Apollo® 800
Flybuddy™

Pilot's Operating Manual

II Morrow Inc.
2345 Turner Road SE
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II MORROW INC.
Limited Warranty
(Avionic Loran Products)

1. Scope of Limited Warranty

II Morrow warrants to the original consumer purchaser 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. Avionic Loran receivers are covered for 26 months 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 (i) II Morrow receives a completed warranty registration card with respect to the specific product unit found to be defective; (ii) the unit was installed by personnel certified by the FAA to install avionic equipment and copy of FAA Form 337 documenting the installation is provided to II Morrow (except for homebuilts); (iii) II Morrow receives notice of such defect during the period of the warranty; and (iv) the consumer purchases the unit in the United States or Canada. (II Morrow's sole and exclusive liability for breach of warranty shall be (at II Morrow's option) to repair or replace the defective II Morrow products or return the purchase price for any defective products that are returned during the warranty period. II Morrow products repaired or replaced under this warranty are subsequently warranted only for the remaining, unexpired portion of the warranty period applicable to the original product. If II Morrow elects to repair or replace the product, II Morrow shall have a reasonable time to do so.

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5.Technical Assistance

The 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 other person rendering of technical advice, assistance or service in connection with the selection, purchase or use of any II Morrow products.

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II Morrow makes no warranty with respect to any installation of II Morrow products by II Morrow, any authorized dealer or any other person.

7.Other Rights

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

8.Place of Repair or Replacement

In order to obtain the benefits of this warranty, the defective II Morrow products must be returned to II Morrow at its plant at 2345 Turner Road, S.E., Salem, Oregon 97302, II Morrow Service Center, or to an authorized dealer, with transportation charges prepaid. II Morrow shall pay for the return of the repaired or replaced II Morrow products to you by surface transportation.

Effective September 1988

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Southeast Coast Service Center
102 South 22nd St.
Tampa, FL 33605
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Caution

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

Your new LORAN should be installed only by an FAA certified facility. Each installation is unique, and there are several variables and cautions that an installer must deal with for you to get the maximum benefit from your Flybuddy.

HISTORY OF REVISION

Flybuddy™

Manual Revision	Software Version	
0	1.0	June 1990
1	1.10	January 1991

Flybuddy
Operation Manual

Databases . . . . . .B - 1
Airport Database . . . . . .B - 1
VOR Database . . . . . .B - 2
User Database . . . . . .B - 2
NDB Database . . . . . .B - 3
Heliport Database . . . . . .B - 3
Seabase Database . . . . . .B - 3

Optional Datacards . . . . . .B - 5
AIRPORT Database . . . . . .B - 6
VOR Database . . . . . .B - 6
NDB Database . . . . . .B - 6
Heliport Database . . . . . .B - 7
Seabase Database . . . . . .B - 7

Displays, Lights, and Controls . . . . .B - 9
Power Switch . . . . . .B - 9
LCD Display . . . . . .B - 9
Knobs . . . . . .B - 10
Buttons . . . . . .B - 10
Multi-Purpose Controls . . . . . .B - 11
Lights . . . . . .B - 13

Modes . . . . . .B - 15

Operating Logic . . . . . .B - 17
Pages . . . . . .B - 17
Displaying a Page . . . . . .B - 17
Editing . . . . . .B - 18
Searching Databases . . . . . .B - 19
Searching By City Name . . . . . .B - 20

Warn Displays . . . . . .B - 21
LORAN Receiver Warn Messages . . . . . .B - 21

Alert Messages . . . . . .B - 25

Display Fields . . . . . B - 27

NAV Displays . . . . . B - 29
Interpreting NAV Displays . . . . B - 31
Nearest Waypoint Listing . . . . . B - 33

Interpreting Database Information . . B - 35
Airport and Heliport Databases . B - 35
VOR Database . . . . . B - 37
NDB Database . . . . . B - 37
Seabase Database . . . . . B - 38

Flight Plans . . . . . B - 39

Auto Nav Scroll . . . . . B - 43

LORAN Data . . . . . B - 45

Alternate Solution . . . . . B - 47

First Flight . . . . . F - 1
Start-Up . . . . . F - 1
Direct Navigation . . . . . F - 3
GRIs (LORAN Chains) . . . . . F - 7
Composite Continental U.S.
LORAN Coverage . . . . . F - 8
U.S. and Canadian
LORAN Coverage . . . . . F - 9

Navigating to a Nearest Waypoint
(Emergency Search) . . . . . N - 1

Using the From/To /Next NAV Page
(Two Leg Flight) . . . . . N - 3

Finding a Waypoint in DB Mode . . . . N - 7
Searching by Identifier . . . . . N - 7
Searching by City Name . . . . . N - 9
Displaying Waypoint
Information . . . . . N - 10

Flight Plans . . . . . .N - 11
Entering INFO on a Flight Plan . . . . . .N - 16
Editing a Flight Plan . . . . . .N - 18
Deleting or Inserting a Waypoint .N - 20
Changing Flight Plan Status (Activating a Flight Plan) . . . . . .N - 25

User Waypoints . . . . . .N - 27
Creating a User Waypoint . . . . .N - 27
Editing a User Waypoint . . . . . .N - 29
Deleting a User Waypoint . . . . .N - 31
Entering/Editing INFO on a User Waypoint . . . . . .N - 32

Starting/Stopping Auto Nav Scroll . . .N - 35

Displaying the Alternate Solution . . .N - 37

Displaying WARN Messages . . . . . .S - 1

Displaying Alert Messages . . . . . .S - 3

GRI, Triad, and LORAN Data . . . . . .S - 5
Entering a New GRI . . . . . .S - 5
Manual Triad Selection . . . . . .S - 6
Displaying LORAN Data . . . . . .S - 8
GRIs (LORAN Chains) . . . . . .S - 9
Composite Continental U.S. LORAN Coverage . . . . . S - 10
U.S. and Canadian LORAN Coverage . . . . . S - 11

Manually Adjusting CDI Sensitivity . . S - 13

Setting the Arrival Alert Radius . . . . S - 15

Manually Adjusting Magnetic Variation . . . . . S - 17

Ground Speed Selection . . . . . S - 19

Latitude/Longitude Calibration . . . . .S - 21

Displaying Software and
Database Version . . . . . .S - 23

Activating the Display Test . . . . . .S - 25

Owner Information . . . . . .S - 27
Entering Owner Information . . . .S - 27
Editing Owner Information . . . . .S - 30

Setting the Auto Nav Scroll Time . . .S - 35

NAV Mode Display Customizing . . . .S - 37
Customizing NAV Displays . . . . .S - 37
Restoring Default Nav Pages . . . .S - 38

Setting the Countdown Timer . . . . . .S - 41

Troubleshooting . . . . . T - 1

Difficulty Report . . . . . T - 9

Glossary . . . . . A - 1

Flybuddy

Basic Concepts

Databases . . . . . .B - 1
Airport Database . . . . . .B - 1
VOR Database . . . . . .B - 2
User Database . . . . . .B - 2
NDB Database . . . . . .B - 3
Heliport Database . . . . . .B - 3
Seabase Database . . . . . .B - 3

Optional Datacards . . . . . .B - 5
AIRPORT Database . . . . . .B - 6
VOR Database . . . . . .B - 6
NDB Database . . . . . .B - 6
Heliport Database . . . . . .B - 7
Seabase Database . . . . . .B - 7

Displays, Lights, and Controls . . . . . .B - 9
Power Switch . . . . . .B - 9
LCD Display . . . . . .B - 9
Knobs . . . . . .B - 10
Buttons . . . . . .B - 10
Multi-Purpose Controls . . . . . .B - 11
Lights . . . . . .B - 13

Modes . . . . . .B - 15

Operating Logic . . . . . .B - 17
Pages . . . . . .B - 17
Displaying a Page . . . . . .B - 17
Editing . . . . . .B - 18
Searching Databases . . . . . .B - 19
Searching By City Name . . . . . .B - 20

Warn Displays . . . . . .B - 21
LORAN Receiver Warn Messages B - 21

Alert Messages . . . . . .B - 25

Display Fields . . . . . B - 27

NAV Displays . . . . . B - 29
Interpreting NAV Displays . . . . B - 31
Nearest Waypoint Listing . . . . . B - 33

Interpreting Database Information . . B - 35
Airport and Heliport Databases . B - 35
VOR Database . . . . . B - 37
NDB Database . . . . . B - 37
Seabase Database . . . . . B - 38

Flight Plans . . . . . B - 39

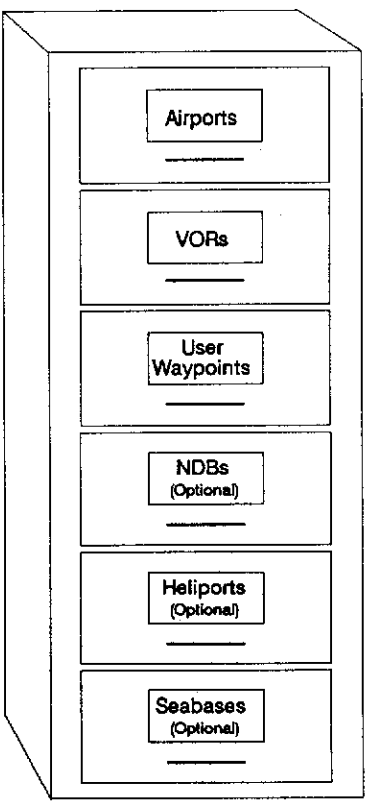
Auto Nav Scroll . . . . . B - 43

LORAN Data . . . . . B - 45

Alternate Solution . . . . . B - 47

Databases

Your Flybuddy has three internal databases--Airports, VORs, and User. Flybuddy Plus is the datacard option, and is available as an upgrade for Flybuddy pilots. With Flybuddy Plus, Airport, VOR, User, NDB, Seabase, and Heliport databases are included on a pilot-replaceable datacard. Information on waypoints, such as runway lengths, frequencies, and available services, are also stored on the datacard. It is useful to think of databases, both internal and on the datacard, as "drawers" in an electronic "file cabinet." Each drawer contains "folders," and each folder represents a waypoint, a specific location on the earth. The User database is the only database that allows you to change its contents. For a complete listing of the information available on datacards, refer to Basic Concepts, *Optional Datacards* (page B - 5).



Airport Database

This database (drawer) contains a "folder" for every public-use airport in the U.S. and Canada. The folders are labeled and organized in alphanumeric order according to airport identifiers; however, Flybuddy automatically rearranges the order of the folders alphanumerically according to city name if you are searching for an airport by city name, rather than by identifier. Searching by city name is only possible with a datacard installed. Without the optional datacard, the only information in each of these folders is the

bearing and distance from your present position, and the latitude/longitude of the airport. The optional datacard provides additional information, including available runways and services; ATIS, Ground Control, and ILS frequencies.

VOR Database

This database (drawer) stores VORs. The internal database contains a "folder" for every VOR in the U.S. and Canada. The folders are labeled and organized in alphanumeric order according to VOR identifiers. Each folder contains the bearing and distance from your present position to the VOR, and the latitude/longitude of the VOR. The optional datacard additionally provides VOR frequencies. You cannot change the contents of this database.

User Database

When your new Flybuddy leaves the factory, the User Database is empty. You may create, remove, and edit (alter) waypoints in the User database. User waypoints may either be created at the location of the waypoint, or at some other location. When creating a User waypoint at the location of the waypoint, the correct position is automatically entered. If you're not at the location of the waypoint you want to create, you may enter latitude/longitude coordinates obtained from an aeronautical chart or some other source. Waypoints created at the location of the waypoint are generally slightly more accurate.

When you create a waypoint, it is automatically assigned a label (identifier). You may change the label and the latitude/longitude coordinates. You may also store and edit other information about the waypoint, such as "GOOD PLACE FOR LUNCH." The waypoints are sorted and stored alphanumerically.

NDB Database

This database is only available with the optional datacard. It contains a "folder" for every NDB in the datacard region. The folders are labeled and organized in alphanumeric order according to NDB identifiers.

Each folder contains the latitude/longitude, City/State/Country, and the frequency of the NDB. You cannot change the contents of this database.

Heliport Database

This database is only available with the optional datacard. The database contains a "folder" for every public-use heliport in the U.S. and Canada. The folders are labeled and organized in alphanumeric order according to heliport identifiers; however, Flybuddy automatically rearranges the order of the folders alphanumerically according to city name if you are searching for a heliport by city name, rather than by identifier. Each folder contains the bearing and distance from your present position to the heliport, the latitude/longitude of the heliport, and other information including elevation and frequencies. You cannot change the contents of this database.

Seabase Database

This database is only available with the optional datacard. The database contains a "folder" for every public-use seabase in the U.S. and Canada. The folders are labeled and organized in alphanumeric order according to seabase identifiers; however, Flybuddy automatically rearranges the order of the folders alphanumerically according to city name if you are searching for a seabase by city name, rather than by identifier. Each folder contains the bearing and distance from your present position to the seabase, the latitude/longitude of the seabase, and other information including elevation and frequencies. You cannot change the contents of this database.

Notes

Optional Datacards

Flybuddy Plus is the datacard option, and is available as an upgrade for Flybuddy pilots. A unique feature of the Flybuddy Plus is "hot replacement" of the datacard. Datacards can be changed or removed without any interruption in navigation. For example, if the pilot flies beyond the bounds of his regional datacard, the datacard can be removed to allow navigation from the internal database. Datacards are inserted in the slot above the display. The unit may be powered-up either with or without the datacard inserted. When a datacard is removed and stored, be sure to keep it free from moisture, and dust.

Five datacards are available:

- North America (includes Continental USA, Canada, Mexico, Central America, and Caribbean)
- Western USA/Canada
- Central USA/Canada
- Eastern USA/Canada
- Europe/Mideast.

