wipe the area (this is the last resort)

Note:

Use a clean fabric with each cleaning method to avoid other contaminates.

LCD Backlight

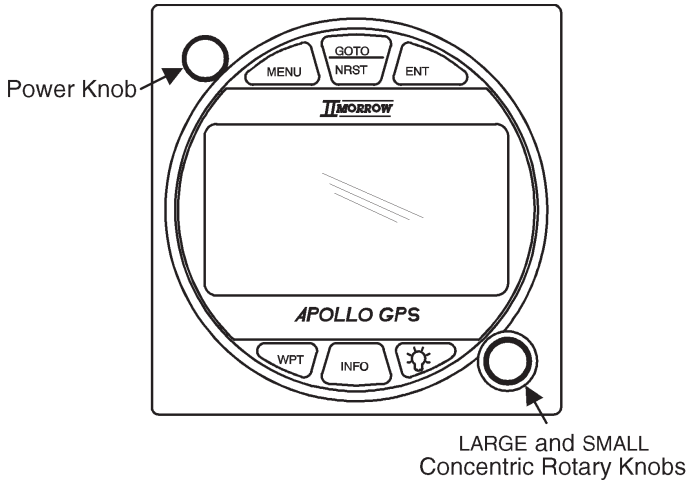
This key controls the Liquid Crystal Display (LCD) backlight, enabling you to easily view the display in a wide variety of cockpit ambient light conditions. Five backlight intensity levels are available from no intensity (off) to high intensity.

Helpful Instructions on the Display

While you use most functions, the Apollo 360 shows you what to do. Helpful instructions typically appear on the top and bottom lines of the display. A highlighted, or darkened word in an instruction advises you which key to press to select an option.

Control Knobs

The control knobs switch the Apollo 360 on and off, select menu options and make changes. The control knobs consist of the power knob at the upper left corner of the front panel and the concentric rotary knobs at the lower right corner of the front panel.



The Power Knob

This knob switches the receiver on and off. Each time you switch the unit on, it performs internal diagnostics, begins tracking available GPS satellites, and activates the navigation function. This process takes only a few seconds, providing that a seed position and current time have been entered.

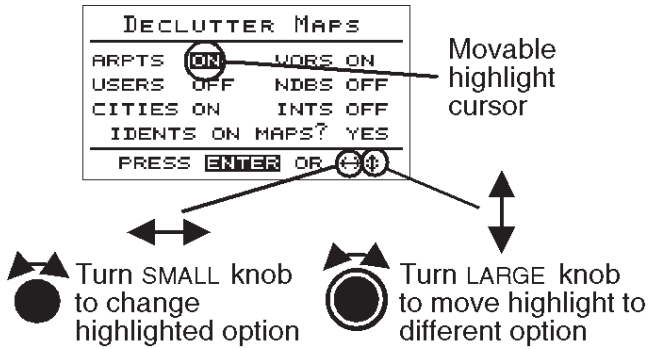
Note

You must enter a seed position and the current time before you navigate with the Apollo 360. This process is required only once, and greatly speeds the otherwise slow receiver process of tracking available GPS satellites. Entering a seed position and the current time is explained in Section 3.

The Concentric Rotary Knobs

The LARGE and SMALL concentric rotary knobs allow you to move the highlight cursor around the display to select menu options and make changes. The highlight cursor typically shows on the display when you use an operating function. The cursor indicates that the highlighted item can be changed.

A vertical and/or horizontal arrow symbol often shows at the lower right corner of the display. These symbols indicate that additional options are available and that changes can be made.



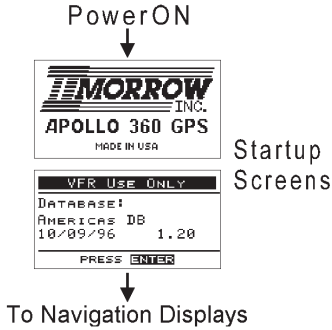
The Display Screens

Information you view on the display while using the Apollo 360 shows one page or "screen" at a time. Many of the operating functions can show more than one screen of information. When more than one screen of information is available, either the vertical arrow symbol or an instruction line shows on the display to inform you that more information awaits your view. Follow the instruction, or if the vertical arrow symbol shows on the display, turn the LARGE knob to view this additional information.

Information screens available while using each operating function are introduced here. Section 4 contains additional details about each operating function.

The Startup Screens

The startup screens shows on the display for several seconds after you switch on the Apollo 360. While these screens show on the display, the unit performs internal diagnostics, begins tracking available GPS satellites, and activates the navigation function.

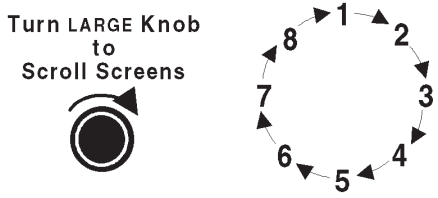


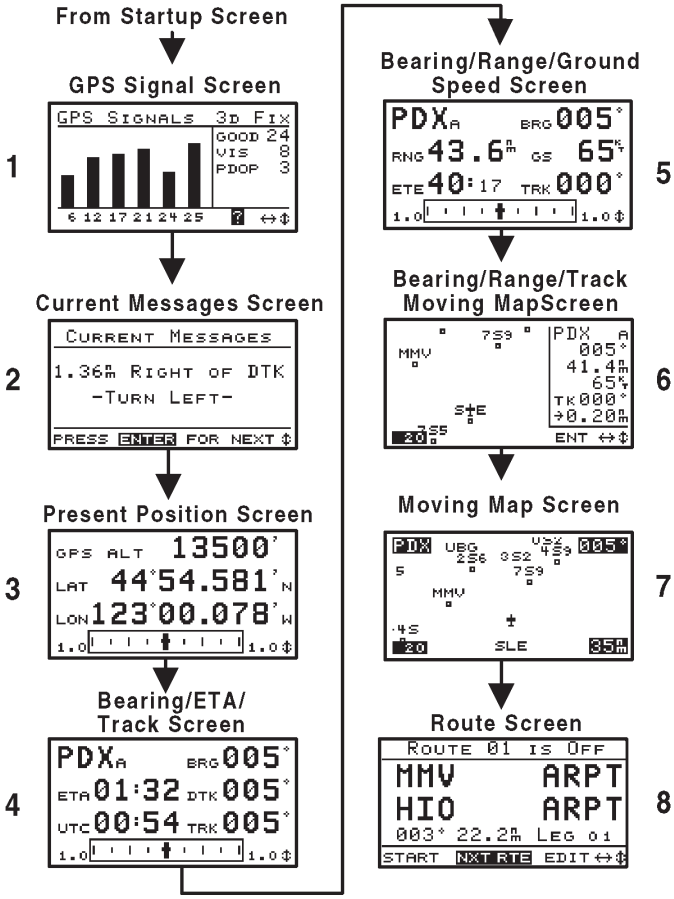
Route Display Selection

It is worth noting here that the Screen Controls screen (located under the Main Menu) allows the user to select either a 1-Leg or 3-Leg route display. The 3-Leg display provides more route information in a single screen, but the 1-Leg provides larger character size for easier viewing.

Navigation Function Screens

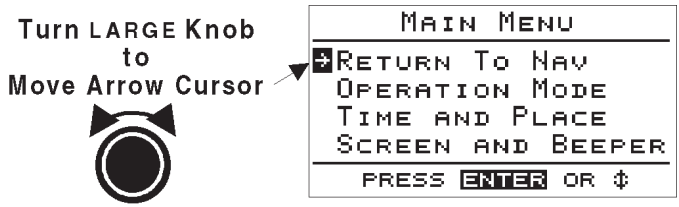
The Apollo 360 shows one of eight screens while you use the navigation function. Each screen contains useful information. After the startup screen appears on the display, the unit shows the GPS signal screen, allowing you to verify good signal reception from available satellites. You can "scroll" or page through the other available screens by turning the LARGE knob.





Menu Function Screen

The menu function contains options that control many ways the Apollo 360 operates and lets you customize the navigation function to suit your preference. The menu function screen is a main menu with options selected by turning the LARGE knob to move the arrow cursor up or down the list.



The main menu contains these options:

- Return to Nav -
  Returns the unit from the menu function to the navigation function
- Operation Mode -
  Enables the built-in navigation simulator or changes the map datum
- Time and Place -
  Contains seed position and current time settings
- Screen Controls -
  Contains control settings for display backlight and contrast
- Map Setups -
  Contains control settings for information shown on moving map screens (navigation function)
- Declutter Maps -
  Contains control settings for types of waypoints to show on moving map navigation screens (navigation function) and in the nearest waypoint list

- Track Point History -
  Controls navigation “track point” storage in memory and whether points show on moving map navigation screens (navigation function)
- Arrival Alerts -
  Controls alert message at waypoint arrival
- Airspace Alerts -
  Controls alert message at airspace entry
- CDI Scale -
  Contains control settings for course deviation indication and alert message
- Magnetic Var -
  Contains control settings for magnetic variation in course headings
- Countdown Time -
  Controls built-in countdown timer
- Display Units -
  Contains control settings for navigation units of measure
- Serial Outputs -
  Controls either of the two serial ports for interface with external devices
- User Wpt Mgmt -
  Controls editing or deletion of waypoints you have entered in the Apollo 360’s memory
- System Info 1 -
  Enables showing of unit serial number and current hardware and software versions on the display
- System Info 2 -
  Enables showing of current database and operating system versions on the display

Using the menu function does not interrupt navigation. Section 5 describes how to use each main menu option.

Goto and Nearest Function Screens

GOTO NRST

The paired goto and nearest functions work together, allowing you to quickly and easily assign a destination waypoint (goto) or to assign a waypoint near your present position as a destination (nrst). The goto function starts when you press the GOTO/NRST key once. Assign a destination waypoint from the goto function screen using the LARGE and SMALL knobs. The assigned destination waypoint may be one you created, or a waypoint from the built-in database. The screen shows the assigned destination waypoint and the waypoint's location relative to your present position.

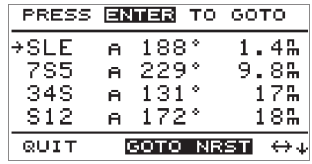
Press once

GOTO NRST

Destination waypoint, identifier, city name, distance, and bearing

When you press the GOTO/NRST key again, the nearest function starts. The nearest function screen shows a listing of up to 30 of the waypoints nearest to your present position and the location of each waypoint relative to your present position. You can assign any of these waypoints as a destination by pressing the ENT key.

Press twice



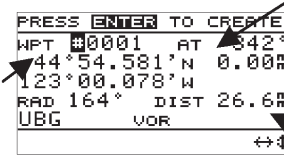
Waypoints nearest to your present position, any of which may be assigned as a destination

Section 3 contains more information about assigning a destination waypoint. Navigation to an assigned waypoint is not interrupted while using either of these functions unless you assign a new destination waypoint.

New Waypoint Function Screen

This screen shows information about waypoints you create using the new waypoint function. You can use present position lat/lon coordinates for the new waypoint's location, or enter coordinates of your choice from this screen. Information on the screen includes the created waypoint's location and the location of the nearest VOR relative to your present position.

Waypoint lat/loncoordinates and location relative to your present position



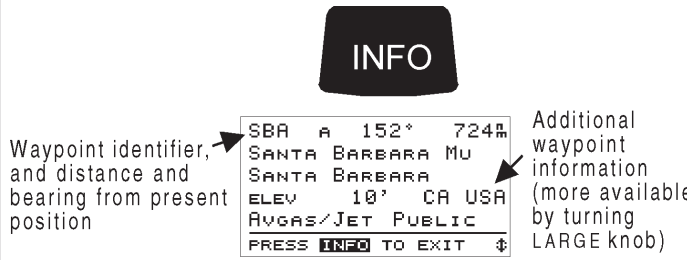
Waypoint name of your choice (default name shown)

Location of nearest VOR

Waypoint Information Function Screen

INFO

The waypoint information function can be used anytime to get information about a waypoint without interrupting navigation. The waypoint information function screen shows the waypoint identifier, and distance and bearing from your present position. The vertical arrow symbol at the bottom right corner of the display indicates that more information is available by turning the LARGE knob to scroll through additional screens.



Summary

Once you have become familiar with using the Apollo 360 to navigate, you will find that switching between operating functions is fast and easy and that you will do this often while navigating a trip. No matter which operating function you use, the unit allows you to quickly and easily return to the always active navigation function. Your present position continues to be calculated without interruption while you use the other operating functions.

Here is a quick review of the purpose of each operating function.

Always Active

Navigation function - provides information about your current position and navigation progress, GPS satellite signals, multiple legs trips, and messages showing important events or conditions while you navigate. You exit from other functions to return to this one.

MENU

Menu function - calls up the main menu of options to control ways the Apollo 360 operates. This function also controls the way navigation information shows on the display.

GOTO

NEAREST

Goto and Nearest functions - Goto assigns a destination waypoint from the Apollo 360's built-in database. Nearest calls up a list of up to 30 waypoints nearest to your present position, any of which may be assigned as a new destination.

WPT

New waypoint function - creates waypoints and stores them in memory. Created waypoints can be based upon your present position, or lat/lon coordinates you enter.

INFO

Waypoint information function - calls up information from the Apollo 360's built-in waypoint database. You can also access information about waypoints you have created. Information includes the waypoint identifier and type, waypoint bearing and distance from your current position, waypoint lat/lon coordinates, and more.

Backlight

LCD backlight - controls whether or not the backlight is on, and the backlight intensity level.

The next section explains how to start up the Apollo 360, enter the seed position and current time, and assign a destination waypoint. Once these tasks are completed, the unit is ready to use to navigate a trip.

Section 3

Getting Started

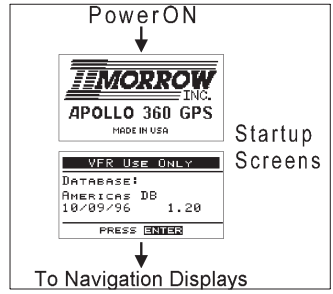
This section explains how to get started using the Apollo 360. Information in this section explains how to startup the unit, check signals from the GPS satellites, enter a seed position, and assign a destination waypoint.

This section shows you how to quickly start the Apollo 360 and check for proper operation. It is necessary to enter a seed position and the current time the first time you switch the unit on.

- Power up
- Enter a seed position (your dealer may have already completed this step for you)
- Check satellite signal strength
- Enter goto waypoint
- Begin navigating

Power Up

To switch the unit on, turn the power knob clockwise (the knob is above and to the left of the display). The startup screen shows on the display for several seconds.



Entering a Seed Position

The first time the Apollo 360 is switched on, it must locate satellites in the sky to acquire signals before determining a position fix. This is a complex process involving lengthy mathematical operations and, without a seed position and the current time and date, can take 30 minutes or more to complete. Enter this information to allow the receiver to quickly locate and track available satellites.

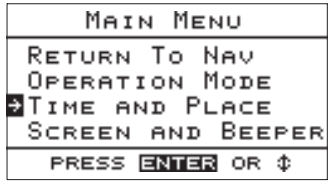
Note

The seed position and current time must only be entered the first time the receiver is switched on. This information is stored in memory and need not be entered again. Your dealer may have already entered the local time and position for you.

How to Do This

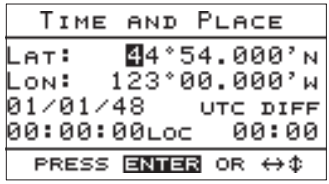
1. Press MENU to access the main menu.

2. Select the “Time and Place” option.



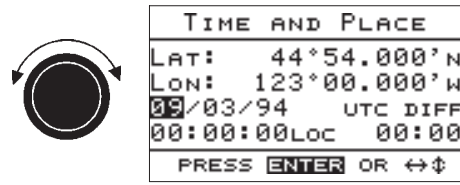
3. Press the ENT key.

4. Set the latitude and longitude coordinates near to your current position.



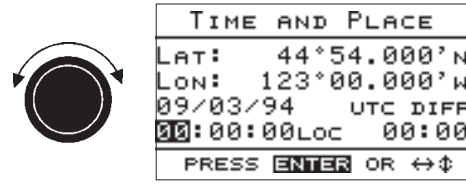
Use the SMALL knob to change values. The LARGE knob moves the highlight on the screen to select the next value to change.

5. Set the current date.



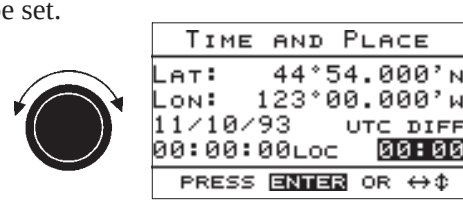
Use the LARGE and SMALL knobs as you did to set the lat/long coordinates in step 4.

6. Set local time. (Or enter UTC time and skip step 7 below.)

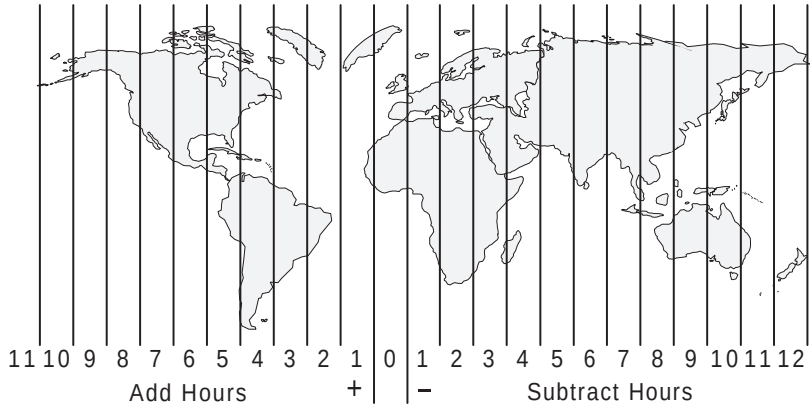


Use the LARGE and SMALL knobs to select and set local time (LOC). You may also enter current UTC time and skip entry of UTC differential in step 7. It is not necessary to enter seconds - they cannot be set.

7. Set the difference between local time and UTC time.



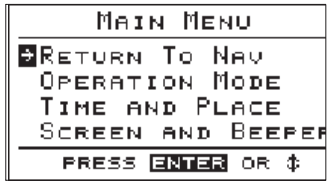
Use the illustration on the next page to determine the UTC differential for your area. Enter this value as the difference between local and UTC time (UTC DIFF).



Subract 1 hour during summer for Daylight Savings Time (where DST applies)

As an example, the UTC DIFF value in Seattle, Washington would be +08:00 (or +07:00 during daylight savings time).

8. Press the ENT key.



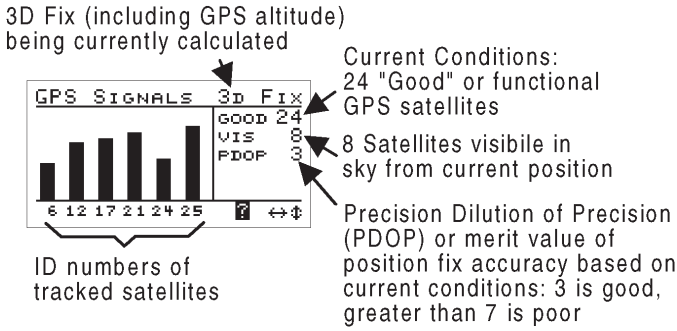
The values you set are entered and the main menu returns to the display. “Return To Nav” is selected.

9. Press the ENT key once again.

The display shows the navigation screen in use before the menu function was started in step 1.

Checking GPS Signal Strength

After startup, the unit shows the GPS signal strength screen on the display, indicating that the navigation function is active.



Note

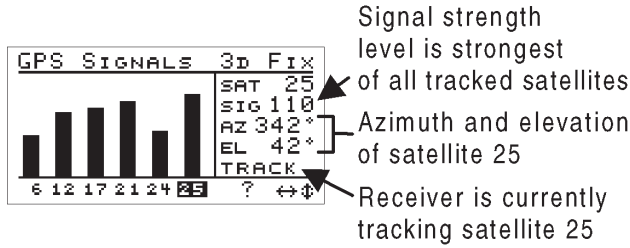
While the Apollo 360 acquires signal information from satellites, the bars representing signal strength show grey in color. This process takes place quickly. When the unit has acquired the signals and begins tracking the satellites, the bars change to black.

The GPS signal strength screen is the first to show on the display after the unit starts up. Make it a habit to check this screen to make sure that the constellation of satellites are healthy and that the unit is properly tracking visible satellites before you fly.

In this example, the screen shows that six satellite signals are being received. The question mark symbol (?) is highlighted, indicating that information on the display relates to all visible satellites. The Apollo 360 requires signals from at least four satellites to calculate a 3D position fix (lat/lon and GPS altitude).

Checking Each Satellite

Turn the SMALL knob to view information about each of the visible satellites. This example shows information about satellite 25.



Important!

The GPS antenna must be able to "see" each satellite it is tracking. If a satellite is "shaded" by the wing or fuselage during a turn, it may temporarily loose track of that satellite. If this happens, or if the geometry of the satellites available is poor, the unit may temporarily calculate a "2D Fix" or "DR Fix" (dead reckoning).

NOTICE

Apollo 360 GPS units, part number 430-0256-01, contain an 8-channel GPS receiver instead of the 6-channel receiver used in earlier units. The 8-channel Apollo 360 GPS units provide performace that is equal to or better than the 6-channel models. However, the Satellite Tracking Page will only show tracking status of the satellites assigned to channels 1 through 6. It is possible that up to 2 satellites that are in track (those assigned to channels 7 and 8) will not appear on the Satellite Tracking Page.

Entering a Destination Waypoint

With a seed position and the current time and date set, the Apollo 360 is ready to begin navigating a trip. Prepare for trip navigation by entering a destination waypoint.

How to Do This

1. Press the GOTO/NRST key.

The goto function screen shows on the display with the distance and bearing from your present position to the indicated waypoint.

2. Select a destination waypoint.

Use the SMALL knob to change the highlighted character in the waypoint identifier. The LARGE knob moves the highlight on the screen to select the next character to change.

Note

Waypoints on the display are stored in the unit's built-in database. By moving the highlight to ARPT and turning the SMALL knob, you can change the type of destination waypoint to select: airport, NDB, VOR, INT, or USER (user created). For instance, with ARPT indicated as the type of destination waypoint, only airports show on the display as you select identifier characters.

Hints

For airport waypoints, turn the LARGE knob to move the highlight on the screen down to the second line containing the city name. You can select characters in this line, too. The SMALL knob scrolls through waypoint names that most closely match the characters you select.

You can also scroll through each waypoint in the database. With the highlight over the first character of either the waypoint identifier OR city name, turn the LARGE knob one detent counterclockwise. A highlighted vertical arrow symbol appears to the left of the first character.

Use the SMALL knob to scroll through each waypoint in the Apollo GPS receiver's built-in database.

3. Make sure correct waypoint is selected.

4. Press the ENT key.

The selected waypoint is set as the destination. The display shows the navigation screen in use before the Goto function was started in step 1.

Summary

With the seed position and current time entered, and the destination waypoint showing on the display, the Apollo 360 is ready to use to help you navigate. Before you fly, remember to check GPS satellite signal strength and verify the type of position fix the unit is providing based on visible satellites above you. This operation is quick and easy, as the satellite signal strength screen is the first to show on the display after the unit starts up.

The next section contains information about how to use the navigation function while you fly. A built-in simulator is included with the Apollo 360 to help you become better acquainted with using it. Appendix C at the back of this manual contains a tutorial on how to start the simulator and practice navigating without actually flying.

Notes:

Section 4

Navigating a Trip

This section explores the navigation function and describes the powerful features it contains. You will use this function most frequently while you fly, so it is important to have a good understanding of this operating function. Follow the instructions provided in Section 2 before you read this section. Leave the unit on, relax in the cockpit with your aircraft parked, and use the features this section describes to become familiar with them. In this way, you can more effectively use this powerful navigation instrument to your advantage when flying. Even though you may not be actively navigating, you will be able to gain valuable familiarity with the unit. When you become comfortable operating the unit, you may wish to "fly" the Apollo 360 using the built-in simulator. Follow the tutorial instructions in Appendix C.

About the Navigation Function

The navigation function is always active. When you use other functions, the navigation function continues to run "in the background" calculating your present position, navigating your multiple leg trip (if active), and alerting you to events or conditions important to the navigation process. When you finish using other functions, the unit automatically returns to the navigation function, displaying the last navigation screen used.

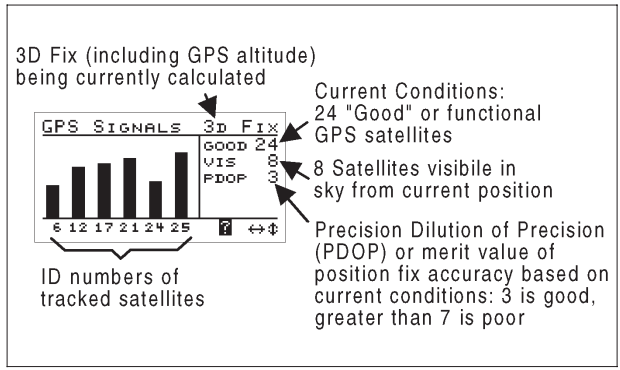
About the Navigation Function Screens

While you navigate, the Apollo 360 gives informationon eight screens. Each screen contains unique information useful to the navigation effort.

The LARGE knob “scrolls” or pages forward or backward through the screens in the order shown in Section 2. After you become more familiar with each screen, you may develop a preference for some. This section describes each screen.

GPS Signal Strength Screen

This screen, the first to appear after the unit starts up, contains information about signals received from visible satellites in the sky.



The screen tells you:

- The type of position fix currently calculated by the unit:

  NO FIX: no signals available

  DR FIX: (Dead Reckoning) the position is estimated based on the last known track, ground speed, and position

  2D FIX: the position fix is calculated based on signals from only three satellites and GPS altitude is not available

  3D FIX: the position fix is calculated based on signals from four or more satellites, and GPS altitude is available

- The total number of operational or “good” GPS satellites in orbit

- The number of satellites visible in the sky from your position
- The Position Dilution of Precision (PDOP) value for the position fix provided by the satellite constellation - a high value (6 or greater) indicates poor position reliability, while a value of 3 or less indicates good position reliability

In addition, individual satellite information is available by rotating the SMALL knob, as follows:

- The strength of the received signal from each satellite
- The satellite azimuth and elevation from the current position
- The GPS receiver's current track status for each visible satellite

Current Messages Screen

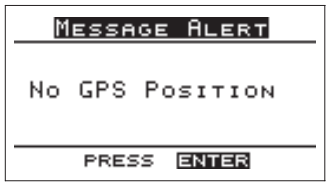
The Apollo 360 helps you navigate by informing you of important events or conditions while you fly. When an important event or condition occurs, an alert message shows on the display to inform you. (Alerts marked with the * can be controlled by menu options described in Section 5.) Alerts may show on the display anytime the unit is operating to alert you of the following conditions:

Airspace penetration*

Arrival at a destination*

Excessive course deviation*

Loss of position fix



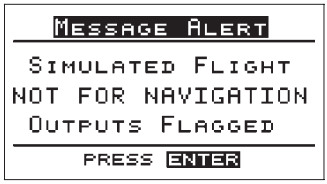
Low memory back-up battery

Expiration of countdown time

Manual magnetic variation alert

Magnetic variation compensation limitation

Simulated flight warning

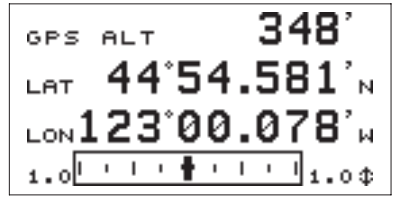


When you see one of these alerts on the display, follow the instruction shown to clear it. Clearing the alert removes it from the display. The screen shown before the alert appeared returns to the display.

The current messages screen serves as a review of any alerts presented this way during the trip. Alert messages that show on the screen must be valid at the time you check them or they will not show as a current message. Press ENT, as shown on the current message screen, to view other current messages (if available).

Present Position Screen

This screen shows the lat/long coordinates of your present position, GPS altitude, and any course deviation from desired track.



When you fly, this screen can be valuable to check your position against a chart with close precision. Keep in mind that GPS altitude is not based on the same criteria as barometric altitude which uses a pressure offset value. GPS altitude is also affected by selective availability.

Course deviation shows in the rectangular Course Deviation Indicator (CDI) at the bottom of the display. The airplane symbol moves over the graduated CDI to show your current distance left or right of desired track. You can select CDI range and units of measure using the menu function options “CDI Scale” and “Units of Measure” described in Section 5.