Supplemental information for each database is shown on the next two pages. To interpret INFO (information) displays, see Basic Concepts, *Interpreting Database Information*, page B - 35).

AIRPORT Database

- Bearing and Distance from Present Position
- Airport Elevation
- Airport Name and Identifier
- Airport City, State, and Country
- Fuel Availability
- Runway Names
- Runway Lengths
- Runway Surface (Paved, Turf)
- Runway Lighting
- Localizer Frequencies
- ATIS Frequencies
- Tower Frequencies
- Ground Control Frequencies
- Clearance Delivery Frequencies
- UNICOM Frequency
- ILS Frequencies
- Localizer Frequencies
- CTAF Frequency
- Radar Services and Frequencies
  - ARSAs
  - TCAs
  - Departure Control
  - Approach Control

VOR Database

- Bearing and Distance from Present Position
- VOR Identifier
- VOR Frequency
- VOR City, State, and Country
- VOR Latitude/Longitude

NDB Database

- Bearing and Distance from Present Position
- NDB Identifier
- NDB Frequencies
- NDB City, State, and Country
- NDB Latitude/Longitude

Heliport Database

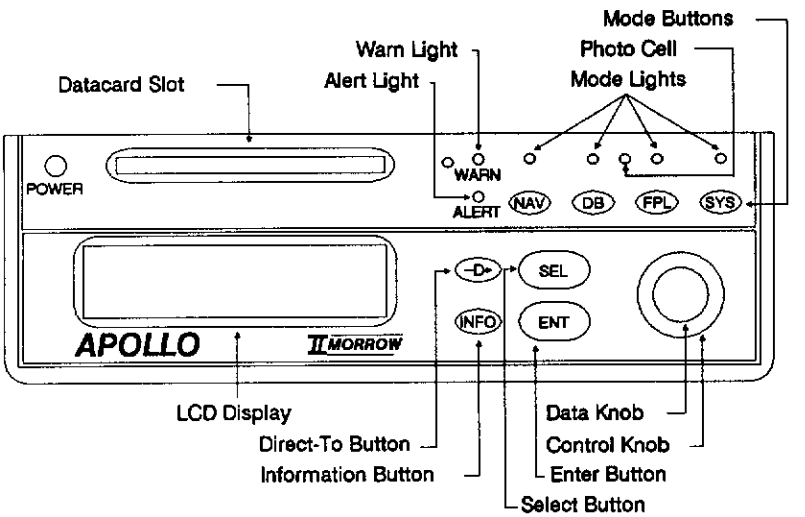
- Bearing and Distance from Present Position
- Heliport elevation
- Heliport Name and ID
- Heliport City, State, and Country
- Fuel Availability
- UNICOM Frequencies
- CTAF Frequencies

Seabase Database

- Bearing and Distance from Present Position
- Seabase elevation
- Seabase Name and ID
- Seabase City, State, and Country
- Fuel Availability
- Runway Names
- Runway lengths
- UNICOM Frequencies
- CTAF Frequencies

Notes

Displays, Lights, and Controls



Power Switch

Push on/pull off power switch.

LCD Display

The display, which uses the latest LCD technology, is comprised of two lines with 16 characters per line. An example of a NAV (navigation) mode display showing the estimated time enroute (ete), ground speed, and distance to the waypoint "SNA", is depicted below.

```
ete SNA      1:32
 214kts    328nm
```

Knobs

Control knob - The Control (large) knob has two functions. First, it is used to change pages (displays).

Second, after (SEL) is pressed, editing is active. The Control knob is then used to move the cursor. The cursor is a horizontal line appearing at the bottom of a character position when you're editing (altering) a display. To move the cursor to the right, turn the Control knob clockwise (cw). To move the cursor to the left, turn the control knob counterclockwise (ccw).

Data knob - The Data (small) knob has two functions. First, it is used to display sub pages of the page displayed with the Control (large) knob. For example, if the User database is displayed with the Control knob, turning the Data knob displays pages pertaining to User waypoints.

Second, after (SEL) is pressed, editing is active. The Data knob is then used to select characters on the display. When the cursor is under a character space, the available characters are displayed by turning the Data knob in either direction.

Buttons

(→D→) (Direct-To) - Press this button to navigate from your present position directly to a waypoint.

(INFO) (Information) - Press this button to obtain information on the displayed waypoint. Anytime the unit is in NAV mode, pressing INFO displays information on the current To waypoint. Turning the Data knob displays the various information pages.

You may enter your own information on User waypoints. For example, if you have created a waypoint at a private airport, you could include the following information--"POWER LINES AT NRTH END OF RNWY." Press INFO again to exit the function.

(SEL) (Select) - Press this button to edit displays. A cursor appears under the character to be changed. For example, when the unit is in DB (Database) mode, pressing SEL causes the cursor to appear beneath the first character in the displayed waypoint. A new character may then be selected with the Data knob.

(ENT) (Enter) - Press this button to enter displayed data. For example, if the unit is in SYS (System) mode with a new GRI displayed, pressing ENT enters the displayed GRI. Anytime a display is changed or edited, ENT must be pressed to save the changes. If ENT is not pressed, the changes will not be saved.

(NAV) (DB) (FPL) (SYS) Press the appropriate button to place the unit in the desired mode.

Multi-Purpose Controls

Each button and knob is designed to serve more than one function, which keeps the number of controls on the unit to a minimum. Fewer buttons make it easier to press the correct button when flying in turbulence.

Pressing (SEL) twice

The SEL button is used to enable editing, and if pressed a second time, disables editing. Therefore, if you're editing, and you decide you do not want to enter the changes you've made, press SEL again.

Changing modes also allows you to exit editing without entering any changes.

Pressing (NAV) twice
Since the Nearest Waypoint Listing is a feature you may want to use in the event of an emergency, it is important to remember that no matter what mode you are in, pressing the NAV button twice activates the Nearest Waypoint Listing. If you are in NAV mode, pressing NAV once activates the feature. The Data knob is then turned to display the nearest waypoint displays.

In an Emergency
If you want to fly to the displayed nearest waypoint, Press (D→) and then (ENT) to set up a new course direct from your present position.

If your purpose in looking at the nearest waypoints was only for information, rotate the Control (large) knob, or press a different mode button to exit the feature.

Hint
One way to exit any function is to change modes.

Pressing (ENT) when in NAV mode
The ENT button is used to enter changes after editing. When in NAV mode, pressing ENT activates Auto Nav Scroll. Pressing any button or turning any knob deactivates the feature.

Pressing (DB) or (FPL) or (SYS) twice
Pressing one of these buttons the first time places the unit in the desired mode. The displayed page is the page that was displayed the last time the unit was in that mode.

Pressing the same mode button a second time displays the first page in the mode. Exception: If the WARN or ALERT light is on, the appropriate message is always displayed first when the SYS button is pressed.

Lights

WARN (warn light) - This light flashes when the LORAN signal quality or strength is insufficient for one or all of the stations in the current chain. Once the reason(s) for the warning have been viewed in SYS mode, the WARN light stops flashing and stays on. If a new warning is generated, the light flashes again. Navigation information is NOT reliable when the WARN light is on or flashing. The WARN light is normally on for a minute or more after the power is turned on. During this time the unit is acquiring a reliable signal. Below is an example of a warning message that typically appears after power-up, while the unit is searching for the stations.

The first letter in the display refers to the station that has a WARN condition. In this example the M (Master) station is in the cycle selection process. See Basic Concepts, *Warn Displays* (page B - 21) for details concerning Warn messages.

ALERT (alert light) - This light flashes to alert you of important information. The alert is generated when you arrive at a waypoint, or the countdown timer expires. Once you view the alert in SYS mode, the ALERT light stops flashing and remains on.

If a new alert is generated, the light flashes again. Some alerts cancel automatically. For example, after you have passed your arrival waypoint, the arrival alert cancels even if you have not viewed the alert display.

Below is an example of an alert message that appears when you arrive at your To waypoint. This alert clears automatically after you pass the waypoint.

Mode Lights - The light above a mode button is on to indicate the unit is in that mode.

Modes

Flybuddy has four operating modes--NAV (Navigation), DB (Database), FPL (Flight Plan), and SYS (System). To enter a mode, press the button with the mode name on it. The light above the button illuminates to indicate which mode the unit is in.

(NAV) (Navigation) mode:
Used to display navigation information, such as bearing and distance to your destination.

(DB) (Database) mode:
Used to access airports, VORs, and user created waypoints. Additional database information is available with an optional data card.

(FPL) (Flight Plan) mode:
Used to store and access specific routes of flight with up to 10 legs (11 waypoints).

(SYS) (System) mode:
Used to make certain selections and settings in the unit, such as setting the value of the arrival alert radius, and customizing NAV (Navigation) displays. SYS mode is also used to display LORAN signal information.

Notes

Operating Logic

Once you understand the basic logic used in operating Flybuddy, the steps involved in a procedure are generally self-evident, and there is no need to memorize them. There are only a few simple processes you must understand.

Hint

Don't be timid when you're learning to use the unit. You cannot hurt it by pressing or turning incorrect combinations of buttons and knobs. You cannot change any of the information contained in the airport or VOR data base, or on the optional database card.

Pages

Each display that appears on the unit is called a "page". Some pages may only be viewed; you cannot input anything into the unit when these pages are displayed. Other pages allow input from you. For example, a page depicting a leg in a flight plan allows input, i.e. you can change the leg to a different leg, delete the leg, or insert a new leg.

Displaying a Page

This three-step process is used to enter a specific mode and display a specific page.

1. Press (NAV) or (DB) or (FPL) or (SYS)

2. Turn  to display the desired page.

3. - Turn  to display sub pages pertaining to the page selected with the Control (large) knob. Some pages don't have sub pages that pertain; in which case, turning the Data knob has no effect.

Editing

Any piece of navigation equipment must allow for your input. For example, a VOR receiver allows you to enter a frequency and a radial. Likewise, Flybuddy allows you to input certain items, such as your route of flight and your destination. With LORAN navigation computers, your input is allowed by changing something on a page. For example, you may alter the page showing your route of flight. This process of changing what you see on a display is known as "editing." No matter what you're editing, the same process applies.

1. - Display the page to be edited.

2. - Press (SEL) to activate editing. The cursor appears.

3 - Turn  to move the cursor under the character to be changed.

4 - Turn  to display the desired character. If necessary, repeat the third and fourth step to change other characters on the page.

5 - Press (ENT) to enter the change.

Searching Databases

Any page in any of the databases (including data from the optional datacards) may be displayed by entering DB mode, turning the Control knob to display the desired database, and turning the Data knob to display the desired page. The Airport and VOR databases contain over 10,000 waypoints. Normally, it isn't practical to turn the Data knob to display the desired waypoint, as there are too many waypoints to scroll through. The Search feature allows you to input the desired waypoint identifier, and have the unit automatically locate and display the waypoint.

1. - Press (DB)

2. - Turn  to display the desired DB.

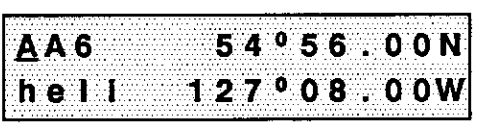
3. - Press (SEL) to activate the Search feature. This causes the cursor to appear. You may now edit the waypoint identifier using the same process described in the previous topic, *Editing*. The unit automatically locates and displays the waypoint.

Exception: When displaying the User database, pressing SEL the first time activates editing (altering) the waypoint; for example, you may change the identifier and/or the latitude/longitude. Pressing SEL the second time activates the Search feature. Since you cannot change any waypoints except in the User database, the Search feature is activated the first time SEL is pressed in all databases except the User database.

Searching By City Name

Searching by city name is only possible with the datacard option. The DB mode display shown below is used to search by city name in the heli (Heliport) database. You may search by city name only in the Airport, Seabase, and Heliport databases. The top line of the display below shows the identifier (AA6), the database (heli), the state or providence (BC--British Columbia), and the country (CAN--Canada). The city name appears on the bottom line. Pressing SEL (i.e. activating the Search feature) causes the cursor to appear under the city name. You may then edit the city name to display waypoints in that city. If "dup" appears in place of the database name, then there are two or more waypoints in the database with that city name. Turn the Data knob to display the other waypoints associated with the city.

In contrast, the display below is used to search by identifier. Pressing SEL causes the cursor to appear under the identifier.



Warn Displays

The following displays may appear when the WARN light is on. Warn messages may be viewed in SYS Mode by turning the Data knob. After Warn messages are displayed, the WARN light stops flashing until a new Warn condition exists. The WARN light remains lighted as long as there is a Warn condition. Some Warn displays automatically clear when the Warn condition is remedied, while others are cleared when viewed. For more information on the WARN light, see Basic Concepts, *Displays, Lights, and Controls* (page B - 13).

The display below only appears when the WARN light is on or flashing. It is the first page displayed in SYS mode, and indicates the number of Warn messages.

```
4 Warn Messages
turn Small knob
```

LORAN Receiver Warn Messages

The display below warns the Lat/Lon conversion is not accurate, and clears automatically when the conversion is completed.

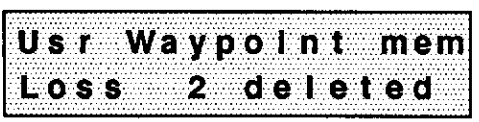
```
No conversion to
Lat/Lon position
```

The display below indicates Flybuddy is not receiving LORAN signals. This may be due to an incorrect GRI selection or a problem with the antenna. This warning automatically clears when Flybuddy begins acquiring the master station.

```
No signal, Check
GRI, antenna
```

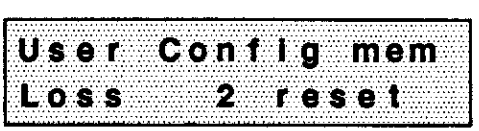
The display below indicates degraded accuracy, perhaps due to the aircraft being positioned near a baseline extension. This warning automatically clears when the condition improves.

The display below indicates a checksum error in the User database. When a checksum error is detected, the displayed number of affected User waypoints are deleted. Flybuddy searches for errors each time the unit is turned on. The warning clears after the message is displayed.



The display below indicates one or more flight plans had a checksum error. When an error is detected, the displayed number of affected flight plans are deleted. The warning clears after the message is displayed.

The display below indicates one or more settings adjusted by the pilot in SYS Mode are not within valid limits. When an error is detected, the affected settings are automatically reset to the default factory values. The display indicates how many settings were reset. Flybuddy checks the settings each time the unit is turned on. The warning clears after the message is displayed.



The display below indicates the unit has automatically changed triads, and a slight shift in position may have occurred as a result. The warning clears after the message is displayed, or after 30 seconds.

The display below indicates the TD sensor has failed, and the unit must be returned for servicing. This display will not clear without servicing.

The display below indicates Flybuddy is searching for a station. The first character on the line indicates which station is being searched for. The warning clears when the condition changes.

The display below indicates the station has a cycle error, or cycle selection for the station is not complete. The warning clears when the condition changes.

The display below indicates the station is being tracked, and there are no cycle errors. This display appears on the top line, and one of the three signal information displays described below appears on the bottom line.

The display below indicates the signal to noise ration (SNR) is low. The display automatically clears when the condition improves.

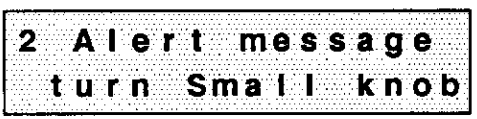
The display below indicates the station is in a blink, or out of tolerance, condition. This display automatically clears when the condition improves.

The display below indicates the station has a low SNR, and is in a blink condition. This display automatically clears when the condition improves.

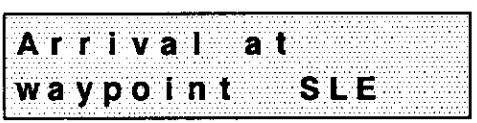
Alert Messages

The following displays may appear when the ALERT light is on. Alert messages may be viewed in SYS mode. After Alert messages are displayed, the ALERT light stops flashing until a new Alert is generated. For more information on the Alert light, see Basic Concepts, *Displays, Lights, and Controls* (page B - 13).

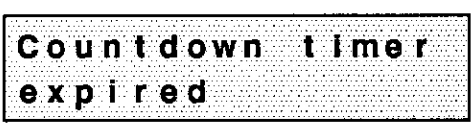
The display below indicates the number of Alert messages. Turn the Data knob to display Alert messages. This display remains until Alert messages have been cleared.



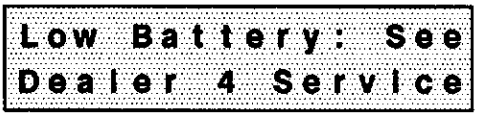
The display below indicates the aircraft is within the arrival radius of the TO waypoint. The alert automatically clears when the aircraft flies outside of the arrival radius.



The display below indicates the countdown timer is at 00:00:00. The alert clears after the message is displayed.



The display below indicates the internal battery used for memory backup is low, and needs to be replaced. Flybuddy must be returned for servicing to replace the battery before memory is lost. The alert message clears when the battery is replaced.



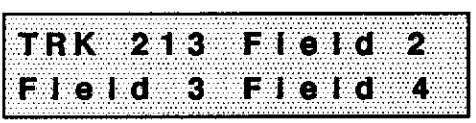
Display Fields

Flybuddy allows you to change (customize) the following 4 NAV displays:

- Track/CDI
- Bearing/Distance/Track/Ground Speed
- ETE/Ground Speed/Distance
- Desired Track/Distance/Flight Time/Bearing

The Flybuddy display is divided into four 8 character fields.

Some NAV displays require one field, such as the Magnetic Track indicator. These displays may be placed in any of the four fields.



Some displays require 2 fields, such as the CDI. These displays require the entire top or bottom line.

The Lat/Lon, From/To/Next, Bearing/Distance/CDI, and Nearest Waypoint pages may not be customized.

For the procedure used to customize NAV displays, see System Mode, *NAV Mode Display Customizing* (page S - 37).

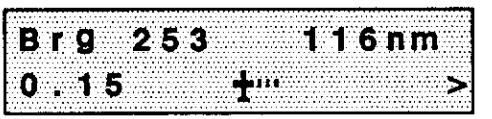
Notes

NAV Displays

In NAV mode, turning the Control knob displays the Nav pages depicted below. These are the default displays set at the factory. Displays listed as Custom may be customized (altered), and displays listed as Auto Nav may be included in the Auto Nav Scroll. For more information on Auto Nav Scroll, see Basic Concepts, *Auto Nav Scroll* (page B - 43). For more information on customizing NAV displays, see Basic Concepts, *NAV Display Fields* (page B - 27).

Bearing/Distance/CDI

Auto Nav

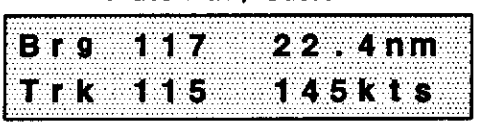


Track/CDI

Auto Nav / Custom

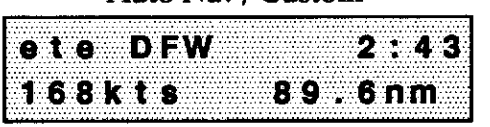
Bearing/Distance/Track/Ground Speed

Auto Nav / Custom



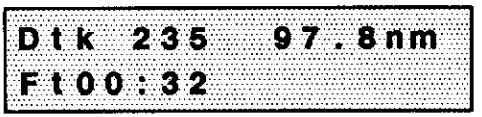
ETE/Ground Speed/Distance

Auto Nav / Custom

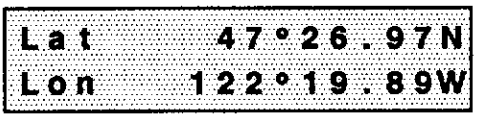


Desired Track/Distance/Flight Time

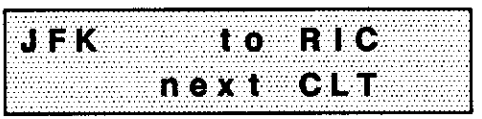
Auto Nav / Custom



Position (Latitude/Longitude)

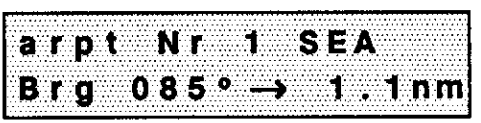


From/To/Next



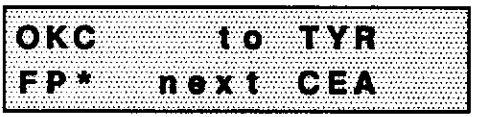
Pressing the NAV button when already in NAV mode, or pressing the NAV button twice when in another mode, displays the Nearest Waypoint page.

Nearest Waypoint



Interpreting NAV Displays

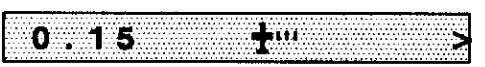
Individual NAV displays and NAV fields are depicted and explained below.



The top line shows the From and To identifiers for the current leg. In this example, the leg is from OKC (Will Rogers Airport) to TYR (Tyler Ponds Airport). The lower line displays the next waypoint after the current leg. In this example, the next waypoint is CEA. "FP*" only appears if a stored flight plan is active.

The Magnetic Bearing display. In the example, the Magnetic Bearing to the waypoint is 253 degrees.

Distance to the To Waypoint. In this example, the distance is 116 nautical miles.



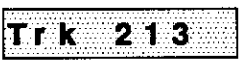
The CDI (Course Deviation Indicator) line. The dots to the side of the symbolic aircraft represent distance units the aircraft is off-course. The sensitivity of the CDI is adjustable. For the adjustment procedures, refer to System Mode, *Manually Adjusting CDI Sensitivity* (page S - 13).

When the default (factory) setting is in use, and the aircraft is off course 1 mile or more, the bar is 4 dots high, and each column of dots represents .25 nautical miles off course.

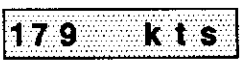
When the default (factory) setting is in use, and the aircraft is off course less than 1 mile, the bar is 2 dots high, and

each column of dots represents .05 nautical miles off course. The CDI automatically become more sensitive when the aircraft is within 1 mile of the selected course. When manual sensitivity is in use, the bar is 2 dots high, and appears at the bottom of the Nav line instead of the middle of the line.

If the bar is to the right of the symbolic aircraft, the desired course is to the right. The number, in this example 0.15, defines the distance in nautical miles the aircraft is off course. This number appears on the opposite side from the CDI bar. The arrow located at the end of the line indicates the trend of the bar. In this example, the arrow points away from the center of the display; therefore, the bar is growing. When the arrow points towards the center of the display, the bar is shrinking, and the aircraft is moving towards the course line.



The Magnetic Track. In this example the track is 213 degrees.



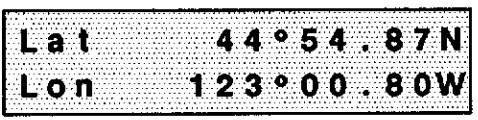
The Ground Speed display. In the example ground speed is 179 knots. Ground speed may be displayed in knots, miles per hour, or in kilometers per hour. For information on ground speed unit selection, refer to System Mode, *Ground Speed Selection* (page S - 19).

Estimated Time Enroute (ETE) to the To waypoint for the current leg. In the example the ETE to DFW is 2 hours, 43 minutes.

The Desired Track and Distance display. The display shows the desired track and distance between the From

and To waypoints. The desired track is a magnetic bearing for the current leg, and is computed using the magnetic variation at the From waypoint. In the example the desired track is 235 degrees, and the distance between the waypoints is 97.8 nautical miles.

Elapsed Flight Time display. The display shows the elapsed flight time since departure. In the example the elapsed time is 0 hours, 32 minutes.



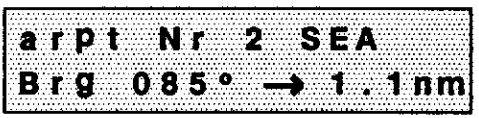
Latitude and Longitude display. The display shows the aircraft's present position coordinates. Note the numbers to the right of the decimal point represent hundredths of a minute, not seconds. In this example, the aircraft's position is 44 degrees, 54.87 minutes North latitude, and 123 degrees, 00.80 minutes West longitude. In the continental U.S. all longitudes are West (W), and all latitudes are North (N). This display may not be customized.

Nearest Waypoint Listing

When in NAV mode, pressing the NAV button activates the Nearest Waypoint Listing. The unit locates the 10 nearest airports in the airport database, the five nearest VORs, and the 5 nearest waypoints in the User database. With the datacard option, the 5 nearest NDBs are also located.

In the example below, "arpt" indicates the waypoint is stored in the airport database, and "Nr" indicates the Nearest Waypoint Listing is active. The "2" indicates the waypoint is the second closest waypoint to your location in the airport database. The waypoint identifier is SEA. The bearing, approximate relative bearing arrow, and

distance are shown on the bottom line. Turn the Data (small) knob to scroll though the nearest waypoints. Turn the Control (large) knob or change modes to exit the Nearest Waypoint Listing. For more information, see Normal Procedures, *Navigating to a Nearest Waypoint (Emergency Search)* (page N - 1).

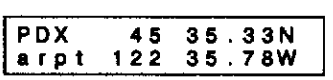


Interpreting Database Information

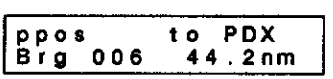
The Flybuddy database contains information concerning airports and VORs. Without an optional datacard, the latitude and longitude of the waypoint is the only information available. With an optional datacard, additional information is available. Also, with the datacard, NDBs, Seabases, Heliports, and associated information is available. For the procedure used to display information on a waypoint, see Normal Procedures, *Displaying Waypoint Information* (page N - 10) Entering information on User waypoints is described in Normal Procedures, *Entering/Editing INFO on a User Waypoint* (page N - 32). Entering information on a stored flight plan is described in Normal Procedures, *Entering INFO on a Flight Plan* (page N - 16).

Airport and Heliport Databases

Information concerning airports may be displayed. In the examples below, the entire listing for the Portland International Airport (PDX) is shown. The Heliport database is only available with the datacard option.



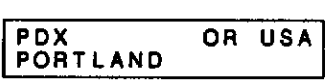
Airport identifier and Latitude
Airport database and Longitude



Present position to PDX
Bearing is 006° and Distance is 44.2nm

The following information is available only with the optional datacard.

Airport Elevation is 27 ft.
Airport name.



Airport State and Country is Oregon, USA.
City is Portland.

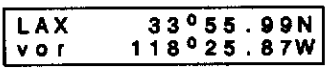
PDX Public Avgas/Jet	Airport is public use. Avgas and Jet fuel available.
PDX 10R/28L Lit 11000ft Hard ILS	Runway 10R/28L is lit. Length is 11,000 ft, Hard surface, ILS.
PDX 10L/28R Lit 8000ft Hard ILS	Runway 10L/28R is lit. Length is 8000 ft, Hard surface, ILS.
PDX 02 /20 Lit 7000ft Hard LOC	Runway 02/20 is lighted. Length, Surface, Localizer
PDX ATIS 128.35 UNIC 122.95	ATIS frequency Unicom frequency is 122.95.
PDX TWR 118.70 GRND 121.90	Tower frequency Ground Control frequency
PDX CLR 119.00 APPR 118.10	Clearance Delivery frequency Approach Control frequency
PDX APPR 126.90 APPR 133.00	Approach Control frequency is 126.90. Approach Control frequency is 133.00.
PDX DEP 118.10 DEP 133.00	Departure Control frequency is 118.10 Departure Control frequency is 118.10
PDX ILS 109.90 Runway 10R	ILS frequency for Runway 10R is 109.90
PDX ILS 111.30 Runway 28R	ILS frequency for Runway 28R is 111.30
PDX LOC 108.90 Runway 20	Localizer frequency for Runway 20 is 108.90

Another display that may appear in some listings is:

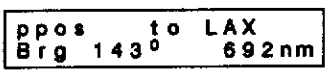
LA10 CTAF 122.90	Common Traffic Advisory Frequency is 122.90.