Bearing/ ETA/Track Screen

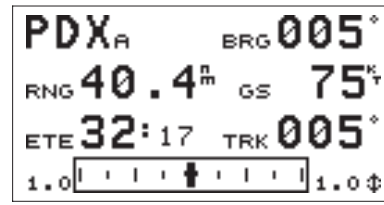
In addition to the CDI, the bearing/ETA/track screen also shows:

- The destination waypoint and type

- The bearing (BRG), estimated time of arrival (ETA), and desired track (DTK) to the destination
- The current time
- The current track

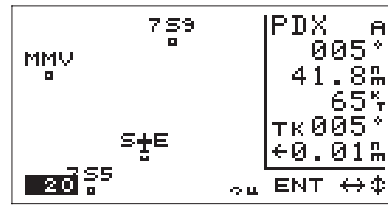
Bearing/ Range/ Ground Speed Screen

Similar to the bearing/ETA/track screen, this one substitutes range for ETA, estimated time enroute (ETE) for current time, and ground speed (GS) for desired track. Since this screen is viewable by turning the LARGE knob only one detent clockwise from the bearing/ETA/track screen, you will likely find it convenient to switch back and forth between these two screens often to check your navigation progress.



Moving Map/Nav Window Screen

One of the most attractive features of the Apollo 360 is its ability to show your navigation progress graphically against a “moving map” of waypoints. Your present position is indicated by the airplane symbol near the center of the display.

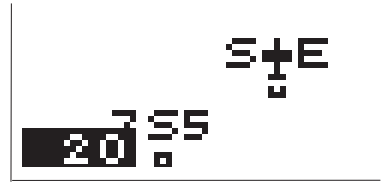


Using the moving map screen, you can easily track your navigation progress as the aircraft travels over or near waypoints beneath you. The moving map/nav window screen shows this information in the box at the right side of the display:

- The destination waypoint and type
- Bearing to the destination waypoint
- Range to the destination waypoint
- Ground speed
- Current track
- Course deviation distance and a directional arrow indicating the direction to turn to get on course

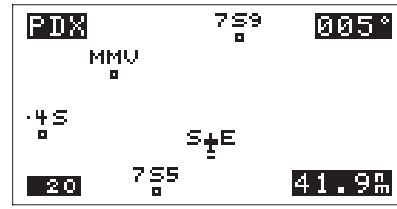
The map scale shows in the highlight at the lower left corner of the screen. The scale shows the approximate distance represented on the map between the airplane symbol and the top border of the display. You can select distance units of measure for the map scale and all other navigation screens using the menu function “Display Units” option explained in Section 5.

The figure below shows a change in scale caused by turning the SMALL knob. The scale may be changed from .1 nm to 750 nm or set to auto. In this case, the distance from the airplane icon to the top of the screen is 20 miles.



Moving Map Screen

This moving map screen is similar to the one just described, but it fills the entire display.



The following information shows in highlighted boxes at each corner of the display:

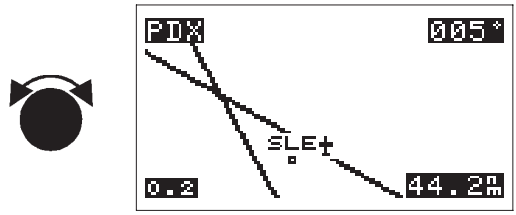
- The destination waypoint
- Bearing to the destination waypoint
- Map scale
- Range to the destination waypoint

The moving map screens represent graphic views of your navigation progress in a format easy to interpret while flying. Note that the display orientation may be changed so that the top of the may be north, desired track, or track. The map setup option, described in Section 5, explains how to change the orientation.

Zooming In or Out

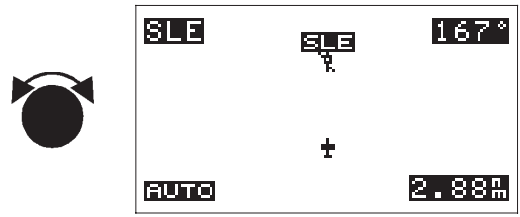
The moving map screens feature a handy zoom function to allow you to enhance your view of navigation progress. Zoom in or out by turning the SMALL knob. Zooming in changes the view to enlarge map detail, as if the airplane symbol was flying at a lower altitude over the map surface.

Similarly, zooming out allows a view of greater distance around the airplane symbol, as if the airplane was flying higher over the map. As you zoom in or out, the map scale changes to show the new distance represented between the airplane symbol and the top border of the display. Zooming in close to airport waypoints enables you to see your orientation in relation to available runways.



Auto Zoom

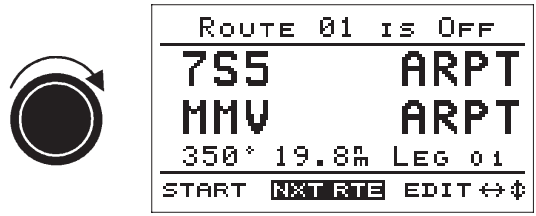
The auto zoom feature changes the moving map scale automatically, adjusting the map scale to zoom in closer and closer as you near the destination waypoint. Similarly, this feature adjusts the map scale to zoom out as your distance from a waypoint of origin increases.



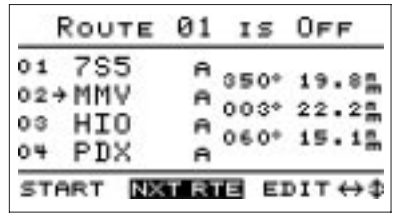
Enable auto zoom by turning the SMALL knob until "AUTO" shows as the map scale. Using auto zoom frees you from manually adjusting the map scale as you view the moving map screens.

The Route Screen

The Apollo 360 has the ability to store up to 20 reversible trip plans or "routes" in memory. Each route can consist of up to 30 waypoints, either those you create or those from the built-in waypoint database.



The preceding and following displays show the 1-Leg and 3-Leg route screens, respectively. You can select either display using the Screen Control function under the Main Menu.

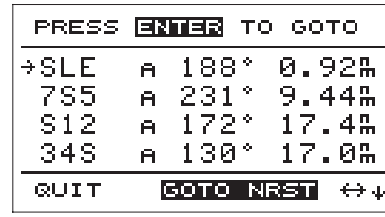


The route screen shows the status (on or off) and either the next two or the next four waypoints of each route, as well as the desired track and distance between the displayed waypoints. No more than one route may be active, or ON at any time while you navigate. When the route screen is displayed, review each route by pressing the ENT key when NXT RTE is highlighted. The procedure to set up routes is explained later in this section. The 1-Leg screen uses larger characters for easier viewing. The 3-Leg screen provides more information on a single display. The procedure for setting up the route is the same using either screen.

Searching for Nearest Waypoints

An important feature of the Apollo 360 is its ability to locate waypoints closest to your position as you fly. Should you have to land the aircraft quickly, you can use this feature to locate a nearby waypoint, assign it as a destination, and quickly navigate to it.

While navigating, press the GOTO/NRST key twice to activate the nearest function and search for waypoints closest to your present position.



The nearest function screen shows up to 30 nearest waypoints in order of distance from your present position. The waypoint type, bearing to the waypoint, and range to the waypoint also shows.

Turn the LARGE knob clockwise to move the arrow cursor down the list to select a destination. Press the ENT key to assign your chosen waypoint as a destination. The display returns to the navigation function automatically.

You can also return to the navigation function without assigning a new destination waypoint from the list by pressing the MENU key. You may also exit the function by turning the SMALL knob to select "QUIT" at the bottom of the display and pressing the ENT key.

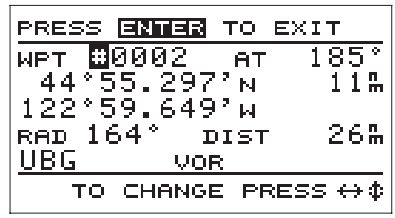
Important

You can control the types of waypoints that show on the display as the result of a search for nearest waypoints. The menu function "Declutter Maps" option allows you to choose whether or not to display airports, VORs, NDBs, and intersections as searched waypoints and on the moving map screens. Before you fly, make sure to check this option and confirm that the waypoint types you wish to show will appear on the display after a search and while using the moving map screens. The "Declutter Maps" option is explained in Section 5.

Creating Waypoints

The Apollo 360 allows you to create up to 2,000 of your own waypoints, each with a name you choose. As you navigate, you may wish to create waypoints at locations that are important to you, or waypoints to which you plan to return. You can use your present position or enter lat/lon coordinates for the waypoint's location.

Use the new waypoint function to create waypoints. Press the WPT key. The new waypoint function screen allows you to enter a waypoint name of your choice, or you can use the default waypoint name that the unit assigns as a number.



Turn the LARGE knob to move the highlight to the desired character in the waypoint name to change it. Once you have entered the desired waypoint name, you can assign the new waypoint your present position coordinates by pressing the ENT key. If you wish your new waypoint to be located elsewhere, use the LARGE and SMALL knobs to move the highlight and change the waypoint lat/long coordinates. When you are finished, press the ENT key to enter the new waypoint into memory.

The fact that you may assign either your present position or lat/lon coordinates of your choice when you create waypoints is significant. You can create waypoints either as you fly, or more conveniently, before or after you fly when you are not busy navigating.

You can always edit or delete waypoints you have created. The menu function "User Waypoint Management" option allows you to perform these tasks. The use of this option is described in Section 5.

Getting Waypoint Information

Use the waypoint information function anytime to get information on waypoints in the Apollo 360's memory, including waypoints you have created. A complete listing of available information is included in Section 6, that explains the built-in waypoint database.

Destination Waypoint Information

Press the INFO key to activate the waypoint information function.

The waypoint information screen introduced in Section 2 shows on the display with information about the current destination waypoint. Turn the LARGE knob to scroll through additional screens of information about the waypoint. Press the INFO key again to return to the navigation function.

Information About Other Waypoints

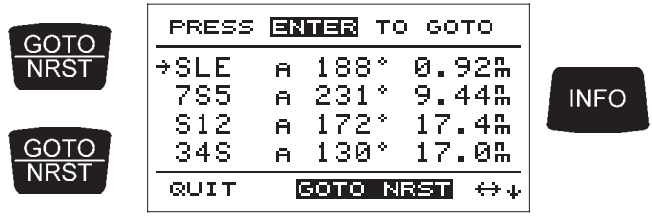
You can also get information about any other waypoint in memory by using the goto function together with the waypoint information function. Press the GOTO/NRST key as if you were assigning a destination waypoint. Use the LARGE and SMALL knobs to select the waypoint name. When the desired waypoint name shows on the display, press the INFO key to get information about the waypoint.

To return to the navigation function, press the MENU key, then press the ENT key.

Information About Nearest Waypoints

The waypoint information function also works with the nearest function. This allows you to quickly get information about any of the waypoints nearest to your present position.

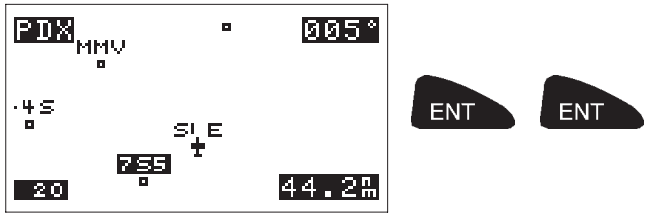
Press the GOTO/NRST key twice to search for nearest waypoints. When the list of these waypoints shows on the display, use the LARGE knob to move the arrow cursor to the desired waypoint. Press the INFO key to get information about the waypoint.



To return to the navigation function, press the MENU key, then press the ENT key.

Scanning Waypoints for Information

You can "scan" waypoints on the moving map screens to get information quickly. With a moving map screen showing on the display, press the ENT key several times.



Notice that the highlight moves from the destination waypoint to a different waypoint on the screen each time you press this key. When the highlight has moved to the desired waypoint, press the INFO key to get information about the waypoint. This feature makes it fast and convenient to get information about any waypoint near your flight path while you navigate.

Navigating Multiple Leg Trips

The ability of the Apollo 360 to store multiple leg flight plans is very useful. Once you set up a route, you can navigate the plan in forward or reverse. You can also edit a route you have created, or select any waypoint from a route and navigate directly to it, skipping other waypoints and legs of the trip. Remember, you can use the Screen Control function to set the route screen to display either 1-Leg or 3-Legs of the route you create.

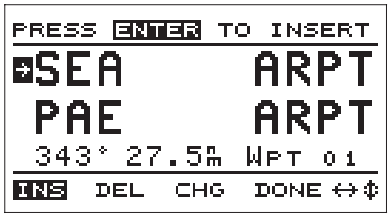
Creating a Route

Select "EDIT" from the route screen to begin creating route number 01. Then select "INS" to insert waypoints into the route.

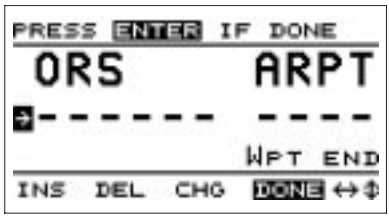
Prepare to insert waypoints into your route beginning with the waypoint of origin. Then you can insert other waypoints in the order you will travel to them, working toward the destination waypoint.

Use the LARGE and SMALL knobs to select and change the waypoint identifier for the first waypoint. When the desired waypoint shows on the first line of the display, press the ENT key. The arrow cursor moves to the second line for insertion of waypoint number 02. Repeat the process you used to insert the origin waypoint into the route.

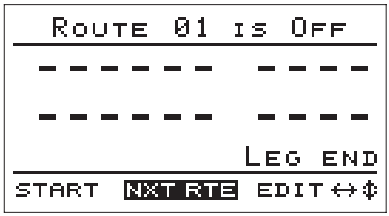
When you scroll up to show two waypoints, the route screen shows the bearing and distance between them.



When you finish inserting waypoints into the route, select "DONE" and press the ENT key to complete route editing. Remember, you can always change, add, or delete route waypoints later.



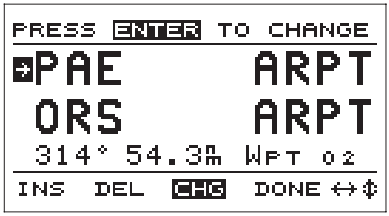
When you finish with the first route, you can immediately create another. The screen shows route 02, empty and ready for insertion of waypoints. To create a new route, select "EDIT" and proceed as with creation of route 01.



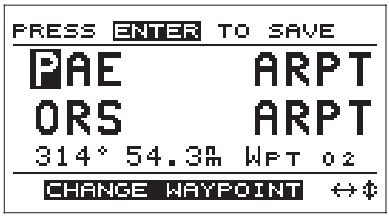
Changing a Route Waypoint

You can change any waypoint along a route. Select the route to change from the route screen. If you have several routes created, press the ENT key while "NXT RTE" is highlighted to page through the routes. When the correct route shows on the display, select "EDIT" as if creating a route.