VOR Database

The following examples display information for the LAX VOR.



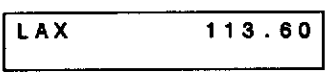
LAX Latitude
VOR database, Longitude



Present position to LAX
Bearing is 143° and Distance is 692 nm.

The following displays are only available with the optional datacard.

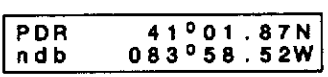
VOR State and Country is California, USA.
VOR City is Los Angeles.



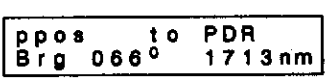
VOR frequency is 113.00

NDB Database

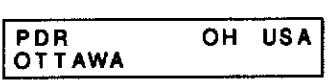
The NDB database is only available with the optional datacard installed. The following examples display information on the PDR NDB.



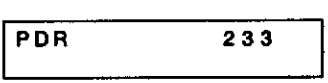
NDB identifier and Latitude.
NDB Database and Longitude.



Present position to PDR.
Bearing is 066° and Distance is 1713 nm.



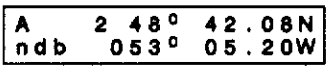
NDB State and Country is Ohio, USA.
NDB City is Ottawa.



PDR frequency is 233.

Duplicate NDB Identifiers

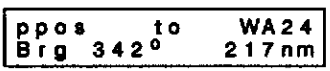
There are several NDBs with duplicate identifiers. When there is more than one NDB with the same identifier, each NDB is assigned a number.



The number (2) indicates there are more than one NDB identified as "A". The NDB assigned the number "2" is displayed here.

Seabase Database

The Seabase database is only available with the datacard option. The following examples display information on WA24 seabase.

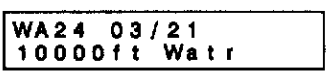


Present position to WA24
Bearing is 3420 and distance is 217nm.

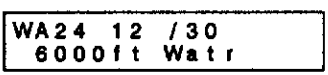
Seabase Elevation is 0 ft.
Seabase Name is Friday Harbor.

Seabase State and Country are Washington, USA.
Seabase city is Friday Harbor.

Seabase is public use.
No fuel is available



Runway 03/21 length is 10,000 ft, and has a water surface.



Runway 12/30 length is 6,000 ft, and has a water surface.

CTAF frequency is 122.80.

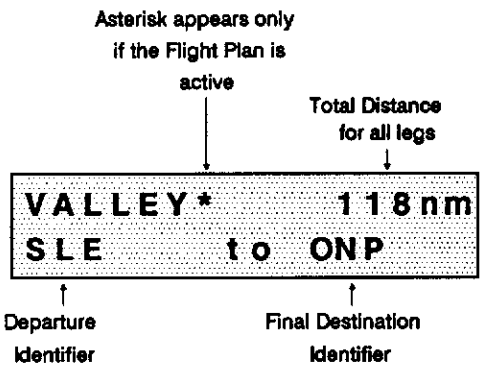
Flight Plans

Flight plans are specific routes you may store in Flybuddy's memory. Each flight plan may contain up to 10 legs (11 waypoints), and 10 flight plans may be stored.

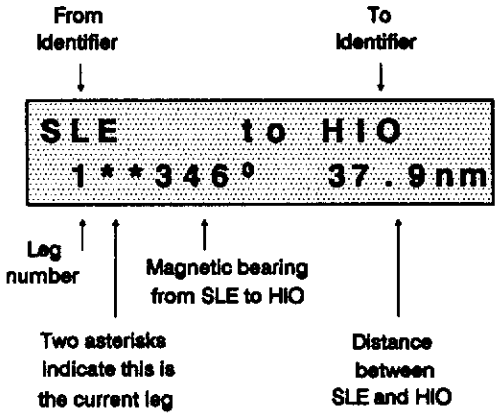
Flight plan identifiers and legs may be edited (altered). When 10 flight plans are stored, you must delete one of the existing flight plans to create a new flight plan.

The procedures pertaining to flight plans are described in Normal Procedures, *Flight Plans* (pages N - 11 through N - 26).

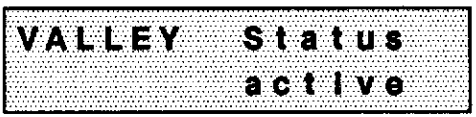
An example of a flight plan named VALLEY is depicted below.



An example of a leg of a flight plan is depicted below.



A status page shows the status of each flight plan.



The five status options are:

Active: Activates the flight plan.

Inactive: This deactivates the flight plan; however, the current leg remains in effect. This does not remove the flight plan from storage.

Hold: This prevents the sequencing of legs in a flight plan. When the status is changed to active, the legs again sequence.

Reverse: This reverses the order of the waypoints in the flight plan. Reverse status is not available when the flight plan is active or on hold.

Reverse/Active: This reverses the order of the waypoints in the flight plan, and activates the flight plan.

The From/To/Next NAV page shows the waypoints as they are used in the active flight plan.

For each flight plan, you may create and store a display containing information such as the one displayed below.

Notes

Auto Nav Scroll

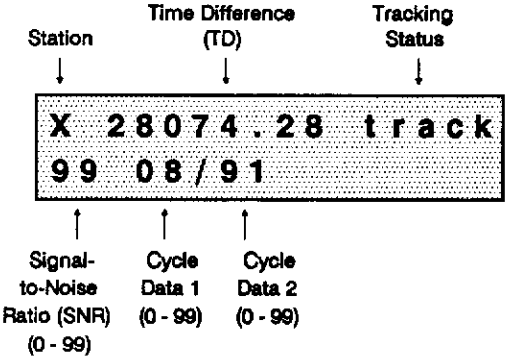
This feature automatically displays each NAV (Navigation) page sequentially for a specified amount of time, from 1 to 9 seconds. Two NAV pages, the From/To/Next page and the position (latitude/longitude) page, are not included in Auto Nav scroll. To select the amount of time each page is displayed, please refer to SYS Mode, *Setting the Auto Nav Scroll Time* (page S - 35). Auto Nav scroll is started in NAV mode by pressing ENT.

Rotating either knob or pressing SEL or ENT stops Auto Nav Scroll.

Notes

LORAN Data

The location of the aircraft is calculated by receiving radio waves from several ground-based transmitters in a LORAN chain. Data concerning the LORAN signal for each station in the chain is displayed in SYS mode. A separate page is displayed for each station. Normally, this information is useful only to technicians. The procedure for displaying LORAN data is described in SYS Mode, *Displaying LORAN Data* (page S - 8).



Tracking status

srch - the unit is in search for the station.

cycle - the unit is in the cycle selection process or has a cycle error.

track - the unit is tracking the station.

Notes

Alternate Solution

LORAN lines of position intersect at two locations. As a result, there are two possible position solutions to the unit's calculations. Normally, the unit is able to determine which solution is the correct one; however, on rare occasions, the unit may display the wrong solution. The error is usually easily recognized because it is of a considerable magnitude. If the unit is displaying the wrong solution, you can manually select the other solution (alternate solution) in NAV (Navigation) mode. The procedure used to select the alternate solution is described in Normal Procedures, *Displaying the Alternate Solution* (page N - 37).

Notes

How To Use This Section

The Action (left) column depicts the steps involved in each procedure. This column can be used by itself as a quick reference for pilots already familiar with the unit. The Explanation (right) column contains an explanation of each step, and a sample of the LCD display that results after completing the step.

Depicts the mode the unit is in after completing the step. In this example, the unit is in SYS (System) mode.

Action	Explanation
5.  Data knob	Turn the Data (small) knob to display the correct GRI.

SYS

GRI 7980
SOUTHEAST US

In this example the action is, "Turn the Data knob in either direction."

Display Example

Flybuddy

First Flight

First Flight . . . . . .F - 1
Start-Up . . . . . .F - 1
Direct Navigation . . . . . .F - 3
GRIs (LORAN Chains) . . . . . .F - 7
Composite Continental U.S.
LORAN Coverage . . . . . .F - 8
U.S. and Canadian
LORAN Coverage . . . . . .F - 9

First Flight

WARNING

Before routinely using Flybuddy in the air, you should be quite familiar with its operation. Federal Aviation Regulations require pilots to practice SEE AND AVOID. It is therefore critical you do NOT study this manual while flying. It is recommended your first flight be made during good weather in a low traffic area. It is important you understand at least the First Flight section before you fly.

Start-Up

This procedure is used to power-up your LORAN and enter a GRI (Group Repetition Interval--also called a LORAN "chain"). The correct GRI for your area must be entered before it is possible to navigate. The GRI is retained in memory when the unit is turned off. A list of the GRIs Flybuddy recognizes appears in this section on page F - 7. VFR coverage areas for North American GRIs appears on pages F - 9 and F - 10. For GRIs outside North America, see II Morrow's *LORAN Reference Guide* (Part # 560-0063). If the correct GRI is already entered, go to the next procedure, *Direct Navigation* (page F - 3).

Action	Explanation
1. Push the power switch in.	After displaying a brief start-up sequence, the unit is in NAV mode, and the WARN light is flashing. The WARN light is normally on for one minute or more after power-up while the unit searches for a signal.

NAV

```
Brg 182   86.4nm
0.15      +       >
```

2. (SYS)

Pressing SYS places the unit in SYS (System) mode. The WARN message page is displayed. WARN messages are displayed until the chosen GRI is acquired, and the unit is tracking the required stations.

SYS
5 Warn Messages
turn Small knob

3. 
Control knob

Turn the Control (large) knob to display the GRI page.

SYS
GRI 9940
US WEST COAST

4. (SEL)

Pressing SEL causes a cursor (line) to appear, allowing you to change the GRI.

SYS
GRI 9940
US WEST COAST
↑
cursor

5. 
Data knob

Turn the Data (small) knob to display the correct GRI.

SYS
GRI 7980
SOUTHEAST US

6. (ENT) The GRI is entered.

SYS

```
GRI              7980
SOUTHEAST US
```

Direct Navigation

This procedure is used to fly directly to a waypoint stored in the Airport (arpt), VOR, NDB, or User database.

Warning

Be sure the WARN light is out before proceeding.

Action	Explanation

1. (→D) The unit is in NAV mode, and the Direct-To page is ready for waypoint entry. The cursor is under the first character in the waypoint identifier. The current database is shown in the lower-left corner.

NAV

```
Enter Dir to Wpt
arpt          00A
```

2. 
Control knob

Turn the Control (large) knob to move the cursor under the database name.

NAV

```
Enter Dir to Wpt
arpt          00A
```

3. 
Data knob

Turn the Data (small) knob to display either the vor, ndb, arpt (airport), or user database.

NAV
Enter Dir to Wpt
vor ABB

4. 
Control knob

Turn the Control (large) knob to move the cursor under the first character in the waypoint identifier.

NAV
Enter Dir to Wpt
vor ABB

5. 
Data knob

Turn the Data (small) knob to select the first character in the waypoint identifier.

NAV
Enter Dir to Wpt
vor DAG

6. Repeat steps 4 and 5 as required.

Select the remaining characters in the waypoint identifier.

NAV
Enter Dir to Wpt
vor DLH

7. (ENT)

A direct course to the waypoint is entered. The Control knob is used to change NAV pages. See Basic Concepts–*Interpreting Nav Displays* (page B - 31) to interpret the navigation information.

NAV

```
Brg 182   86.4nm
0.15        +     >
```

Notes

GRIs (LORAN Chains)

VFR coverage areas for North American chains are depicted on the next three pages. Below is a list of all the chains Flybuddy Plus recognizes. For information on coverage areas outside of North America, refer to the *LORAN Reference Guide* (part # 560 - 0063).

U.S. West Coast 9940

North Central U.S. 8290
(New Chain- Scheduled to be fully operational Spring 1991)

South Central U.S. 9610
(New Chain - Scheduled to be fully operational Spring 1991)

Great Lakes 8970

Southeast U.S. 7980

Northeast U.S. 9960

Canadian East Coast 5930

Labrador Sea 7930

Iceland 9980

Norwegian Sea 7970

Western Europe 8940

Mediterranean 7990

Western U.S.S.R. 8000

Northern Saudi Arabia 8990

Southern Saudi Arabia 7170

Central Pacific 4990

East Asia 5970

Northwest Pacific 9970

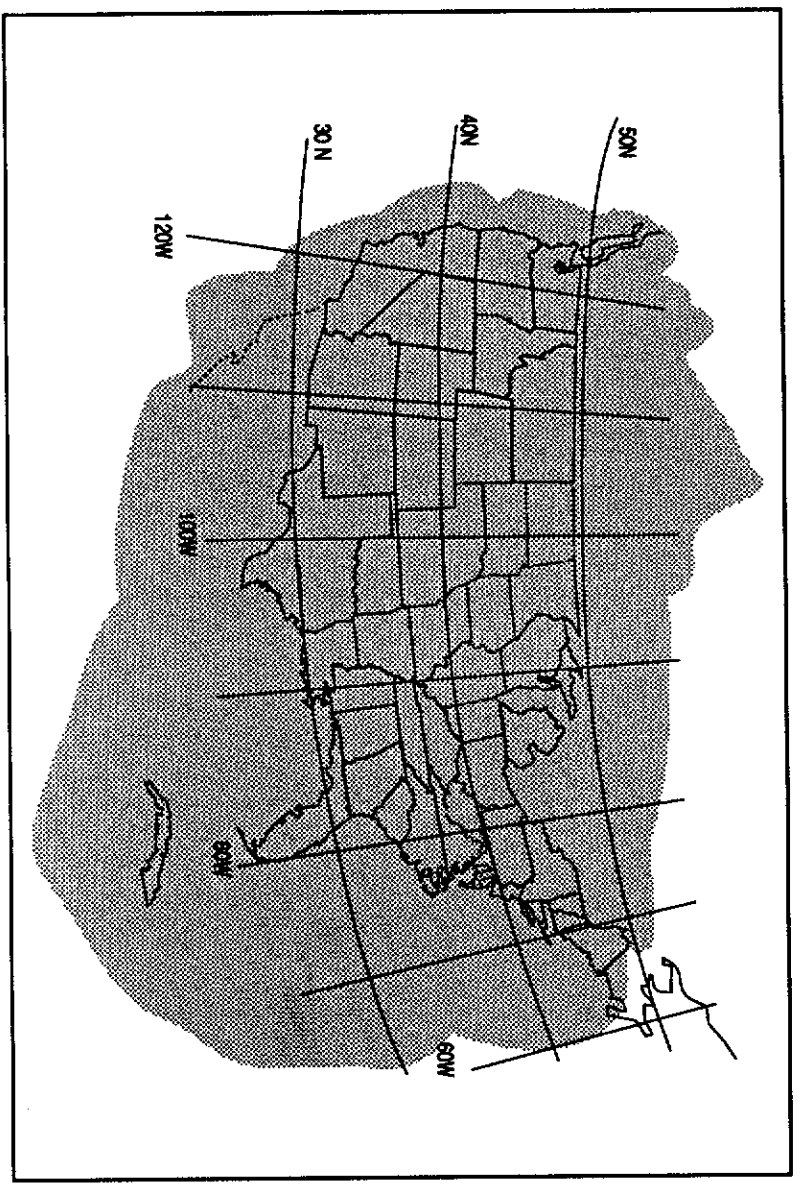
Eastern U.S.S.R 7950

North Pacific 9990

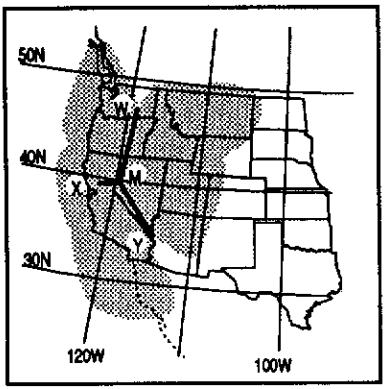
Gulf of Alaska 7960

Canadian West Coast 5990

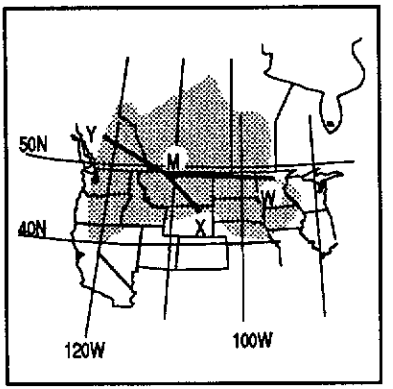
Composite Continental U.S. LORAN Coverage



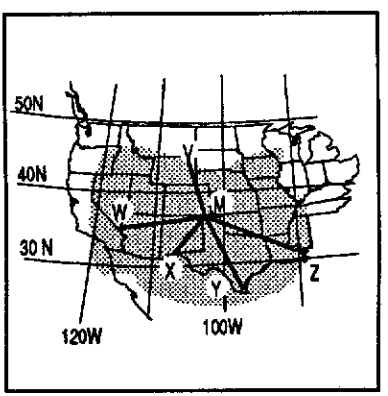
U.S. and Canadian LORAN Coverage



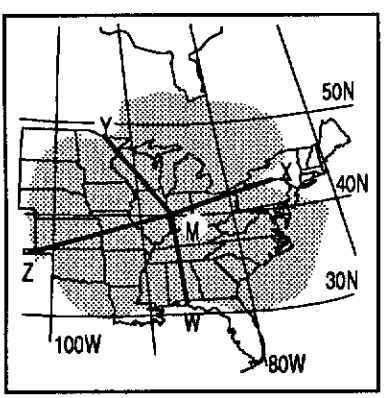
U.S. West Coast GRI 9940



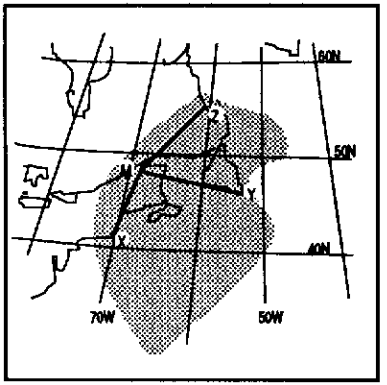
North Central U.S. GRI 8290



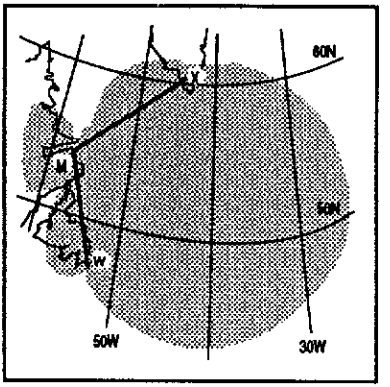
South Central U.S. GRI 9610



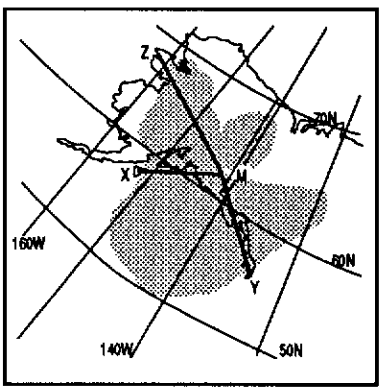
Great Lakes GRI 8970



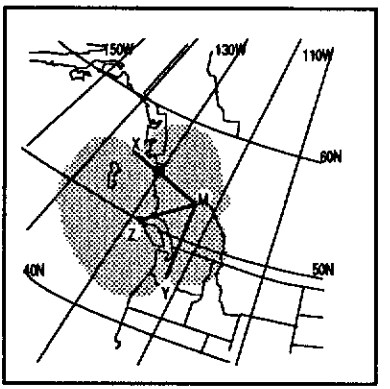
Canadian East Coast GRI 5930



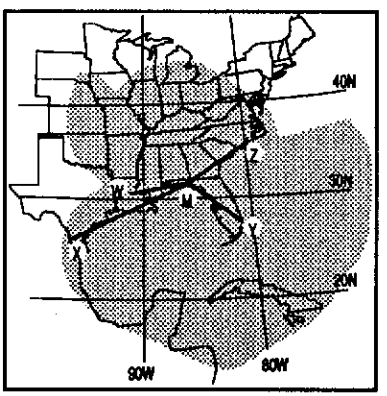
Labrador Sea GRI 7930



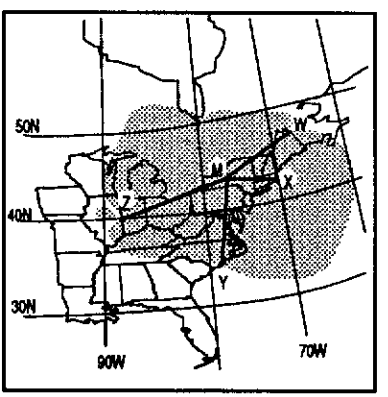
Gulf of Alaska GRI 7960



Canadian West Coast GRI 5990



Southeast U.S. GRI 7980



Northeast U.S. GRI 9960

How To Use This Section

The Action (left) column depicts the steps involved in each procedure. This column can be used by itself as a quick reference for pilots already familiar with the unit. The Explanation (right) column contains an explanation of each step, and a sample of the LCD display that results after completing the step.

Depicts the mode the unit is in after completing the step. In this example, the unit is in DB (Database) mode.

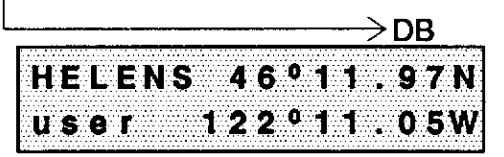
Action

1. 

In this example the action is, "Press the DB button, then turn the Control knob either direction."

Explanation

The unit is in DB mode. Turn the Control knob to display the user database.



Display Example

Flybuddy

Normal Procedures

Navigating to a Nearest Waypoint (Emergency Search) . . . . . N - 1

Using the From/To /Next NAV Page (Two Leg Flight) . . . . . N - 3

Finding a Waypoint in DB Mode . . . N - 7
- Searching by Identifier . . . . . N - 7
- Searching by City Name . . . . . N - 9
- Displaying Waypoint Information . . . . . N - 10

Flight Plans . . . . . N - 11
- Entering INFO on a Flight Plan . . N - 16
- Editing a Flight Plan . . . . . N - 18
- Deleting or Inserting a Waypoint . . . . . N - 20
- Changing Flight Plan Status (Activating a Flight Plan) . . . . . N - 25

User Waypoints . . . . . N - 27
- Creating a User Waypoint . . . . . N - 27
- Editing a User Waypoint . . . . . N - 29
- Deleting a User Waypoint . . . . . N - 31
- Entering/Editing INFO on a User Waypoint . . . . . N - 32

Starting/Stopping Auto Nav Scroll . . . . . N - 35

Displaying the Alternate Solution . . . . . N - 37

Navigating to a Nearest Waypoint (Emergency Search)

Flybuddy locates the ten nearest airports, 5 nearest VORs, and the 5 nearest user waypoints. With the datacard, the 5 nearest NDBs are also displayed.

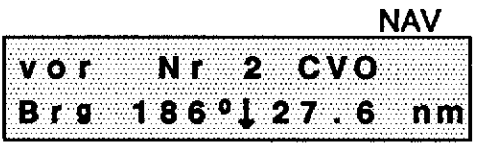
Action	Explanation
1. (NAV) (NAV)	In NAV mode, press the Nav button again to activate the Nearest Waypoint Listing. The nearest airport is displayed. (To exit the Nearest Waypoint function without defining a course to one of the waypoints, turn the Control knob or change modes.)

NAV

```
arpt Nr 1 SLE
Brg 096° → 1.0 nm
```

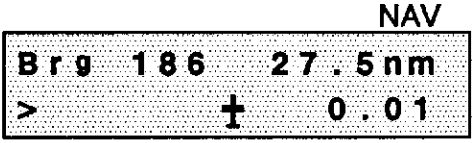
2. 	Turn the Data knob to display the desired waypoint. Turning cw displays the 10 nearest airports first, beginning with the closest and ending with the most distant. Next, the 5 nearest VORs, and then the 5 nearest user waypoints are displayed. With the datacard installed, the 5 nearest NDBs are displayed after the VORs. Turning the knob ccw displays the waypoints in the opposite order, beginning with the most distant User waypoint and ending with the closest

airport. If no user waypoints exist, they will not be displayed. Only waypoints within 600 nm are displayed.



3. (→D) The page for entering the waypoint identifier appears. The editing function is active; however the selected waypoint identifier is already displayed. The Nearest Waypoint Listing is no longer active.

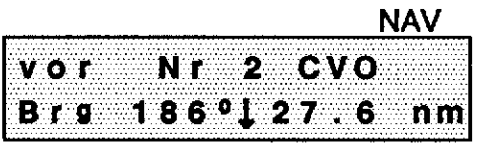
4. (ENT) A direct course to the waypoint is entered.



Hint

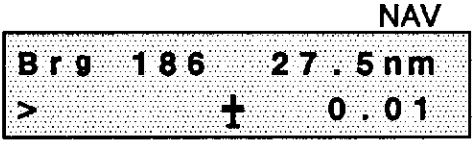
This feature is also useful when entering a new To waypoint that is near your location. There are fewer steps involed than if you begin by pressing the Direct-To button. Simply activate the Nearest Waypoint Listing, scroll to the desired waypoint, press the Direct-To button, and press ENT.

airport. If no user waypoints exist, they will not be displayed. Only waypoints within 600 nm are displayed.



3. (→D) The page for entering the waypoint identifier appears. The editing function is active; however the selected waypoint identifier is already displayed. The Nearest Waypoint Listing is no longer active.

4. (ENT) A direct course to the waypoint is entered.



Hint

This feature is also useful when entering a new To waypoint that is near your location. There are fewer steps involed than if you begin by pressing the Direct-To button. Simply activate the Nearest Waypoint Listing, scroll to the desired waypoint, press the Direct-To button, and press ENT.

Using the From/To /Next NAV Page (Two Leg Flight)

This procedure is used to enter a waypoint stored in one of the databases as the From, To, or Next waypoint. In the sample displays shown in this procedure, a new From waypoint is entered. The same method is used to enter a new To or Next waypoint. The From/To/Next NAV page automatically displays the current leg when a Flight Plan is active.

Action	Explanation
1. (NAV) 	In NAV mode, turn the Control knob to display the From/To/Next page. The current From, To, and Next identifiers are displayed. Blank lines appear in spaces where there are currently no identifiers.

NAV

```
CVO      to PDX
         next ------
```

2. (SEL)	Pressing SEL activates the editing function.

NAV

```
CVO      to PDX
         next _ -----
```

3. 

Turn the Control knob to move the cursor under the desired identifier.

NAV

```
CVO      to PDX
      next ------
```

4. 