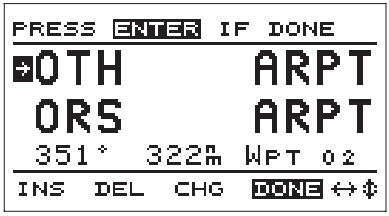
Turn the LARGE knob to select a waypoint to change. When the cursor arrow points to the desired waypoint, select "CHG" to change it.



Change the waypoint as desired. Repeat for other waypoints to change.



Each time a change is made, "DONE" is highlighted. When waypoints are changed as desired, press the ENT key to complete route editing.



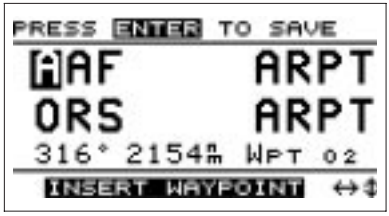
Adding a Route Waypoint

You can add waypoints to any route. Add waypoints to a route by inserting them into the route at the proper location.

Select the route from the route screen that you want to insert waypoints. Then, select “EDIT” as if creating a route.

Turn the LARGE knob to move the cursor arrow to the waypoint where you wish to insert the new waypoint.

Select “INS” to insert the waypoint into the route.



Each time a change is made, “INS” is highlighted to allow insertion of another waypoint.

When all desired waypoints are inserted into the route, move highlight to “DONE” and press the ENT key to complete route editing.

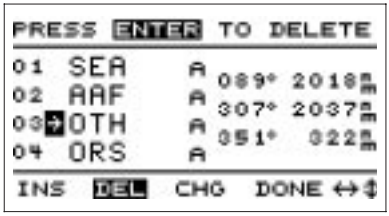
Deleting Route Waypoints

To delete waypoints from a route, scroll through the route screen pages to select the route that you wish to delete waypoints. Then, select “EDIT” as if creating a route.

Use the LARGE knob to move the marker arrow to the waypoint you wish to delete. Select “DEL” to delete the waypoint from the route and press the ENT key.

Note

The screen below shows deletion of a waypoint with the 3-leg route screen selected.



When desired waypoints are deleted from the route, select “DONE” and press the ENT key to complete route editing.

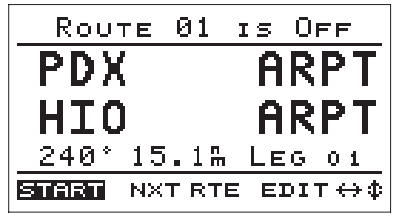
Note

Deleting waypoints from routes will not remove them from the waypoint database.

Starting a Route

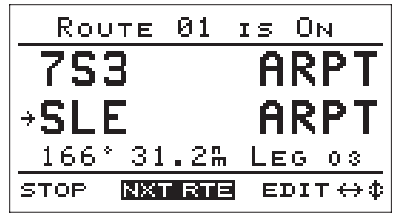
When you are ready to navigate a route, it must be started. Only one route can be started, or active at any time.

Select the route you wish to start from the route menu. Select "START" to start the route.



Only one route can be "started" or active at any time. You can navigate the route in either direction, depending on your present position. If your present position is at the last waypoint in the route, you could use this last waypoint as the point of origin by selecting "REVERSE."

After a route is started (route "ON"), you can view other routes or edit them. From any route screen, you can quickly return to the active route by pressing and holding the ENT key.

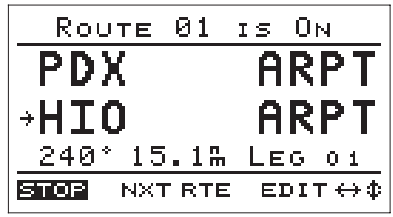


Stopping or Holding a Route

While flying a route, you may wish to deviate temporarily from your intended flight plan. You may then want to resume travel on this route. You can "hold" the route to do this. A route on "hold" can be resumed later from the current leg. "Holding" a route leaves the route active, but stops leg sequencing while you deviate from the planned course of travel.

In other cases, you may wish to abandon an active route to navigate a different route or to travel to waypoints not in the route. Press the GOTO key, dial in a new waypoint, and press the ENT key. If the new waypoint is not in the active route, the route will be stopped. If you wish just to stop the route, use the "Stop" option.

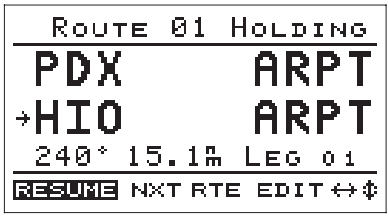
Stop or hold the active route by selecting it from the route menu. Press and hold the ENT key to select the active route.



Select "STOP" or "HOLD" the route. You can also select "QUIT" to avoid any action and return to the active route screen.

Resuming a Route

Select “RESUME” to resume a route on hold.

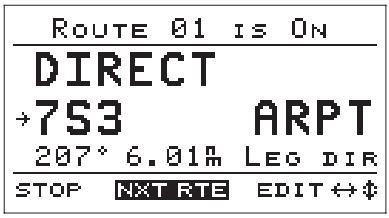


Route “Direct To”

While navigating a route, you may wish to bypass one or more waypoints and proceed directly to a destination waypoint. The route “Direct To” feature allows you to do this.

Select the active route from the route menu. Then, select “EDIT” as if creating or modifying a route.

Turn the LARGE knob to move the marker arrow to the waypoint to which you wish to navigate. Then, press the GOTO/NRST key. Press the ENT key to enter the waypoint as the destination.



The route screen shows “direct” status to the waypoint.

You can now navigate directly to the desired destination waypoint, bypassing previous waypoints in the route.

Section 5

Menu Function Options

This section details options available when you use the menu function. Use this function to access a menu of options that modify the way navigation information is displayed. The menu options allow you to customize the Apollo 360 to best suit your navigation requirements. The menu function also controls many other important ways the unit operates. A list of menu option default settings (those in effect when the unit is first switched on) for each option is included at the back of this section. Option settings are stored in memory and remain in effect until you change them.

Note

Navigation is not interrupted while you use other features.

The menu function makes these options available:

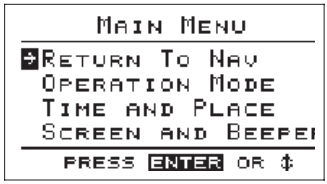
- Return to Nav
  Returns the unit from the menu function to the navigation function
- Operation Mode
  Enables the built-in navigation simulator or changes the map datum
- Time and Place
  Contains seed position and current time settings
- Screen Controls
  Contains control settings for display backlight and contrast as well as 1-Leg/3-Leg route display selection
- Map Setups
  Contains control settings for information shown on moving map screens (navigation function)

- Declutter Maps
  Limits items shown on the moving map screens and in the nearest waypoints list
- Track Point History
  Controls navigation "track point" storage in memory and whether points show on moving map screens (navigation function)
- Arrival Alerts
  Controls alert message at waypoint arrival
- Airspace Alerts
  Controls airspace penetration alert message
- CDI Scale
  Contains control settings for course deviation indication and alert message
- Magnetic Var
  Contains control settings for magnetic variation in course headings
- Countdown Time
  Controls built-in countdown timer
- Display Units
  Contains control settings for navigation units of measure
- Serial Outputs
  Controls the two serial ports for interface with external devices
- User Wpt Mgmt
  Controls editing or deletion of waypoints you have entered in the Apollo 360's memory
- System Info 1
  Enables viewing of unit serial number and current hardware and software version information
- System Info 2
  Shows current database and operating system versions

Take a moment to become familiar with each menu option. Use the information in this section to explore each option and understand how it affects the operation of the Apollo 360. This section can also serve as a reference for later use to refresh your memory about options you may use infrequently.

The Main Menu

The main menu contains all menu function options. You can call up the main menu anytime to use the options. Press the MENU key. When the main menu shows on the display, select the desired option by turning the LARGE knob to move the arrow cursor up or down the list of options. With the desired option selected, press the ENT key to activate it.



Changing Menu Option Settings

Changing settings on any menu option screen is done in the same way. Use the LARGE knob to move the highlight on the screen to the option item you wish to change. Then use the SMALL knob to change the setting.

Return to Nav

Use this option to leave the menu function and return to the screen shown on the display before you pressed the MENU key. This option is typically used when you are ready to continue navigating after using other menu options to make changes.

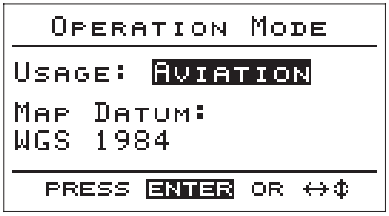
Note

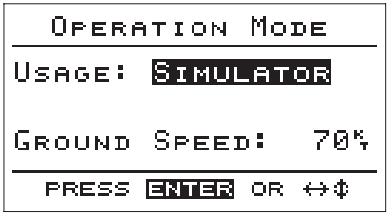
"RETURN TO NAV" is automatically selected when you call the main menu. If you accidentally select the wrong menu option or if you decide to abandon making changes, you can easily leave the menu function by

pressing the MENU key to again call the main menu. With "RETURN TO NAV" selected, press the ENT key to leave the menu function, or turn the LARGE knob to select a different option.

Operation Mode

This option sets the Apollo 360 operation mode and selects the map datum the unit uses while you navigate.





Select either the "aviation" or "simulator" operation mode. Select "simulator" only when you wish to use the built-in simulator to practice navigating with the unit. With the aviation mode selected, you can change the map datum

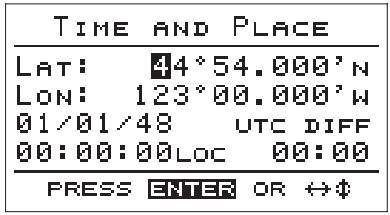
Important

Verify that you have the correct map datum selected for the area where you navigate. Datum WGS 1984 is automatically selected and is the most current for navigation in the United States. If you navigate using a chart based on a different datum, make sure you change the datum to match the chart. A list of available map datums appears in Appendix B.

Using the simulator mode, you can select the ground speed you "fly" the Apollo 360. Ground speed units of measure are changeable using the "Display Units" option discussed later in this section. All operating functions are available while you use the simulator. After simulator use, the unit returns automatically to the "aviation" operation mode the next time you switch on the power.

Time and Place

Use this option to enter your present position and set UTC and local times as Section 3 describes. It is necessary to enter the time and place the first time the Apollo 360 is switched on. It is also necessary to enter this information if the unit is switched off and moved a distance of several hundred miles or more. Time and place information you enter is stored in memory and need not be entered again.



Screen Controls

This option controls operation of the display backlight, and allows you to adjust display contrast. Turn the SMALL knob to select backlight Off, Lo, MLo, MHi, or Hi intensity levels. This option also allows selection of either 1-Leg or 3-Leg Route Display screens.

Note

You can also control the display backlight using the backlight key at the lower right of the front panel. Press this key repeatedly to switch the backlight intensity through the levels described above.

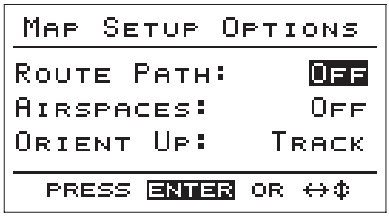
Turn the LARGE knob to select "CONTRAST." Adjust display contrast by turning the SMALL knob.

Adjust the contrast to suit your preference and viewing angle. As you make adjustments, the horizontal bar at the bottom of the display shows the current contrast level. "-" indicates lower contrast, while "+" indicates higher contrast. A contrast setting near the middle of the bar is satisfactory in most cases. The contrast setting you select is stored in memory and remains in effect until you change it.

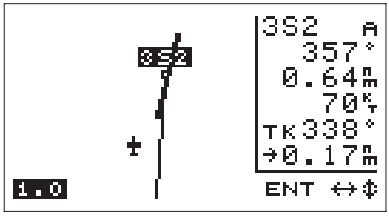
Turn the LARGE knob highlight route diplay and the SMALL knob to select between 1-Leg and 3-Leg Route Display screens. The 1-Leg display uses large letters for easier viewing. The 3-Leg display provides more information on a single screen.

Map Setups

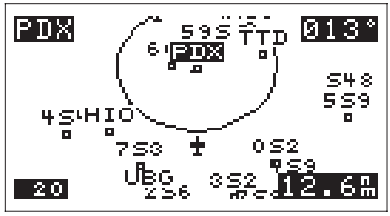
This option controls what and how information shows on the moving map screens. Select whether or not the Apollo 360 should show a route path or airspaces in the vicinity.



With route path "ON," a line representing your intended flight path shows on the moving map screens to aid you in navigating to your destination. Zooming in on the moving map screens, you can clearly see deviation from your course.



When airspaces are “ON,” airspace boundaries show on the moving map screens.

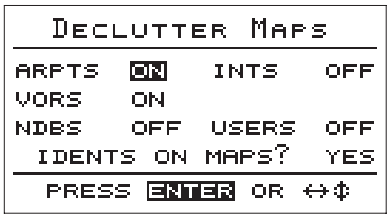


“ORIENT UP” allows you to select orientation of the moving maps, with the top of the screen representing current track, desired track, or true north.

Declutter Maps

This option controls the waypoints that show on the moving map screens and are used for nearest waypoint search. Types of waypoints you set to “ON” are displayed while those set to “OFF,” are not visible on the moving map screens. You can choose whether or not to show the following types of waypoints:

- Airports (ARPTS)
- Very High Frequency Omnirange (VORS)
- Non-Directional Beacon (NDBS)
- Intersections (INTS)
- User Created (USERS)



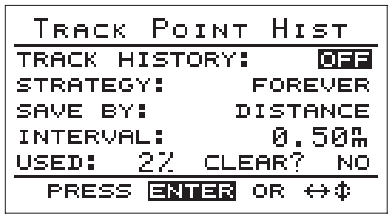
The "IDENTS ON MAPS" feature controls whether or not waypoint identifiers show on the moving map screens. With "NO" selected, small symbols represent locations of waypoints. Only the current To waypoint, and possibly route waypoints (see Map Setups) show on the moving map screens.

Note

The destination waypoint identifier always shows on the moving map screens, regardless of this setting.

Track Point History

This option allows you to store a record of navigation progress in memory. The stored record consists of a series of track points, each containing your position at the time the point was stored. You can choose whether or not to store track points, how often to store them, and manage the storage process using this option.



Each stored track point consumes space in memory. You can store up to 2,000 track points.