Turn the Data knob. The page allowing entry of the identifier appears. (If "direct" was the previous From waypoint identifier, question marks appear in place of the database name, and the cursor is under the question marks--in which case skip step 5.)

NAV

```
Enter From Wpt
arpt        CVO
```

5. 

Turn the Control knob to move the cursor under the database name.

NAV

```
Enter From Wpt
arpt        CVO
```

6. 

Turn the Data knob to display the desired database.

NAV

```
Enter From Wpt
vor         ABB
```

7. 

Turn the Control knob to move the cursor under the waypoint identifier.

NAV

```
Enter From Wpt
vor          ABB
```

8. 

Turn the Data knob to display the first character in the waypoint identifier. Turn the Control knob to move the cursor under the next character.

NAV

```
Enter From Wpt
vor          LAA
```

9. Repeat step 8.

ENT

Choose the remaining characters in the waypoint identifier. Press ENT to enter the waypoint.

NAV

```
LBL      to PDX
         next -----
```

Notes

Finding a Waypoint in DB Mode

These procedures are used to display a waypoint contained in one of the databases. After displaying the waypoint, pressing the INFO button displays information on the waypoint, or pressing the Direct-To button allows entry of the displayed waypoint as the To waypoint. When flying directly to a waypoint, it is *not* necessary to display the waypoint in DB mode. Instead, simply press the Direct-To button, regardless of what mode the unit is in, or what page is displayed.

Searching by Identifier

Waypoint identifiers are arranged in alphanumeric order.

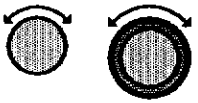
Action	Explanation
1. DB 	In DB mode, turn the Control knob to display the desired Identifier Search database.
2. SEL	Pressing SEL activates the search function.

DB

```
ABB        38°35.33N
vor        85°38.16W
```

DB

```
ABB           Enter
vor           Ident
```

3. 

Turn the Data knob to display the first character in the waypoint identifier. Turn the Control knob to move the cursor under the next character.

DB

CAE	Enter
vor	Ident

4. Repeat step 3.

ENT

Choose the remaining characters in the identifier. Press ENT to activate the search. The waypoint is displayed.

DB

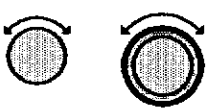
CBM	33°38.49N
vor	88°26.31W

Note

The small knob may also be used to scroll through all of the waypoints in the selected database in alphanumeric order; however, this is normally impractical due to the large size of the databases.

Searching by City Name

Airports, Seabases, and Heliports may be displayed alphanumerically by city name.

Action	Explanation
1. DB 	In DB mode, turn the Control knob to display the desired City Search database.
	DB AB2 heli BC CAN ACTIVE PASS
2. SEL	Pressing SEL activates the search function.
	DB AB2 heli BC CAN ACTIVE PASS
3. 	Turn the Data knob to display the first character in the waypoint identifier. Turn the Control knob to move the cursor under the next character.
	DB 02B heli CT USA WALLINGFORD

4. Repeat step 3.

ENT

Choose the remaining characters in the identifier. Press ENT to activate the search. The waypoint is displayed.

DB

```
106  hell KY USA
WINCHESTER
```

Note

The small knob may also be used to scroll through all of the waypoints in the selected database in alphanumeric order by city; however, this is normally impractical due to the large size of the databases.

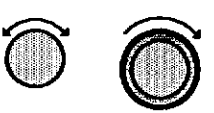
Displaying Waypoint Information

Action	Explanation
1. INFO 	In any mode, pressing INFO displays information about the displayed waypoint. Turning the Data knob scrolls through the Waypoint Information pages. For examples of waypoint information displays, see Basic Concepts, *Interpreting Database Information* (page B - 35)

Flight Plans

Creating a Flight Plan

For more information on flight plans, see Basic Concepts, *Flight Plans*, (page B - 39).

Action	Explanation
1. FPL 	In FPL mode, turn the Control knob to display the page for naming a new flight plan. This page does not appear if the maximum of 10 flight plans already exist.
2. SEL	Pressing SEL displays the page for entering the flight plan name. The identifier may contain a maximum of six characters.
3. 	Turn the Data knob to display the first character in the name. Turn the Control knob to move the cursor to the next space.

FPL
Press 'SEL' to
name flight plan

FPL
_ - - - - - Enter
flight plan name

FPL
D_ - - - - Enter
flight plan name

4. Repeat step 3.

ENT

Choose the remaining characters in the name. Press ENT to enter the flight plan name.

FPL

```
Press 'SEL' to
Input first wpt
```

5. SEL

Pressing SEL displays the page for entering the From identifier for the leg. The leg number and database name appear on the bottom line.

FPL

```
----
 1 arpt
```

6. 

If necessary, turn the Control knob to move the cursor under the database name.

FPL

```
----
 1 arpt
```

7. 

Turn the Data knob to display the desired database.

FPL

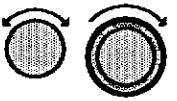
```
ABB
 1 vor
```

8. 

Turn the Control knob to move the cursor under the space for the first identifier character.

FPL

```
ABB
 1 vor
```

9. 

Turn the Data knob to display the desired character. Turn the Control knob to move the cursor to the next space.

FPL

```
PAE
 1 vor
```

10. Repeat step 9.

ENT

Choose the remaining characters in the identifier. Press ENT to enter the identifier as the From waypoint for the leg. The cursor moves to the space for the To identifier. The database for the To identifier appears on the bottom line, right.

FPL

```
PMD      to ____
 1 vor        arpt
```

11. 

If necessary, turn the Control knob to move the cursor under the database name.

FPL

```
PMD      to ----
 1 vor       arpt
```

12. 

Turn the Data knob to display the database for the second waypoint.

FPL

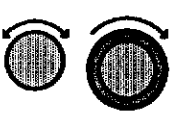
```
PMD      to BEND
 1 vor       user
```

13. 

Turn the Control knob to move the cursor under the identifier space.

FPL

```
PMD      to BEND--
 1 vor       user
```

14. 

Turn the Data knob to display the first character in the identifier. Turn the Control knob to move the cursor under the next character.

FPL

```
PMD      to SANDS
 1 vor       user
```

15. Repeat step 14.

ENT

Choose the remaining characters in the identifier. Press ENT to enter the identifier in the flight plan. The cursor is under the character space for the waypoint in the second leg. The database for the identifier appears on the bottom line, right.

FPL

```
SILVER to _---
 2 user      aprt
```

16. Repeat steps 11 - 15.

Choose the identifiers for the remaining legs. A maximum of 10 legs (11 waypoints) may be entered.

FPL

```
WJF     to _---
 6 aprt     aprt
```

17. ENT

Pressing ENT without a To waypoint displayed for the leg, deactivates the editing function. The last waypoint chosen is the final destination for the flight plan.

FPL

```
WJF     to ------
 6   ---°   --.-nm
```

18. 

Turn the Data knob to view the various legs, the main Flight Plan page, and the Status page. Leg four of the flight plan is depicted below.

FPL

```
PKE      to DAG
 4   286°    107nm
```

Entering INFO on a Flight Plan

This procedure is used to enter information on a stored flight plan. Any desired changes can be made later using the same procedure.

Action	Explanation
1. FPL 	In FPL mode, turn the Control knob to display the desired flight plan.

FPL

```
COAST        172nm
AST      to OTH
```

2. INFO	Press INFO to display the Plan Info page. The FPL light flashes while the INFO function is active.

FPL

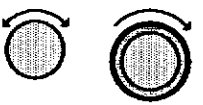
```
Plan Info: Press
  'SEL' to edit
```

3. (SEL)

Pressing SEL activates the editing function, causing a cursor to appear on an otherwise blank page.

FPL

-

4. 

Turn the Data knob to display the first character in the information to be entered. Turn the Control knob to move the cursor to the next space.

FPL

2 -

5. Repeat step 4.

(ENT)

Choose the remaining characters in the information. Press ENT to store the information.

FPL

2000FT OVER WILD
LIFE BY PAC CITY

6. (INFO)

Press INFO to exit the information function. The FPL light stops flashing and remains on.

FPL

COAST 172nm
AST to OTH

Editing a Flight Plan

Action	Explanation
1. (FPL) 	In FPL mode, turn the Control knob to display the Flight Plan to be changed.

FPL

```
ISLAND        83.6nm
BLI      to S43
```

2. 	Turn the Data knob to display the leg to be edited.

FPL

```
S88      to S43
 4  152°  15.3nm
```

3. (SEL)	Pressing SEL activates the editing function. The database for the From waypoint is displayed to the right of the leg number on the bottom line. The database for the To waypoint is display on the far right, bottom line.

FPL

```
S88      to S43
 4 arpt       arpt
```

4. 

Turn the Control knob to move the cursor under the desired database name.

FPL

```
S88      to S43
 4 arpt      arpt
```

5. 

Turn the Data knob to display the desired database.

FPL

```
S88      to ABB
 4 arpt      vor
```

6. 

Turn the Control knob to move the cursor under the waypoint identifier.

FPL

```
S88      to ABB
 4 arpt      vor
```

7.  

Turn the Data knob to display the first character in the identifier. Turn the Control knob to move the cursor under the next character.

FPL

```
S88      to EAF
 4 arpt      vor
```

8. Repeat step 7.

ENT

Choose the remaining characters in the identifier. Press ENT to save the changes.

FPL

```
S88      to ELN
 4    114° 96.8nm
```

Deleting or Inserting a Waypoint

Action	Explanation
1. FPL 	In FPL mode, turn the Control knob to display the desired flight plan.

FPL

```
VALLEY        103nm
7S3      to 61S
```

2. 	Turn the Data knob to display the leg that is to be deleted or have a new waypoint inserted as the To waypoint.

FPL

```
S30      to EUG
 3    189° 27.5nm
```

3. SEL

Pressing SEL activates the editing function. The database for the From waypoint is displayed to the right of the leg number on the bottom line. The database for the To waypoint is display on the far right, bottom line.

FPL

```
S30      to EUG
 3 arpt      arpt
```

4. 

Turn the Control knob to move the cursor under the To waypoint identifier.

FPL

```
S30      to EUG
 3 arpt      arpt
```

5. 

Turn the Data knob to display "insrt?" if inserting a waypoint or "del?" if deleting the waypoint from the flight plan.

FPL

```
S30      to Insrt?
 3 arpt      arpt
```

6. ENT

If deleting, the waypoint is deleted from the flight plan. The sample display below only appears if a waypoint is being inserted.

FPL
S30 to ----
3 arpt arpt

7. 

If necessary, turn the Control knob to move the cursor under the To waypoint database name.

FPL
S30 to ----
3 arpt arpt

8. 

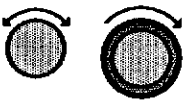
Turn the Data knob to display the desired database.

FPL
S30 to ABB
3 arpt vor

9. 

Turn the Control knob to move the cursor under the first identifier character.

FPL
S30 to ABB
3 arpt vor

10. 

Turn the Data knob to display the first character in the identifier. Turn the Control knob to move the cursor under the next character.

FPL

```
S30      to CAE
 3 arpt      vor
```

11. Repeat step 10.

ENT

Choose the remaining characters in the identifier. Press ENT to enter the new leg.

FPL

```
S30      to CVO
 3    246° 15.7nm
```

Deleting a Flight Plan

This procedure is used to delete a stored flight plan, and all of the legs and information it contains.

Action	Explanation

1. FPL 

In FPL mode, turn the Control knob to display the flight plan to be deleted.

FPL

```
RIVER      331nm
AST      to PSC
```

2. (SEL) Pressing SEL activates the editing function.

FPL
RIVER 331nm
AST to PSC

3.  Turn the Data knob to display "del?".

FPL
del?-- 331nm
AST to PSC

4. (ENT) The flight plan is deleted. The next flight plan in alphanumeric order is displayed.

FPL
WORK 51.1nm
HOME to CRP

Changing Flight Plan Status (Activating a Flight Plan)
This procedure is used to change the status of a stored flight plan. The five status options are Hold, Inactive, Active, Reverse/active, and Reverse. For more information on flight plan status, see Basic Concepts, *Flight Plans*, (page B - 39).

Action	Explanation
1. FPL 	In FPL mode, turn the Control knob to display the desired flight plan.
	FPL ISLAND 165nm BLI to ELN
2. 	Turn the Data knob to display the Status page.
	FPL ISLAND Status Inactive
3. SEL	Pressing SEL activates the editing function.
	FPL ISLAND Status Inactive

4. 

Turn the Data knob to display the desired status.

FPL

```
ISLAND    Status
          Reverse
```

5. (ENT)

The new status is entered. In this example, the order of the waypoints in the flight plan are reversed, but the flight plan will NOT be active until the "active" status is entered

FPL

```
ISLAND      1916nm
ELN         to BLI
```

User Waypoints

Creating a User Waypoint

For more information on User waypoints, see Basic Concepts, *User Database*, (page B - 2).

Action	Explanation
1. DB 	In DB, turn the Control knob to display the User database. If the User database is empty (contains no waypoints), the "open" waypoint page appears (shown in step 2). This page is used to create a new waypoint. It is unnecessary to complete step 2 if the open waypoint page is now displayed. If the User database contains waypoints, the waypoint that was displayed the last time the unit was in the User database appears. A previously entered waypoint is shown in the example below.
2. DB	Pressing the DB button when the unit is in the User database displays the "open" waypoint page.

DB

```
FERN    44°04.15N
user   123°17.40W
```

DB

```
#000    --°--.--N
user   ---°--.--W
```

3. (SEL)

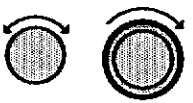
Pressing SEL activates editing, The present latitude/longitude is assigned to the waypoint.