When track history is "ON," points are stored in memory. Your track history displays on the moving map screens as a series of dots showing your flight path. Each dot indicates a stored point. When track history is "OFF," no track points are stored or shown on the moving map screens.

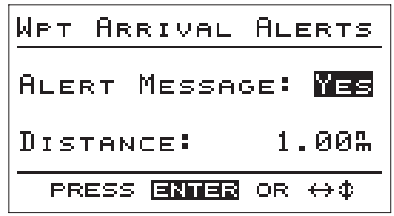
You can select the track point storage strategy. Select "FOREVER" to continuously store points, starting again and writing over existing points when memory becomes full, or select "UNTIL FULL" to stop storing points when memory becomes full.

You can also control the storage interval for track points. Saving points by "DISTANCE" allows you to select a distance interval to determine when each track point is stored. Similarly, saving points by "TIME" allows you to select the minutes and seconds interval for each track point.

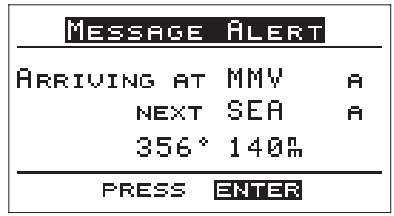
"USED" shows you the percentage of memory space used for track point storage. If you wish to empty the memory of track points, select "CLEAR?" and choose "YES."

Arrival Alerts

This option controls whether or not and when the Apollo 360 should alert you of arrival at a destination.



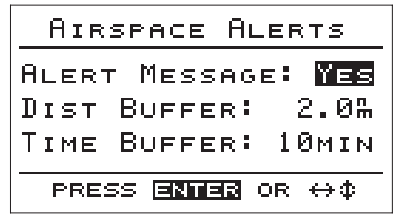
If you choose "YES" for the alert message, the arrival alert will show on the display to advise you of arrival at a destination waypoint.



You can choose the radius distance around the destination waypoint where the Apollo 360 alerts you. This distance can be shown in the unit of measure you choose using the "DISPLAY UNITS" setting described later in this section.

Airspace Alerts

Use this option to control whether or not and when the unit should alert you when approaching Class B, C, or special use airspaces.

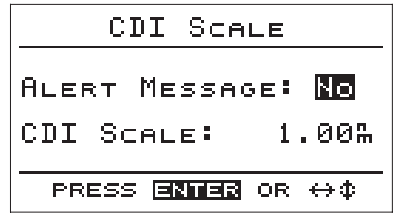


If you choose "YES" for the alert message, the airspace alert will show on the display advising you of approaching airspace penetration within the distance or time you select.

The distance buffer is the distance from the airspace border where you will be alerted. This distance can be shown in the unit of measure you choose using the "DISPLAY UNITS" setting described later in this section. The time buffer contains the travel time (based upon current track and speed) from the airspace border where you will be alerted.

CDI Scale

This option controls operation of the course deviation alert and allows you to set the CDI scale units to your preference.

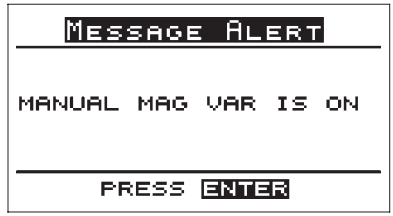


If you choose “YES” for the alert message, the course deviation alert will show on the display advising you when course deviation exceeds CDI scale maximum value left or right.

You can also select the CDI scale maximum course deviation left or right. This distance can be shown in the unit of measure you choose using the “DISPLAY UNITS” setting described late in this section.

Magnetic Variation

This option allows you to override automatic magnetic variation and manually enter a variation value. A manual setting is normally not required for navigation anywhere in the world except near the poles, where magnetic variation is the greatest.



If manual entry of magnetic variation is necessary, obtain the correct value from a reliable chart or other source. Select “MANUAL” and enter the variation value east or west.

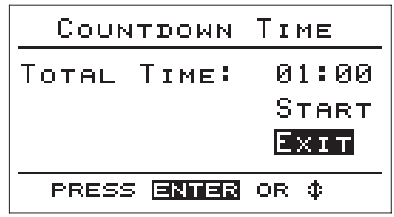
To disable magnetic variation, select “TRUE.” All course headings will show referenced to true north.

Note

The Apollo 360 automatically sets magnetic variation to 0 degrees when you fly above 70 degrees north or south latitude. It is not necessary to disable automatic magnetic variation as you travel north or south to high latitude regions.

Count-down Time

The Apollo 360 includes a countdown timer. Use this option to count elapsed time from as long as 60 minutes.



Enter a "TOTAL TIME" of up to 60 minutes (60:00). You can select a total time at:

- 1 second intervals from 1 to 10 seconds
- 5 second intervals from 10 to 60 seconds
- 10 second intervals from 1 minute to 10 minutes
- 30 second intervals from 10 minutes to 60 minutes

Select "START" and press the ENT key to begin countdown from the total time shown. As the countdown progresses, the screen shows "COUNTING" during the time you can stop the countdown, and continue it later.

Select "EXIT" to return to the main menu.

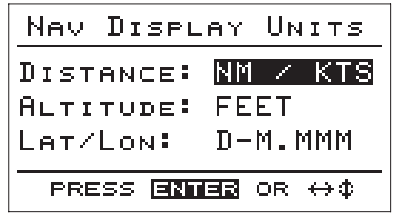
Note

The countdown timer can run "in the background" while you navigate and will not interfere with unit operation.

An alert message shows on the display when the countdown time has expired.

Display Units

This option controls the way navigation units of measure show on the display. The units of measure you select show consistently throughout all screens in all operating functions.

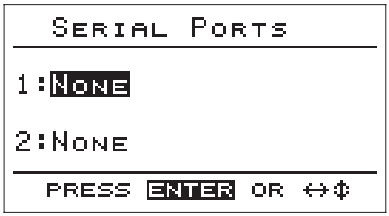


You can select the following units of measure for each navigation parameter:

- Distance - nm/kts; sm/mph; km/kph
- Altitude- feet; meters
- Lat/lon - d-m.mmm; d-m-s.s (where d=degrees, m=minutes, and s=seconds of latitude or longitude)
- UTMS - Universal Transverse Mercator System

Serial Outputs

The Apollo 360 is equipped with 2 serial data ports for communication with external serial devices. This option controls the function of each port.



Using this option with appropriate electrical connections, you can:

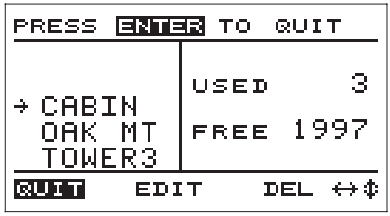
- Connect the Apollo 360 to your personal computer to manage waypoints you create*
- Send serial data to an external moving map display in the cockpit**
- Send serial data matching the NMEA formats to any serial device in the cockpit capable of accepting it**
- Disable the serial data port

**See your II Morrow dealer or contact the factory for information about the optional Apollo 360/PC Interface Kit. Consult kit documentation for instructions on proper serial port settings.*

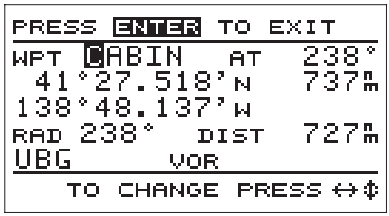
***Your avionics dealer should install this equipment and select proper serial port settings for you.*

User Waypoint Manage-ment

This option allows you to manage waypoints you have created (user waypoints). You can edit or delete waypoints as your area of travel or other requirements change.



You can edit created waypoints to change the waypoint name or lat/lon coordinates. To edit a waypoint, turn the LARGE knob to move the arrow cursor to the desired waypoint. Turn the SMALL knob to select "EDIT."



Move the highlight to the desired name character or coordinate digit to make changes. When you finish making changes, press the ENT key to save changes in memory.

Note

It is important to manage user waypoints wisely. With the capacity to store up to 2,000 user waypoints in memory, the Apollo 360 can hold an immense amount of information. When you edit, use intuitive identifiers for waypoints you have created. This will help you find waypoints more easily when you need to navigate to them.

You can also delete waypoints you no longer need. With the arrow cursor at the waypoint you wish to delete, move the highlight at the bottom of the screen to "DEL" and press the ENT key. The waypoint is removed from memory.

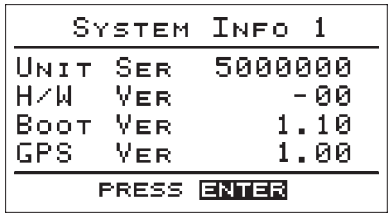
Important

Waypoints deleted from memory cannot be recovered.

When you are finished, press the MENU key to return to the main menu.

System Info 1

This option shows your Apollo 360 serial number and hardware and software version information.



You will need this information and the information shown on the System Info 2 screen if you contact the factory about the unit. Record the serial number on your owner's warranty record and keep the card in a safe place with your avionic instrumentation records.

System Info 2

This option contains more information about the software and database your Apollo 360 is equipped with. Also provide this information in correspondence with the factory about your unit.

Default Settings

The Apollo 360 is shipped from the factory with menu options set as shown here. Note that where a range exits for a setting, the upper and lower boundaries are shown with the default setting shown as **bold**.

These menu option settings are stored in memory and remain in effect until you change them.

Option	Description	Defualt	Alert
Operation Mode	Usage: Map Datum:	Aviation WGS 1984	N/A N/A
Time and Place	Lat/Long: Date: Loc: UTC Diff:	Enter seed position, current time, and UTC diff. at power up (see Section 2)	N/A
Screen Controls	Route Disp: Backlight: Contrast:	1-Leg Hi 0 - **50** - 100%	N/A
Map Setups	Route Path: Airspaces: Orient Up:	OFF OFF NORTH **TRK** DTK	N/A
Declutter Maps	ARPTS: VORS: NDBS: INTS: USERS: Idents On Maps:	ON ON OFF OFF OFF YES	N/A
Track Point History	Track History: Strategy: Save By: Interval: Used: Clear?	ON FOREVER **DIST** - TIME .1 - **.50** - 10nm **0** - 100% NO	N/A

Option	Description	Default	Alert
Arrival Alerts	Alert Message: Distance:	YES .1 - **1** - 9.9 nm	YES
Airspace Alerts	Alert Message: Dist. Buffer: Time Buffer:	YES 0 - **2** - 100 nm 0 - **10** - 20 min	YES
CDI Scale	Alert Message: CDI Scale:	NO .1 - **1** - 9.9 nm	NO
Magnetic Variation	Option: Setting:	AUTOMATIC (Computed)	N/A
Countdown Time	Total Time:	(User programmable 1 sec. to 60 min.)	When time expires
Display Units	Distance: Altitude: Lat/Lon:	NM/KTS FEET D-M.MMM	N/A
Serial Outputs	1: 2:	NONE PC [R/T]	N/A
User Wpt Mgmt	No default settings	N/A	N/A
System Info 1	No default settings	N/A	N/A
System Info 2	No default settings	N/A	N/A

Section 6

The Waypoint Database

Database Structure

The Apollo 360 provides an extensive built-in database of waypoint information to aid the navigator.

Waypoints in the database are divided into 5 categories by type. This category structure allows you to more easily select a waypoint as a destination, search for waypoint information, search for nearest waypoints, or display waypoints on moving map screens. The database filters waypoints by these types whenever you use it, controlling, organizing, and speeding the delivery of information.

The waypoint types are:

- Airports (ARPTs)
- Non-directional beacons (NDBs)
- Very high frequency omniranges (VORs)
- Enroute intersections (INTs)
- User created (USERs)

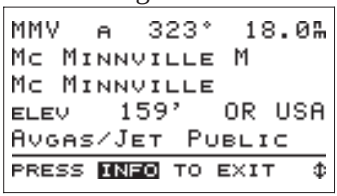
Available Waypoint Information

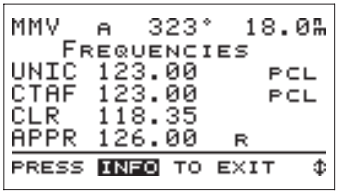
The following information is available for each waypoint type. Use the waypoint INFO function to get this information as Section 2 describes in “Waypoint Information Function.”

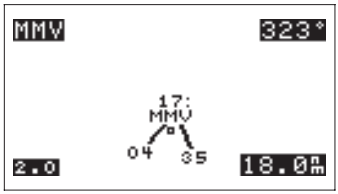
ARPT Waypoint Information

- Bearing and distance from present position
- Airport type
- Airport elevation
- Fuel availability by type

- Runway length(s) and surface type
- Radio communication frequencies (an asterisk at the frequency indicates part-time availability; “PCL” at the frequency indicates pilot controlled lighting.)
- Lat/lon coordinates
- Navigation beacon light
- IFR capability (an “R” at the frequency indicates that Radar service is available on this frequency.)
- Landing fee





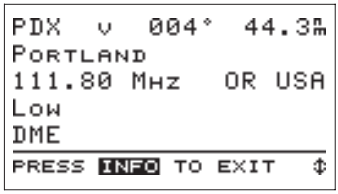


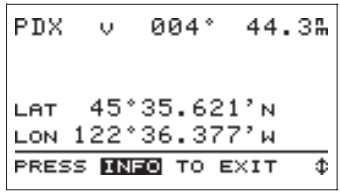
VOR Waypoint Information

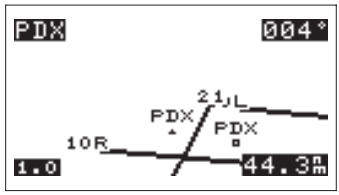
- Bearing and distance from present position
- Operating frequency
- Lat/lon coordinates
- DME available
- Class (high/low/terminal)
- Weather broadcasts

NDB Waypoint Information

- Bearing and distance from present position
- Operating frequency
- Lat/lon coordinates
- DME available
- Class (high/low/terminal)

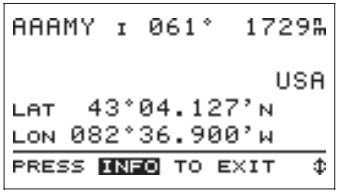


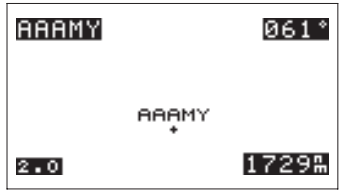




INT Waypoint Information

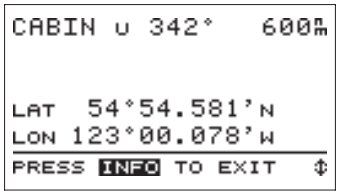
- Country
- Bearing and distance from present position
- Bearing from present position
- Lat/lon coordinates

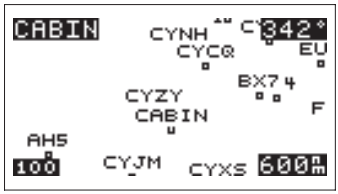




USER Waypoint Information

- Bearing and distance from present position
- Distance from present position
- Lat/lon coordinates





Appendix A

Glossary of Navigation Terms

A

Altitude (GPS ALT): Altitude, as calculated by the Apollo 360, based upon a mathematical model of the earth's surface curvature. A substantial difference between this altitude value and altitude referenced to sea level may exist.

Automatic Terminal Information Service (ATIS): Recorded information about weather and other conditions at an airport, periodically updated when conditions change.

Azimuth: Bearing, as measured clockwise from true or magnetic north.

B

Bearing (BRG): The direction to any point, usually measured in degrees relative to true or magnetic north.

C

Constellation: A group of stars or objects, such as GPS satellites, in the heavens.

Coordinates: Values for latitude and longitude that describe a geographical point on the surface of the earth.

Course: The planned direction of travel in a horizontal plane.

Course Deviation: A measurement of distance left or right from the desired course of travel.

Course Deviation Indicator (CDI): A graphic indicator of course deviation typically shown as a graduated horizontal bar with an icon indicating the deviation distance left or right of course.

Common Traffic Advisory Frequency (CTAF)

D

Database: A collection of data structured in such a way as to allow quick and convenient access to any particular record or records. The Apollo 360 contains a built-in database of waypoints and waypoint information. Users may add waypoints to this database.

Degree: 1/360th of a circle.

Desired Track (DTK): The desired course of navigation between a point of origin and a destination waypoint.

Distance: A measure of interval in space. Also referred to as range.

Distance Measuring Equipment (DME)

Drift: Displacement from the intended course of travel.

E

Elevation: The altitude above ground.

Estimated Time of Arrival (ETA)

Estimated Time Enroute (ETE)

F

Fix: A geographical location determined by either visual reference or by electronic navigation aids.

G

Global Positioning System (GPS): Also known as NAVSTAR. A constellation of satellites launched by the U.S. Department of Defense into six orbit lanes (four satellites per plane) at an altitude of 10,898 nm above the earth.

Ground (GRND): Ground communication frequency

Ground Speed (GS): Speed of travel across the ground. In aviation, the relation between ground speed and air speed is affected by the prevailing winds.

I

Icon: A symbol shown on the display depicting present position. The icon is shown as a symbol of an airplane on the Apollo 360's moving map screens.

Identifier: A name, typically abbreviated, assigned to a waypoint. The identifier may consist of numbers and alpha characters, up to six in length. For example, the airport identifier for Los Angeles International Airport is LAX.

Instrument Flight Rules (IFR)

Intersection (INT): A point defined by any combination of courses, radials, or bearings of two or more navigational aids.

K

Knot (kt): A unit of speed equal to one nautical mile per hour.

L

Latitude (lat): Any line circling the earth parallel to the equator, measured in degrees, minutes, and seconds north and south of the equator.

Longitude (lon): Any line from the north to the south pole, measured in degrees, minutes, and seconds of a circle, east or west of the Prime Meridian (Greenwich, England).

M

Magnetic North: The region, some distance from the geographic north pole where the earth's magnetic lines concentrate. A magnetic compass points to the magnetic north.

Magnetic Variation (Mag Var): The angle between the magnetic and true north. At various points on the earth it is different due to local magnetic disturbances. It is shown on charts as isogonic lines marked with degrees of variation, either east or west. These degrees must be added to or subtracted from the true course to get the magnetic course. (Easterly variations are deducted, and westerly variations are added.) The Apollo 360 automatically sets

magnetic variation to 0 degrees at positions above 70 degrees north or south latitude.

Map Datum: A mathematical model of the earth used for the purpose of creating navigation charts and maps. The Apollo 360 contains the set of datums listed in Appendix B.

Meter (m): A metric distance measurement equal to 39.37 inches.

Minute: 1/60th of a degree.

N

Nautical Mile (nm): A distance measurement equal to 6,076 feet, or 1.15 statute mile. One nautical mile is also equal to one minute of latitude.

Non-directional Beacon (NDB): A low frequency/medium frequency navigation aid sending non-directional signals that can be used for navigation.

P

Position Dilution of Precision (PDOP): A merit value for the calculated position based on the geometrical configuration of the satellites used; 3 is considered good, greater than 7 is considered poor.

R

Radial: Any of the 360 magnetic courses from a VOR or similar navigational aid, beginning at the navigational aid and proceeding outward in a straight line.

Range (RNG): The distance from the present position to a destination waypoint.

S

Second: 1/60th of a minute of a degree.

Seed Position: A latitude and longitude position fix approximately equal to the current position that the Apollo 360 uses to determine the location of available satellites from which signals may be received.

Selective Availability (SA): The degradation of accuracy of GPS position fix data by the United States Department of Defense for civilian use.

Statute Mile: A distance measurement equal to 5,280 feet or 0.87 of a nautical mile.

T

Three-dimensional (3D) Position Fix: A position fix defined by latitude, longitude, and altitude.

Track (TRK): The imaginary line that the flight path of an airplane makes over the earth.

True North: Geographic north, at the earth's north pole.

Tower (TWR): Airport tower communication frequency

U

UNICOM: The radio frequencies assigned to aeronautical advisory stations for communication with aircraft. Unicoms may provide such airport information as active runway, wind direction and velocity and other conditions of importance to pilots.

Universal Coordinated Time (UTC): Greenwich Mean Time, or the time at the Prime Meridian in Greenwich, England. Also referred to as Zulu time.

UTC Differential: The difference in time between that at the present position and UTC.

V

Very High Frequency Omnirange (VOR): A navigational aid that transmits signals such that a receiver can indicate its current radial or bearing from the transmitter.

W

Waypoint: A navigational fix used in area navigation and defined by latitude and longitude coordinates.

Notes

Appendix B

Map Datums

This appendix shows a list of the GPS map datums used with the Apollo 360. Each map datum represents a mathematical model of the earth used for the purpose of establishing precision in charting various areas of the earth. Since each datum relies on a different mathematical model, inconsistencies exist in defining the location of charted points between datums. For this reason, it is important to verify that you have selected the correct map datum for the area where you navigate and the chart you use.

Note

WGS-1984 is the default datum until you change it.

Datum Name	Ellipsoid (Model)
ARC 1950	Clarke 1880
ARC 1960	Clarke 1880
Australian Geodetic 1966	Australian National
Australian Geodetic 1984	Australian National
Bogota Observatory	International
Campo Inchauspe	International
Cape	Clarke 1880
Carthage	Clarke 1880
Chatham 1971	International
Chua Astro	International
Corrego-Allegre	International
European 1950 West Europe	International
European 1950 Cyprus	International
European 1950 Egypt	International
European 1950 Iran	International

Datum Name	Ellipsoid (Model)
European 1950 Sicily	International
European 1979	International
Gandajika Base	International
Geodetic Datum 1949	International
Hjorsey 1955	International
Indian (Thailand/Vietnam)	Everest
Indian (Bangladesh/India/Nepal)	Everest
Ireland 1965	Airy Modified
Kertau 1948	Everest Modified
Liberia 1964	Clarke 1880
Luzon	Clarke 1866
Massawa	Bessel 1841
Merchich	Clarke 1880
Minna	Clarke 1880
Nahrwan	Clarke 1880
North American 1927 Conus	Clarke 1866
North American 1927 Alaska	Clarke 1866
North American 1927 Canada	Clarke 1866
North American 1927 Cntrl. Amer.	Clarke 1866
North American 1963	GRS-80
Old Egyptian	Helmert 1906
Old Hawaiian	Clarke 1866
Oman	Clarke 1880
Ordered Survey Great Britain 1936	Airy
Pitcairn Astro 1967	International
Quatar National	International
Qurmoq	International
Schwarzeck	Bessel 1841
South America 1969	S. America 1969
Timbalai	Everest
Tokyo	Bessel 1841

Datum Name	Ellipsoid (Model)
Zanderij	International
WGS-1972	WGS-72
WGS-1984	WGS-84

Notes

Appendix C

Tutorial

This appendix presents a tutorial on using the built-in simulator to practice "flying" the Apollo 360. Use this tutorial at your own pace to become familiar with using the unit.

During the tutorial, you will use many of the Apollo 360's features as you would during an actual trip. All operating functions are available while you use the simulator. Each will work the same way when you actually navigate later.

With the aircraft parked, take some time to settle into the cockpit and follow the instructions in this appendix to take a trip. As you navigate with the simulator, feel free to experiment with the features as much as you like. The instructions here should serve only as a general guide. The goal of this tutorial is to help you become comfortable using the Apollo 360.

Important

Enter a seed position, and the current time and date as Section 2 describes before using the simulator.

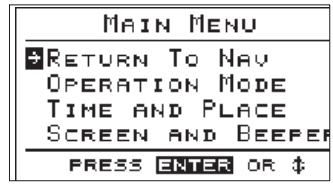
When you finish using the simulator, switch the unit off. The next time you switch it on, simulator mode will be automatically canceled and the unit will be set to aviation mode for actual navigation.

Starting the Simulator

How to Do This

1. Turn the power knob to switch on the Apollo 360.

2. Press the MENU key to call the main menu.



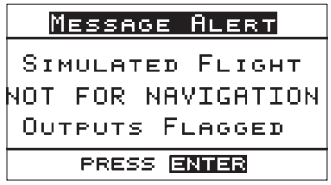
3. Turn the LARGE knob clockwise one detent to select the "Operation Mode" option.

4. Press the ENT key to select the option.

5. Turn the SMALL knob clockwise one detent to select Simulator mode.

6. Set your Ground Speed.

7. A message warns you against navigating while using the Flight Simulator. Press ENT to continue.



Preparing for the Trip

Before you navigate a trip, determine whether you will fly direct to a waypoint, or navigate a route of several waypoints. This tutorial presents instructions to set up either kind of trip. It may be helpful to first navigate direct to a destination before setting up a route to travel.

Originating the Trip

The Apollo 360's simulator uses your present position as the point of origin for the trip unless you have already used the unit to navigate a route. If this is the case, refer to the tutorial section entitled "Navigating a Route" later in this section, or deactivate your route and continue. These exercises assume your present position is the point of origin for the trip.

Assigning a Direct Waypoint

How to Do This

1. Press the GOTO key.

Note:

Prepare to choose a waypoint close to your present position to keep the trip length under approximately 40 nm.

2. Turn the SMALL knob to select the first character of the destination waypoint name.

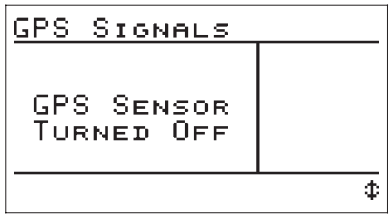
3. Turn the LARGE knob to move the highlight to the next character of your destination waypoint name.

4. Repeat steps 2 and 3 to select the last character of the destination waypoint name.

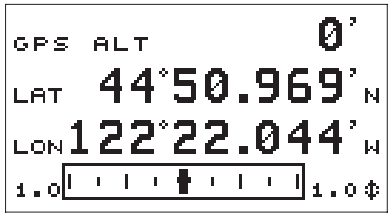
5. Press the ENT key to assign the waponit as the destination.

Navigating the Trip

Turn the LARGE knob to scroll through the navigation screens. Notice the GPS signal screen. No received signals are shown while you use the simulator.



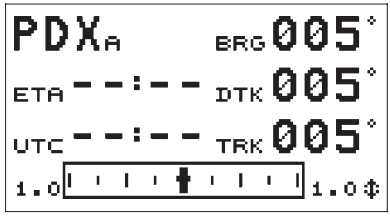
Notice the present position screen. Your track shows directly on course with no deviation from the bearing to the destination. The lat/lon coordinates change to reflect your present position to the nearest hundredth of a minute.



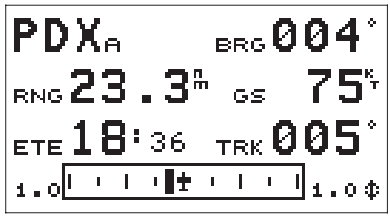
Note

GPS altitude is invalid while you use the simulator. No GPS altitude value shows on the display.

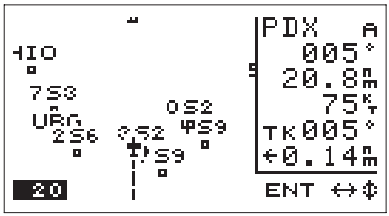
Continue to turn the LARGE knob to check the other navigation screens. The bearing/ETA/track screen shows your the bearing and desired track to the destination. UTC time is invalid while you use the simulator. For this reason, no ETA shows on the display.



The bearing/range/ground speed screen shows your selected ground speed and estimated time enroute on the trip.



Check the moving map screens to view your navigation progress.



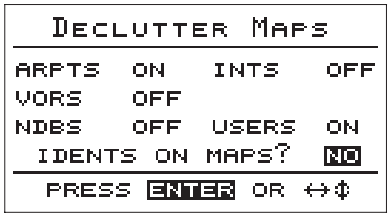
Looking Around

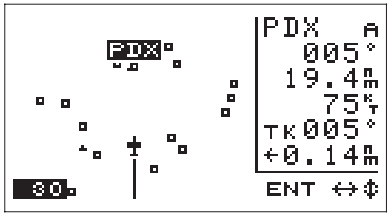
Turn the SMALL knob to zoom in and out and see waypoints around you. The map scale shows in the lower left corner of the display and indicates the represented distance between the airplane symbol and the top of the display. For example, if you are 20 nm from your destination and the map scale is set to 20 nm, you should be able to see the destination on the display. If, at the same map scale setting, your destination was 30 nm distant, you would not be able to see it on the display unless you selected a larger map scale.

Change the map scale to "AUTO" to enable the auto zoom feature. Auto zoom shows your destination on the screen and keeps it in view as you navigate your course. The map scale changes automatically to a smaller scale as you approach the destination.

Hint

If the screen seems cluttered with waypoint names as you use the larger map scales or auto zoom, use the Declutter Maps menu option to "declutter" the map and remove unnecessary names. Set "IDENTS ON MAPS?" to "NO." Notice that the small symbols representing waypoint locations are not removed from the screen.