DB

#000	44°54.96N
edit	123°01.31W

Hint

If you want to quickly establish a waypoint as you fly over a position, you may choose to accept the automatically assigned numerical identifier instead of naming the waypoint. Pressing ENT at this point in the procedure eliminates the need to execute steps 4 and 5.

4. 

Turn the Data knob to display the first character in the desired waypoint identifier. Turn the Control knob to move the cursor to the next character position.

DB

HQ00	44°54.96N
edit	123°01.31W

5. Repeat step 4.

(ENT)

Edit the identifier, latitude, and longitude. The identifier may contain a maximum of six characters. Blank spaces may be chosen as well as characters. When a waypoint is created at the location

of the waypoint, it is not necessary to edit the position coordinates (latitude/longitude). Press ENT when the display is correct. The waypoint is stored, and the open waypoint page appears.

DB

```
#000    --°--.--N
user    ---°--.--W
```

Editing a User Waypoint

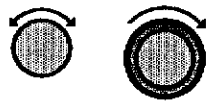
This procedure is used to change the identifier or latitude/longitude coordinates of a waypoint in the User database.

Action	Explanation
1. DB 	In DB mode, turn the Control knob to display the User database. (If the open waypoint page is displayed, turn the Data knob to display any User waypoint. If the desired waypoint is displayed, skip step 2.)

DB

```
HELENS  46°11.97N
user   122°11.05W
```

2. SEL



ENT

Pressing SEL activates the search feature. Use the Data and Control knobs to display the desired identifier. Press ENT to display the waypoint.

DB

```
SPIRIT 46016.75N
user  122°05.50W
```

3. SEL SEL

Pressing SEL twice activates the editing function. Turn the Control knob to move the cursor under the character to be changed. Turn the Data knob to display the desired character.

DB

```
SPIRIT 46°16.75N
edit   122°07.50W
```

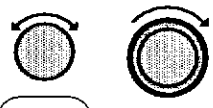
4. ENT

Pressing ENT stores the changes in the User database. The search feature is activated, allowing another User waypoint to be displayed, if required.

DB

```
SPIRIT        Enter
user          Ident
```

Deleting a User Waypoint

Action	Explanation
1. DB 	In DB mode, turn the Control knob to display the User database. (If the open waypoint page is displayed, turn the Data knob to display any User waypoint. If the desired waypoint is displayed, skip step 2.)
2. SEL  ENT	Pressing SEL activates the search feature. Use the Data and Control knobs to display the desired identifier. Press ENT to display the waypoint.
3. SEL SEL 	Pressing SEL twice actives the editing function. Turn the Data knob to display "del?" in place of the identifier.

DB
SPIRIT 46°16.75N
user 122°07.50W

DB
HELM 36°32.05N
user 120°06.00W

DB
del? 36°32.05N
edit 120°06.00W

4. (ENT)

The waypoint is deleted. The next User waypoint in the database is displayed, and the search feature is activated.

DB

SPIRIT	Enter
user	Ident

Entering/Editing INFO on a User Waypoint

There are two INFO pages for each User waypoint. The first page may *not* be edited.

Action	Explanation

1. (DB) 

In DB mode, turn the Control knob to display the User database. (If the open waypoint page is displayed, turn the Data knob to display any User waypoint. If the desired waypoint is displayed, skip step 2.)

DB

SPIRIT	46°16.75N
user	122°07.50W

2. SEL

ENT

Pressing SEL activates the search feature. Use the Data and Control knobs to display the desired identifier. Press ENT to display the waypoint.

DB

```
HELM    36°32.05N
user   120°06.00W
```

3. INFO

The first INFO page appears. This page may not be edited. The bearing and distance appear on the bottom line. The arrow shows the approximate relative bearing to the waypoint. The arrow only appears if the ground speed is 20 knots or more. The DB light flashes while the INFO function is active.

DB

```
ppos    to HELM
Brg 006°↑ 84.7nm
```

4. 

Turn the Data knob to display the prompt for entering User information. (If INFO has previously been entered, the information is displayed instead of the prompt.)

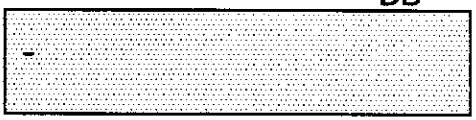
DB

```
User Info: Press
 'SEL' to edit
```

5. (SEL)

Pressing SEL activates the editing function.

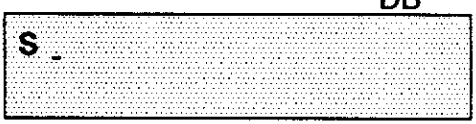
DB



6.

Turn the Data knob to display the first character in the information. Turn the Control knob to move the cursor under the next character position.

DB



6. Repeat step 6.

(ENT)

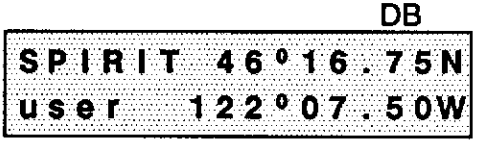
Choose the remaining characters in the information. Press ENT when the display is correct.

DB

7. (INFO)

Press INFO to exit the information function. The DB light stops flashing and remains on.

DB



Starting/Stopping Auto Nav Scroll

For an explanation of Auto Nav Scroll, see Basic Concepts--*Auto Nav Scroll* (page B - 43). To Adjust the amount of time each page is displayed, see SYS Mode, *Setting Auto Nav Time* (page S - 35).

Action	Explanation
1. (NAV)	Display any page in NAV mode.

NAV

```
Brg 186   27.5nm
Trk 188   188kts
```

2. (ENT)	Auto Nav Scroll is started. To stop the scroll, press SEL or ENT or turn either knob.

NAV

```
ete ILM     08:39
 188kts   27.1nm
```

Notes

Displaying the Alternate Solution

This procedure is used to manually select the alternate latitude and longitude solution. For an explanation of Alternate Solution, see Basic Concepts -- *Alternate Solution* (page B - 47).

Action	Explanation
1. (NAV) 	In NAV mode, turn the Control knob to display the Position (latitude/longitude) page.
2. (SEL)	Pressing SEL displays the alternate solution, if one is available.
3. (ENT)	Press ENT to enter the displayed solution.

NAV

```
Lat     39°50.00N
Lon    085°40.00W
```

NAV

```
Lat?    46°59.08N
Lon?   106°02.02W
```

NAV

```
Lat     46°59.08N
Lon    106°02.02W
```

Notes

How To Use This Section

The Action (left) column depicts the steps involved in each procedure. This column can be used by itself as a quick reference for pilots already familiar with the unit. The Explanation (right) column contains an explanation of each step, and a sample of the LCD display that results after completing the step.

Depicts the mode the unit is in after completing the step. In this example, the unit is in SYS (System) mode.

Action | **Explanation**

1. 

Turn the Data knob to select the GRI. Press ENT to enter the GRI.

SYS

GRI 9960
NORTHEAST US

Display Example

In this example the action is, "Turn the Data knob either direction, then press the ENT button."

Flybuddy

System Mode

Displaying WARN Messages . . . . . S - 1

Displaying Alert Messages . . . . . S - 3

GRI, Triad, and LORAN Data . . . . . S - 5
- Entering a New GRI . . . . . S - 5
- Manual Triad Selection . . . . . S - 6
- Displaying LORAN Data . . . . . S - 8
- GRIs (LORAN Chains) . . . . . S - 9
- Composite Continental U.S. LORAN Coverage . . . . . S - 10
- U.S. and Canadian LORAN Coverage . . . . . S - 11

Manually Adjusting CDI Sensitivity . . S - 13

Setting the Arrival Alert Radius . . . . S - 15

Manually Adjusting Magnetic Variation . . . . . S - 17

Ground Speed Selection . . . . . S - 19

Latitude/Longitude Calibration . . . . S - 21

Displaying Software and Database Version . . . . . S - 23

Activating the Display Test . . . . . S - 25

Owner Information . . . . . S - 27
- Entering Owner Information . . . . S - 27
- Editing Owner Information . . . . . S - 30

Setting the Auto Nav Scroll Time . . . S - 35

NAV Mode Display Customizing . . . S - 37
- Customizing NAV Displays . . . . S - 37

Restoring Default Nav Pages . . . .S - 38
Setting the Countdown Timer . . . . . .S - 41

Displaying WARN Messages

The Warn page is the first page displayed when entering SYS mode if the WARN light is on. If the WARN light is off, this page does not appear. For an explanation of Warn messages, see Basic Concepts -- *Warn Displays* (page B - 21).

Warning
Do not navigate with the unit when the WARN light is on.

Action	Explanation
1. (SYS)	In SYS mode, the Warn page is displayed (provided the WARN light is on).

SYS

```
5 Warn Messages
Turn Small knob
```

2. 	Turn the Data knob to display each specific message.

SYS

```
No signal, Check
GRI, antenna
```

After each Warn message has been viewed, the WARN light stops flashing and stays on. If a new Warn message comes up, the WARN light will flash again. The light goes out when the Warn condition clears.

Notes

Displaying Alert Messages

The Alert page is the first page displayed when entering SYS mode if the ALERT light is on; however, if the WARN light is also on, the Warn page appears before the Alert page. If the Alert light is off, the Alert page does not appear. For an explanation of Alert messages, see Basic Concepts, *Alert Messages* (page B - 25).

Action	Explanation
1. (SYS) 	In SYS mode, turn the Control knob (if necessary) to display the Alert page.
2. 	Turn the Data knob to display each specific message.

SYS
2 Alert messages
turn Small knob

SYS
Arrival at
waypoint SLE

After each Alert message has been viewed, the ALERT light stops flashing and stays on. If a new Alert message comes up, the ALERT light will flash again. The light goes out when the Alert clears.

Notes

GRI, Triad, and LORAN Data

Coverage areas for North American GRIs are shown at the end of this section (page S - 9). For coverage areas outside of North America, refer to II Morrow's LORAN Reference Guide (part # 560-0063).

Entering a New GRI

Action	Explanation
1. (SYS) 	In SYS mode, turn the Control knob (if necessary) to display the GRI page.
2. (SEL)	Pressing SEL activates the editing function.
3.  (ENT)	Turn the Data knob to select the GRI. Press ENT to enter the GRI.

SYS
GRI 9940
US WEST COAST

SYS
GRI 9940
US WEST COAST

SYS
GRI 9960
NORTHEAST US

Manual Triad Selection

Normally, auto (automatic) triad selection should be used, but there may be occasions when manual triad selection will be needed.

Action	Explanation
1. SYS 	In SYS mode, turn the Control knob to display the GRI page.
2. 	Turn the Data knob to display the triad page.
3. SEL	Pressing SEL enables the editing function.

SYS

```
GRI              9960
NORTHEAST US
```

SYS

```
Triad            auto
MWY              MWXYZ
```

SYS

```
Triad            auto
MWY              MWXYZ
```

4. 

Turn the Data knob to display "manual".

SYS

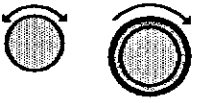
Triad	manual
MWY	MWXYZ

5. 

Turn the Control knob to move the cursor under the character representing the first secondary in the triad.

SYS

Triad	manual
MWY	MWXYZ

6. 

Turn the Data knob to display the desired secondary. Turn the Control knob to move the cursor under the character representing the other secondary in the triad.

SYS

Triad	manual
MXY	MWXYZ

7.  (ENT)

Turn the Data knob to display the desired secondary. Press ENT to enter the new triad. To return to auto triad selection, repeat this procedure, selecting "auto"--then press ENT. Secondary selection does not apply when auto triad selection is in use.

SYS

Triad	manual
MXW	MWXYZ

Displaying LORAN Data

Action	Explanation

1. (SYS) 

In SYS mode, turn the Control knob (if necessary) to display the GRI page.

SYS

GRI	9960
NORTHEAST US	

2. 

Turn the Data knob to display the LORAN data pages. The first page pertains to the master station.

SYS

MASTER	track
97 22/81	

Signal-to-Noise Ratio (SNR) (0-99) | Cycle Data 1 (0-99) | Cycle Data 2 (0-99) | Tracking Status

GRIs (LORAN Chains)

VFR coverage areas for North American chains are depicted on the next three pages. Below is a list of all the chains Flybuddy Plus recognizes. For information on coverage areas outside of North America, refer to the *LORAN Reference Guide* (part # 560 - 0063).