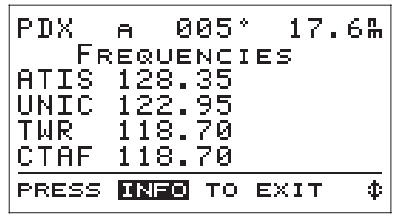




Getting Waypoint Information

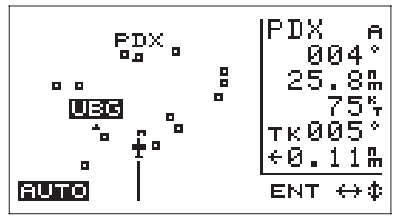
While you are enroute, you may want to get information about your destination waypoint. You can check for fuel availability, runway lengths and surface, communication frequencies, and more. With the moving map screen displayed, press the INFO key to get information about the destination waypoint.

Turn the LARGE knob to view additional pages of information.

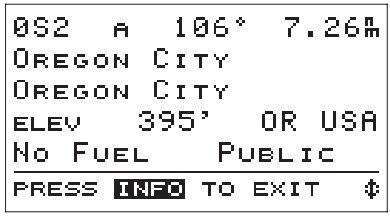


Press the INFO key again to return to the moving map screen.

You can also get information about other waypoints on the screen as you navigate, whether or not the waypoint names are displayed. Select a map scale that presents at least several waypoints around you, or use auto zoom. Press the ENT key several times and watch the highlight move from waypoint to waypoint on the screen.



Information about the highlighted waypoint is available when you press the INFO key.

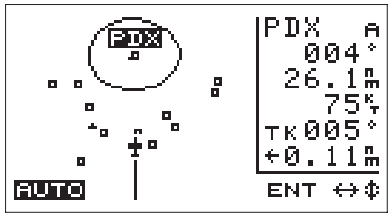


Hint

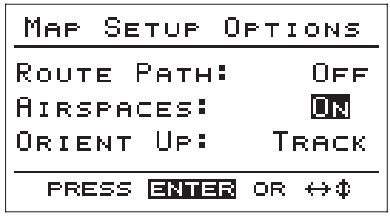
You can get information about any waypoint in the Apollo 360's built-in database. Follow steps 1 through 4 in "Assigning a Waypoint" earlier. With the desired waypoint name showing on the display, press the INFO key. Waypoint information shows on the screen, without the waypoint being assigned as a destination. Press the INFO key again to cancel waypoint information and then press the MENU and ENT keys to continue navigating.

Checking Alert Settings

Looking ahead at the destination, the screen shows an airspace around it.



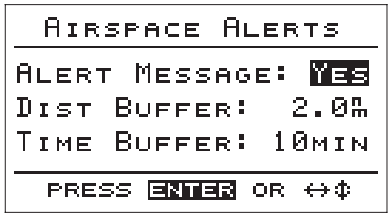
The airspace shows because the Map Setup menu option has the “AIRSPACES” item set to “ON.”



You can also select an alert message to show on the display when you approach the airspace.

For the purpose of this tutorial, check to make sure the alert message will show.

Select the Airspace Alerts option on the main menu.



The “ALERT MESSAGE” item should be set to “YES.” Set the distance buffer to the desired distance from the airspace where you wish to be alerted. Similarly, set the Time Buffer item to the desired travel time (at your present speed) from the airspace where you wish to be alerted. Press the ENT key to return to the main menu.

The Apollo 360 can also alert you with a message on the display as you approach your destination. This feature should also be enabled for the purpose of this tutorial.

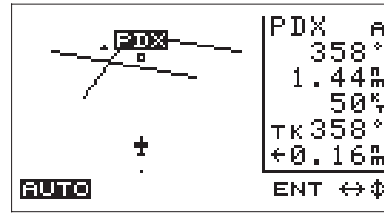
Select the Arrival Alerts option from the main menu. Verify that the "ALERT MESSAGE" item is set to "YES." Set the distance from the destination where you wish to be alerted.

Approaching the Destination

With the destination approaching, the airspace alert message shows on the display at the time or distance from the airspace (whichever occurs first) selected earlier. Press the ENT key to acknowledge the alert.

As you approach the destination, the arrival alert message also shows on the display at the distance from the destination you selected. Press the ENT key to acknowledge the alert.

Scroll through the navigation screens to check your progress and decreasing range to the destination. When you are within several miles of the destination, adjust your ground speed to slow your rate of travel to approximately 30 knots. See “Setting the Ground Speed” earlier in this tutorial. Use the moving map screen to view your arrival at the destination. Set the map scale to auto zoom. At this slower rate of travel, you can clearly see the approaching destination. As you approach, you can see the runway configuration.



Note

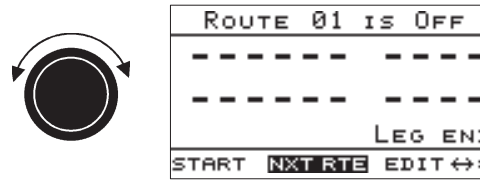
The simulator will not “land,” but shows a “fly-by” and continues travel at the current heading and ground speed until you enter another destination. When you do this, the heading changes and the unit navigates to the new destination. You can stop travel at any time by adjusting ground speed to 0.

Setting Up a Route

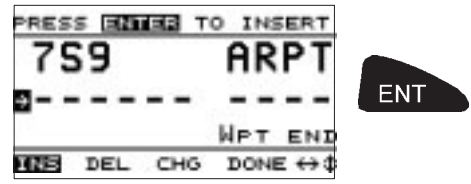
The Apollo 360 can store up to 20 routes or multiple leg trips of up to 30 waypoints each. After you create a route, you can edit it to add or change waypoints anytime. You can also delete waypoints from existing routes. You can navigate any route you choose, but only one route can be active at any time.

How to Do This

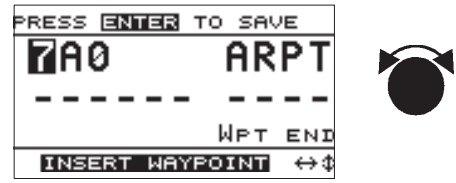
1. Select the route screen from the navigation screens by turning the LARGE knob. From the route screen, select "EDIT" and press the ENT key.



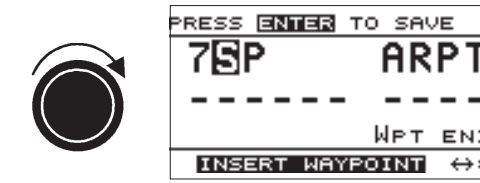
2. The arrow cursor points to the first line in the route and "INS" is highlighted. Press the ENT key to begin inserting waypoints.



3. Turn the SMALL knob to select the first character of the waypoint to insert.



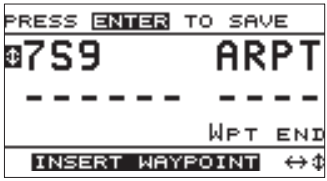
4. Turn the LARGE knob to move the highlight and the SMALL knob to select the next character of the name.



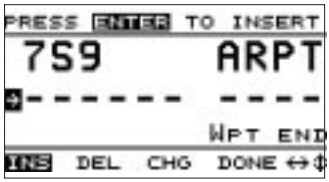
5. Repeat steps 3 and 4 to select the last character of the waypoint name.

Hint

With the highlight on the first character of the waypoint name, turn the LARGE knob one detent to the left to search the database of waypoints one by one if necessary to find the waypoint you desire. You will need to do this if more than one waypoint share a common name. The vertical arrow symbol appears to the left of the waypoint name. Turn the SMALL knob to search waypoints one by one.



6. *Press the ENT key to insert the waypoint in the route. The arrow cursor moves down to the second line in the route, ready for insertion of the next waypoint.*



7. *Repeat steps 2 through 6 to enter a second and third waypoint in the route. For the purpose of this tutorial, we will only insert 3 waypoints in the route, and since we have the 1-Leg route screen selected, only 2 will show on screen at a time.*

8. When you finish inserting waypoints in the route, select “DONE” and press the ENT key. The route is ready to navigate once it is started. You can also create more routes using these steps.

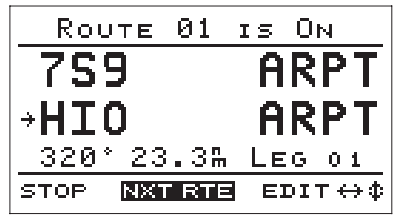
Starting a Route

With the route you just created showing on the screen, select “START” and press the ENT key.

The arrow marker points to line 2, indicating the “To” waypoint. Waypoint 7S9 on line 1 is the point of origin.

You can navigate any route you choose, but only one route can be “started” or active at any time. You can navigate the route in either direction, depending on your present position. For example, if your present position is at the last waypoint in the route, you could use this last waypoint as the point of origin by selecting “REVERSE.” This tutorial uses the forward direction, navigating the route the way it was created.

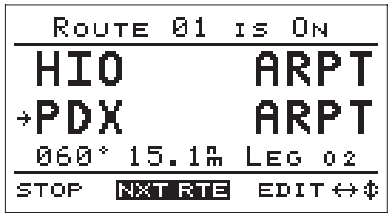
With “NORMAL” selected, press the ENT key. The route screen shows on the display with the message “ROUTE 01 IS ON” at the top of the screen. The bearing and range to the waypoint are below the waypoint designators.



Navigating a Route

With the route started, set the ground speed to a realistic rate of travel. Use the instructions presented earlier in this tutorial. Route navigation is underway. During route navigation, the arrow marker on the route screen always points to the current "To" waypoint. Scroll through the navigation screens to check your progress on the route.

As you approach the first destination waypoint, the arrival alert screen shows on the display to indicate your proximity to the waypoint. When you arrive at the first waypoint, the simulator changes course automatically to begin the second leg of the trip. The arrow marker on the route screen points to the new "To" waypoint.

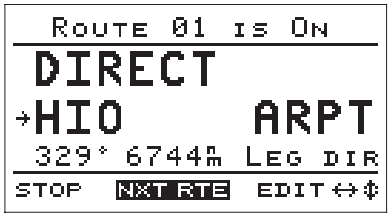


Continue navigating the route.

Route "Direct To"

While navigating a route, you may find it necessary to alter your trip and proceed "Direct To" a waypoint elsewhere in the list. You can navigate directly to any waypoint in the route, either those behind or those ahead of you.

From the route screen choose the active route underway. Select "EDIT" and press the ENT key to assign a "Direct To" waypoint from the list. Turn the LARGE knob to move the arrow cursor to the waypoint you want. Press the GOTO and the ENT keys to assign the waypoint as the "Direct To" destination. The route screen shows the assigned waypoint "Direct To" status. You can assign any waypoint in the route a "Direct To" status at any time.



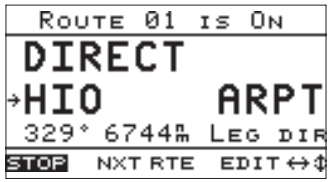
Navigation continues to the "Direct To" waypoint as described in "Navigating the Trip" earlier in this tutorial.

Holding or Stopping a Route

While navigating a route, you may want to deviate from the route with the intention of later resuming the route. You can place a route on "hold" and it will not sequence to the next leg until you resume it, regardless of where you fly.

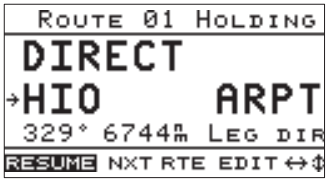
How to Do This

1. With the route active or "ON," select "STOP" and press the ENT key.



2. Select "HOLD" and press the ENT key. The route screen shows the route is "HOLDING."

3. Select "RESUME" to resume navigating the route.



You can fly to other waypoints on the same route and later resume the route continuing from the waypoint you left earlier.

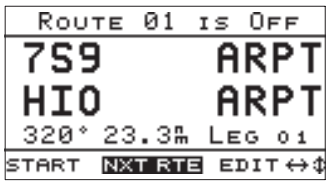
You may wish to abandon the route entirely and fly to a waypoint not on the route list. You can do this quickly as described in "Assigning a Destination Waypoint" earlier. When you assign a new destination waypoint not on the current route, the route is automatically stopped, or switched "OFF." Stop a route if you do not plan to resume travel on that route.

How to Do This

1. Stop the route by selecting "STOP" from the route screen.

2. Press the ENT key to stop the route.

3. The route screen shows "OFF" status for the stopped route.



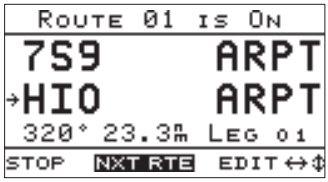
Editing a Route

You can edit any route you have created to insert, change, or delete waypoints in the route. Changes remain in effect until you edit the route again.

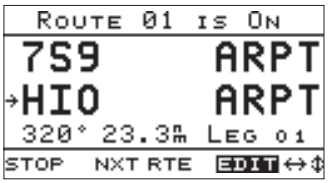
Inserting a Waypoint

How to Do This

1. Choose the route you want to insert waypoints. You can choose any route, including an active route.

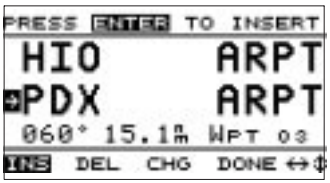


2. Select “EDIT” and press the ENT key.

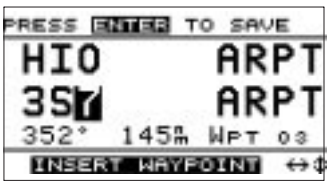


3. Use the LARGE knob to move the arrow cursor to the waypoint before which the new waypoint is to be inserted.

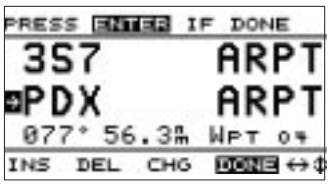
4. Select “INS” and press ENT to insert a waypoint.



5. Use the LARGE and SMALL knobs to select the waypoint name to insert. When the desired name shows on the line, press the ENT key.



6. Select “DONE” and press the ENT key.



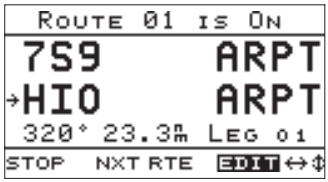
Changing a Waypoint

To change a waypoint in a route, begin by editing the route as you did to insert a waypoint.

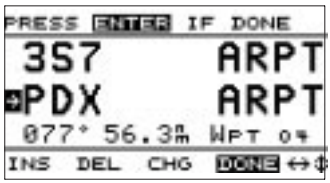
How to Do This

1 Choose the route to change. You can choose any route and change any or all waypoints in the route.

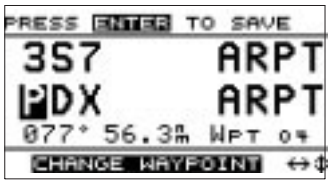
2. Select “EDIT” and press the ENT key.



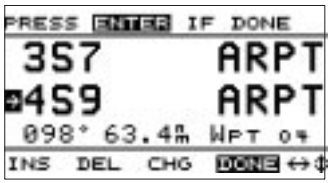
3. Use the LARGE knob to move the arrow cursor to the waypoint to change.



4. Select “CHG” and press ENT to change the waypoint.



5. Use the LARGE and SMALL knobs to select the new waypoint name. When the desired name shows on the line, press the ENT key to enter the change.

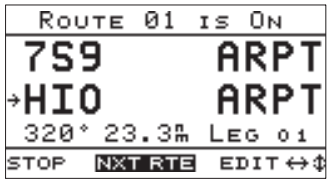


6. Select “DONE” and press the ENT key.

Deleting a Waypoint

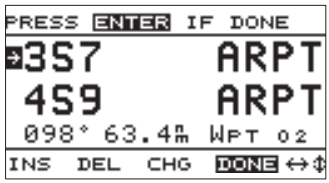
How to Do This

1. Choose the route from which you want to delete a waypoint. You can delete any or all waypoints in the route.

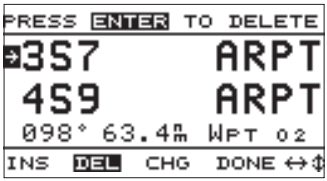


2. Select “EDIT” and press the ENT key.

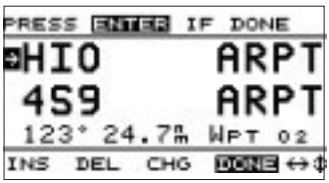
3. Use the LARGE knob to move the arrow cursor to the waypoint to delete.



4. Select “DEL” to delete the waypoint and press the ENT key.



5. Select “DONE” and press the ENT key.

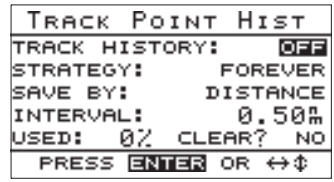


Track Point History

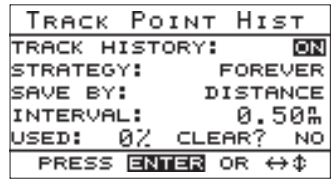
The Apollo 360 can store a record of your trip navigation progress in memory. The record consists of a series of track points, each containing your position at the time the point was stored. You can store up to 2,000 track points. Track point storage can be activated or deactivated any time you navigate.

How to Do This

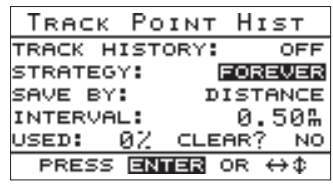
1. Select the Track Point History option from the main menu. The track point history screen shows on the display.



2. Turn the SMALL knob to activate the Track Point History feature.

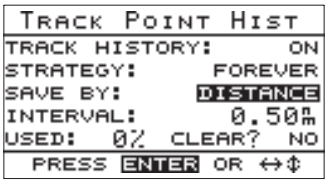


3. Select a storage strategy.



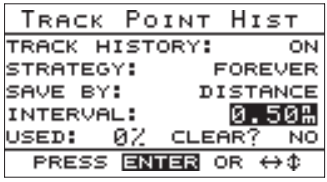
Select either “FOREVER” or “UNTIL FULL.” The “FOREVER” setting records track points indefinitely, recording over existing track points when memory becomes full. The “UNTIL FULL” setting stops recording points when memory fills to capacity.

4. Select a storage method. Choose either “DISTANCE” or “TIME.”



The “DISTANCE” setting records points at the distance interval you select. Similarly, the “TIME” setting records points at the interval of time you select.

5. Select a storage interval for the method you selected.

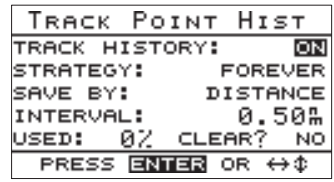


Note

After you begin recording track points and go about navigating, you can always refer to the Track Point History screen to check how much memory space has been used. Check the “USED” item on the screen to see the percentage of track point storage memory currently used.

You can move the highlight to the “CLEAR?” item to empty the track point history memory anytime. Select “YES” and press the ENT key to delete all track points. Deleted track points are not recoverable.

6. With the track point history screen items properly set, press the ENT key to begin recording.

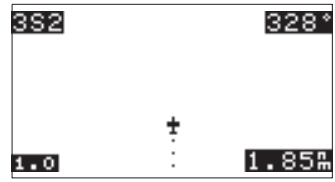


Hint

Select the "DISTANCE" storage method if you prefer to leave track point recording "ON" most of the time. Using this storage method, the unit will not record track points unless your position changes by the distance you specify.

The "TIME" storage method records track points at the selected time interval, regardless of your present position. At busy airports, this could result in many track points being recorded at the same or nearly the same position as you wait to proceed in ground traffic.

Check the moving map screen as you navigate the route. With track points being recorded, small dots appear behind the airplane symbol as you travel. Each dot represents a stored track point.

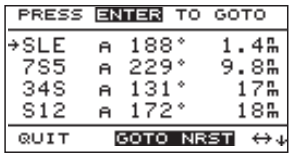


Navigating to a Nearest Waypoint

The Apollo 360 can help you select and navigate to waypoints near your present position. This feature could be valuable if you had to land the aircraft quickly. For the purpose of this tutorial, imagine that the weather conditions were becoming worse and you wish to land immediately.

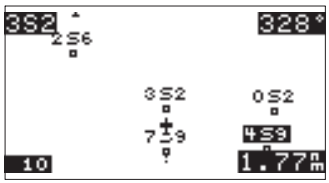
How to Do This

1. Press the GOTO/NRST key twice to display up to 30 closest waypoints around you.



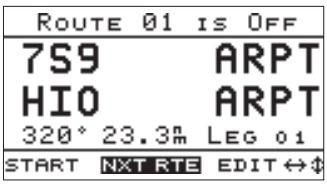
2. Turn the LARGE knob clockwise to move down the list to select a waypoint.

3. Press the ENT key to chose the waypoint as the destination.



Note:

The route you are navigating is automatically inactivated. The route screen shows route "OFF" status.



Conclusion

This tutorial has explored many of the Apollo 360's features. If you feel comfortable using the unit, switch it off and then back on to cancel the simulator. The unit is ready for actual navigation. If you need more time to become comfortable operating the Apollo 360, repeat this tutorial. Navigate to different destinations, add new routes, and take your time exploring the way the unit works. The way you move the highlight around the screen and select option items is consistent throughout all items on the main menu.

Remember:

- The LARGE knob moves the highlight
- The SMALL knob changes highlighted settings

While you navigate, remember:

- The LARGE knob changes navigation screens
- The SMALL knob moves the highlight on the GPS signal screen and route screen, and changes the map scale on moving map screens

Notes:

Appendix D

Troubleshooting

This appendix contains information to troubleshoot the Apollo 360 when improper operation is observed. The table below lists possible problems you could encounter while operating the unit. Examine the possible causes of the problem and take the action listed to correct the trouble. If you cannot correct the problem, contact your dealer. If your dealer is unavailable, contact the II Morrow factory at the address and phone number listed at the back of this appendix.

Problem	Possible Cause(s)	Action
Unit does not power on	Open in power supply circuit	Check circuit breaker - reset if necessary
	Faulty electrical wiring or connection	Contact your dealer to perform electrical system test
No GPS signal reception	Obstructed signal path	Move aircraft out of hangar or away from buildings to provide the antenna an unobstructed view of the sky
	Incorrect seed position, time, or UTC differential entered	Check these settings and make corrections if necessary - refer to Section 2
	Unit in simulator mode	Select “Aviation” mode - refer to Section 5, “Operation Mode”
	Faulty antenna, wiring, or connection	Contact your dealer to check antenna and wiring

Problem	Possible Cause(s)	Action
Display too dark or too light - characters hard to see	Change in viewing angle or ambient light conditions in cockpit	Adjust display backlight (use backlight key) or adjust display contrast as Section 5 describes in “Screen Controls” option
Search for nearest waypoints reveals too few or wrong types of waypoints	Incorrect selection of waypoint types to show after search	Check “Declutter Maps” option as Section 5 describes to verify that desired waypoint types to search are “On”
Wrong types of waypoints show on moving map screens	Incorrect selection of waypoint types to show on moving map screens	See action above - the waypoint types you set to “No” do not show on moving map screens OR after nearest waypoint searches
Position fix seems inaccurate	Incorrect map datum selected	Check “Operation Mode” option as Section 5 describes to verify selection of correct map datum
Displays wrong bearing and track values	Incorrect magnetic variation value entered manually	Check “Magnetic Var” option as Section 5 describes - select “Automatic” or verify correct value for manual entry

Problem	Possible Cause(s)	Action
Airspace boundaries missing from moving map screens	Airspace display on moving map screens set to "Off"	Check "Map Setup" option as Section 5 describes and verify that "Airspaces" item is set to "Yes"
Line representing route path on moving map screens is missing	Route path display on moving map screens set to "Off"	Check "Map Setup" option as Section 5 describes and verify that "Route Path" item is set to "Yes"
Waypoint identifiers missing on moving map screens	Waypoint identifiers set not to show on moving map screens	Check "Declutter Maps" option as Section 5 describes and verify that "Idents On Maps" item is set to "Yes"

Contacting the Factory

If efforts to resolve the problem fail, contact your dealer or the factory weekdays from 8:00 A.M. until 5:00 P.M. Pacific time for technical assistance. The II Morrow technical service staff will gladly assist you.

II Morrow Inc.
Technical Service Department
2345 Turner Road S.E.
Salem, OR 97301 U.S.A.

U.S.A. Toll Free 800-525-6726
Canada Toll Free 800-654-3415
FAX (503) 364-2138
International (503) 391-3411

Notes

Appendix E

Features

The Apollo 360 is a powerful and versatile navigation instrument designed with the latest technology to offer you unprecedented ease in navigating your aircraft. The unit includes:

- A graphic LCD display with adjustable contrast and backlight
- Display contrast automatically compensates to maintain optimum contrast during shifts in ambient temperature
- A 6-channel GPS receiver to ensure accurate position fix under wider range of conditions in the satellite constellation
- A moving map display to graphically show your navigation progress
- Avionics outputs for interface with external CDI, annunciators, or moving map displays
- An extensive built-in database of airports, VORs, NDBs, and Intersections
- Memory capacity to store up to 2,000 user created waypoints
- Storage capability for up to 30 flight plans, each consisting of up to 20 legs
- Low power consumption circuitry
- A lightweight chassis to minimize instrument weight
- An internal fuse to protect against damage to electronic components (not user replaceable)
- A memory backup battery to protect against loss of user entered data (typical battery life is 4 to 6 years)

- A built-in low battery alert to advise you when memory backup battery requires replacement (not user replaceable)
- Personal computer interface capability (using optional kit) to help you manage the internal waypoint database

Limited Warranty

1. Scope of Limited Warranty

II Morrow warrants to the original consumer purchaser only that II Morrow products will be free of defects in materials and workmanship, under normal use, for the periods described below. The warranty begins on the original retail delivery date, or on the date of first use, whichever occurs earlier. Avionics equipment is covered for 26 months (12 months reconditioned) after delivery or first use, whichever is earlier. Antennas and antenna preamplifiers are covered for a period of 12 months after delivery or first use, whichever is earlier. This warranty shall be effective only if and when (a) II Morrow receives a completed warranty registration card with respect to the specific product unit found to be defective, (b) the unit was installed by personnel certified by the FAA to install avionic equipment and a copy of FAA Form 337 documenting the installation is provided to II Morrow (except homebuilts), (c) II Morrow receives notice of such defect during the period of the warranty, and (d) the consumer purchases the unit in the United States or Canada. II Morrow's sole and exclusive liability, and purchaser's sole and exclusive remedy under this Limited Warranty shall be, at II Morrow's option, either (a) the repair or replacement of the defective product or (b) the return of the price paid for such product. This Limited Warranty shall apply to a repaired or replacement product only for the remaining, unexpired portion of the warranty period applicable to the original product. In no event shall II Morrow's liability exceed the purchase price of the defective product. This Limited Warranty gives you specific legal rights. You may have other rights which vary from state to state.

2. No Other Warranties

TO THE EXTENT PERMITTED BY APPLICABLE LAW, AND EXCEPT ONLY AS PROVIDED IN PARAGRAPH 1 ABOVE, THE PRODUCTS ARE PROVIDED "AS IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

3. Exclusion of Liability for Damages

IN NO EVENT SHALL II MORROW, ANY DISTRIBUTOR, OR THE SELLING DEALER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, OR EXEMPLARY DAMAGES (INCLUDING LOSS OF PROFITS, LOSS OF TIME, OR INCONVENIENCE) WHETHER BASED ON CONTRACT, TORT, STRICT LIABILITY, OR ANY OTHER LEGAL THEORY, EVEN IF II MORROW, SUCH DISTRIBUTOR, OR THE SELLING DEALER WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Some states do not allow limitations of incidental or consequential damages, so the above limitation may not apply to you.

4. Limitation of Warranty

The foregoing warranty is void if any defect to perform results from (a) improper or inadequate maintenance, (b) unauthorized modification of any product, (c) operation of the products outside of their environmental specifications, (d) improper installation, (e) neglect, misuse, or abuse of the products, (f) integration with other products not covered by a II Morrow warranty, or (g) exposure to corrosive environments. This warranty shall not apply to any products not manufactured by II Morrow. No one is authorized to change or add to this Limited Warranty. II Morrow makes no warranty with respect to any installation if II Morrow products, whether such installation is performed by II Morrow, any authorized dealer, or any other person.

5. Technical Assistance

The Limited Warranty set forth above shall not be enlarged, diminished, or affected by, and no obligation or liability shall arise from II Morrow, any authorized dealer, or any person rendering technical advice, assistance, or service in connection with the selection, purchase, or use of any II Morrow products.

6. Place of Repair or Replacement

In order to obtain the benefits of this Limited Warranty, the defective II Morrow products, along with a copy of your receipt, must be returned within the applicable warranty period and with the transportation charges prepaid, to II Morrow at its plant at 2345 Turner Road, S.E., Salem, Oregon 97302 or to any authorized II Morrow dealer. Products repaired or replaced by II Morrow under this Limited Warranty will be returned by surface transportation at II Morrow's expense.

Revised September 28, 1994