U.S. West Coast 9940

North Central U.S. 8290
(New Chain- Scheduled to be fully operational Spring 1991)

South Central U.S. 9610
(New Chain - Scheduled to be fully operational Spring 1991)

Great Lakes 8970

Southeast U.S. 7980

Northeast U.S. 9960

Canadian East Coast 5930

Labrador Sea 7930

Iceland 9980

Norwegian Sea 7970

Western Europe 8940

Mediterranean 7990

Western U.S.S.R. 8000

Northern Saudi Arabia 8990

Southern Saudi Arabia 7170

Central Pacific 4990

East Asia 5970

Northwest Pacific 9970

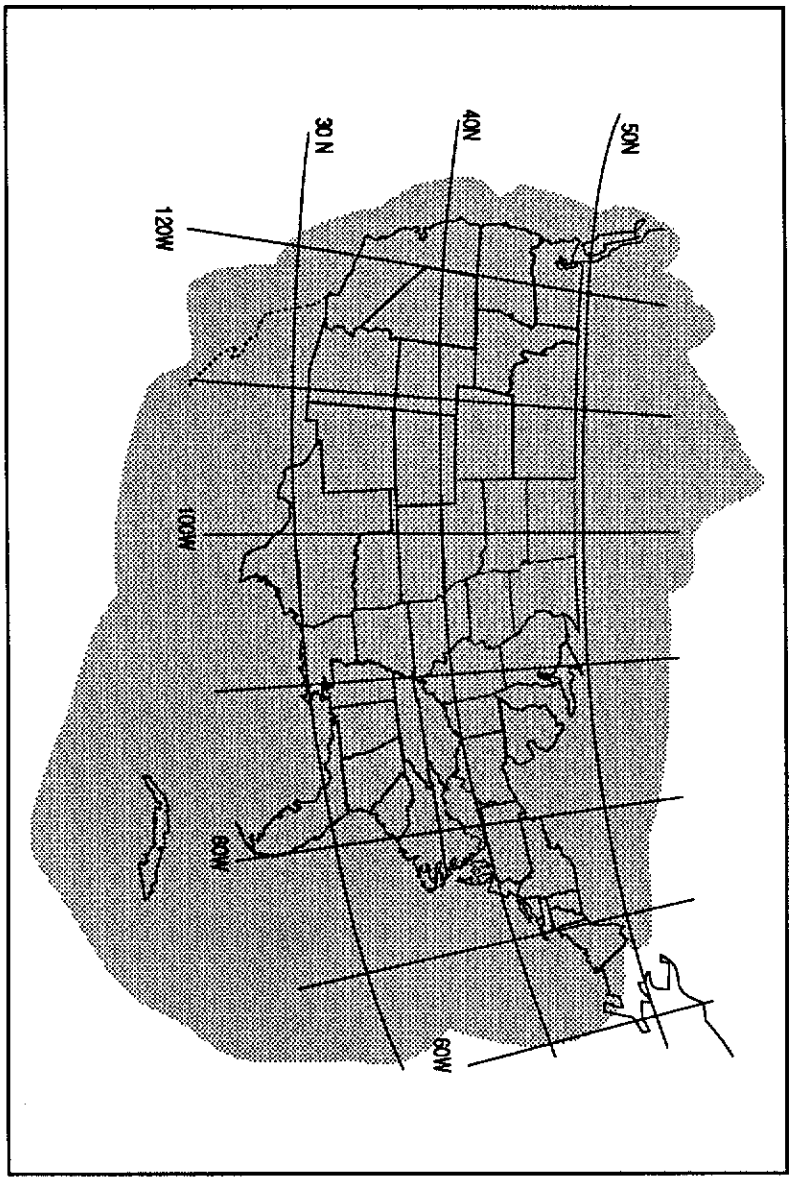
Eastern U.S.S.R 7950

North Pacific 9990

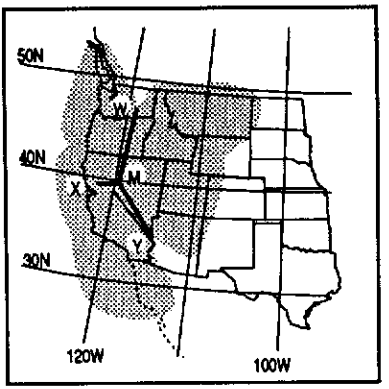
Gulf of Alaska 7960

Canadian West Coast 5990

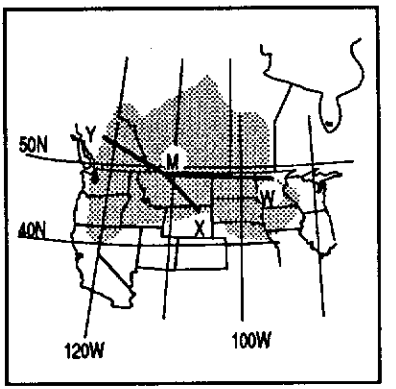
Composite Continental U.S. LORAN Coverage



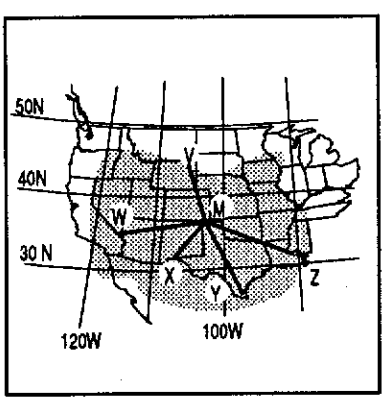
U.S. and Canadian LORAN Coverage



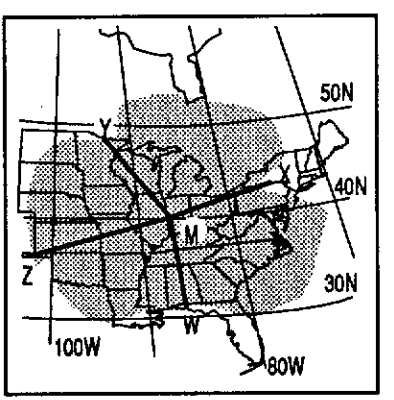
U.S. West Coast GRI 9940



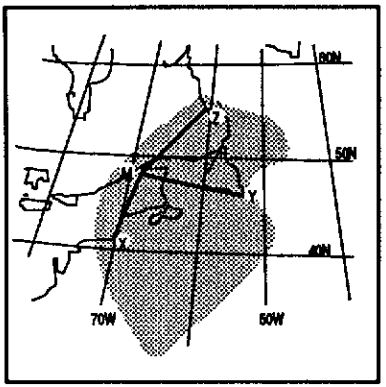
North Central U.S. GRI 8290



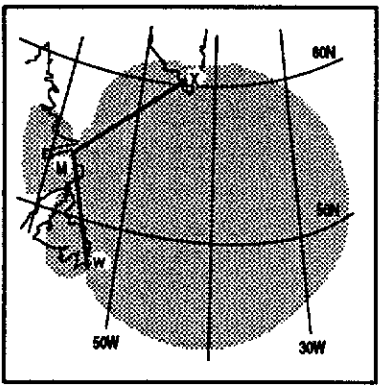
South Central U.S. GRI 9610



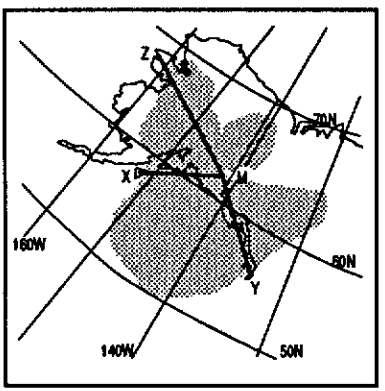
Great Lakes GRI 8970



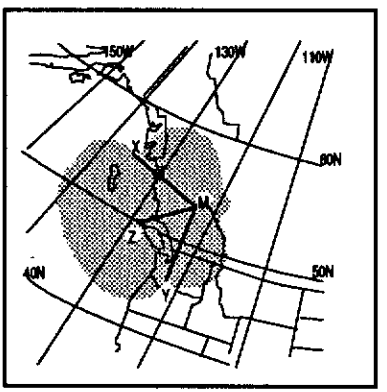
Canadian East Coast



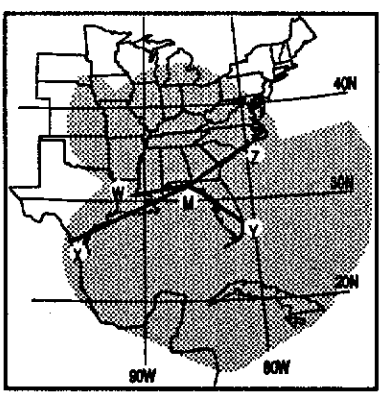
Labrador Sea GRI 7930



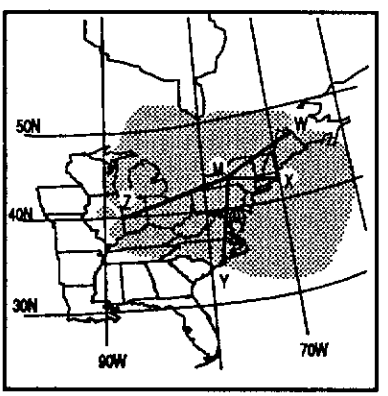
Gulf of Alaska GRI 7960



Canadian West Coast



Southeast U.S. GRI 7980



Northeast U.S. GRI 9960

Manually Adjusting CDI Sensitivity

If automatic CDI sensitivity is not desired, use this procedure to manually adjust the sensitivity. When manual sensitivity is in use, the deviation bar on the CDI display is two dots high, and is at the bottom of the display line. For more information on CDI sensitivity, see Basic Concepts--*Interpreting NAV Displays* (page B - 31).

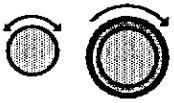
Action	Explanation
1. (SYS) 	In SYS mode, turn the Control knob to display the CDI Sensitivity page.
	SYS CDI Sensitivity auto 0.25nm/mark
2. (SEL)	Pressing SEL activates the editing function.
	SYS CDI Sensitivity auto 0.25nm/mark
3. 	Turn the Data knob to display "man" (manual).
	SYS CDI Sensitivity man 0.25nm/mark

4. 

Turn the Control knob to move the cursor under the desired character in the nautical miles per mark setting.

SYS

```
CDI Sensitivity
man   0.25nm/mark
```

5. 

ENT

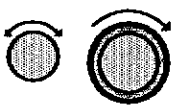
Set the desired value using the Data and Control knobs. Press ENT to enter the new value. To return to automatic sensitivity, repeat this procedure choosing "auto".

SYS

```
CDI Sensitivity
man   0.30nm/mark
```

Setting the Arrival Alert Radius

The ALERT light flashes upon entering the Arrival Alert radius of the To waypoint, and automatically clears when departing the radius. The default radius is 1.00nm, and may be adjusted between 0.10nm and 9.99nm.

Action	Explanation
1. (SYS) 	In SYS mode, turn the Control knob to display the Arrival Alert page.
2. (SEL)	Pressing SEL activates the editing function.
3.  (ENT)	Set the desired value using the Data and Control knobs. Press ENT to enter the new value.

SYS
Arrival Alert
radius 1.00nm

SYS
Arrival Alert
radius 1.00nm

SYS
Arrival Alert
radius 2.50nm

Notes

Manually Adjusting Magnetic Variation

Flybuddy automatically accounts for magnetic variation when computing bearings and tracks. If desired, this procedure is used to manually enter the magnetic variation.

Action	Explanation
1. SYS 	In SYS mode, turn the Control knob to display the Mag Variation page.

SYS

```
Mag Variation
auto          20°E
```

2. SEL	Pressing SEL activates the editing function.

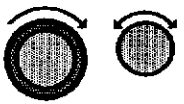
SYS

```
Mag Variation
auto          20°E
```

3. 	Turn the Data knob to display "manual".

SYS

```
Mag Variation
manual        20°E
```

4. 

Display the desired variation value using the Control and Data knobs. Press ENT to enter the setting. To return to "auto" variation, repeat this procedure, selecting "auto".

SYS

```
Mag Variation
manual        15°E
```

Ground Speed Selection

This procedure is used to choose the units for ground speed displays. The selections are kts (knots), mph (miles per hour), or kph (kilometers per hour). The default setting is kts.

Action	Explanation
1. SYS 	In SYS Mode, turn the Control knob to display the Ground speed selection page.
2. SEL	Pressing SEL activates the editing function.
3.  ENT	Turn the Data knob to display the desired Ground speed units. Press ENT to save the selection.

SYS

```
Ground speed
units:          kts
```

SYS

```
Ground speed
units:          mph
```

Notes

Latitude/Longitude Calibration

This procedure is used to calibrate the unit to a known latitude/longitude. Normally, position errors are so slight they are insignificant; however, if highly precise navigation is required, the unit may be calibrated. When the unit is powered-up with calibration factors entered, the display below appears as a reminder. Press any button to continue.

```
LL cal in use!
    Press any Key
```

Action **Explanation**

1. (SYS) 

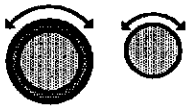
In SYS mode, turn the Control knob to display the LL Calibration page.

```
                              SYS
LL Calibration
        Press 'SEL'
```

2. (SEL)

Pressing SEL activates the editing function. The values on the left of the display show the direction and extent, in minutes, of the adjustment. If you edit these values, the latitude/longitude position on the right of the display changes only after ENT is pressed. (You may edit the latitude/longitude directly by pressing SEL a second time.)

```
                              SYS
±0.00   44°54.96N
+0.00  123°01.32W
```

3. 

Turn the Control knob to move the cursor under the value to be changed. Turn the Data knob to display the desired value. The maximum adjustment allowed is +/- 9.99 minutes.

SYS

```
+0.20   44°54.96N
+0.00  123°01.32W
```

4. Repeat Step 3.

ENT

Edit other values as required. Press ENT to save the changes. To remove calibration factors, set the latitude/longitude calibration to +0.00.

SYS

```
+0.20   44°55.16N
+0.00  123°01.32W
```

Displaying Software and Database Version

If you need to call your dealer or the factory about a problem, it will be helpful if you write down your units' version number a described on these pages. A form is provided in the Troubleshooting section.

Action	Explanation
1. 	In SYS mode, turn the Control knob to display the SW Vers (Software Version) page.

SYS

```
Flybuddy 1
SW Vers        1.10
```

2. 

Turn the Data knob to display the TD Sensor SW Vers page.

SYS

```
TD Sensor
SW Vers        1.01
```

3. 

Turn the Data knob to display the Database Version page.

SYS

```
USA & Canada DB
02/07/91 1.00.17
```

Notes

Activating the Display Test

Action	Explanation
1. (SYS) 	In SYS mode, turn the Control knob to display the Test page.
2. (ENT)	Pressing ENT activates the test.

SYS

```
To test display
      Press 'ENT'
```

Notes

Owner Information

Flybuddy allows the owner to input up to three and one-half pages of personal information. This is designed to discourage theft. The information may not be changed without the proper six letter password, also entered by the owner. Entry of this information is optional, but highly recommended.

Caution

To change the owner information, you must remember your password. The password can only be cleared by II Morrow technicians.

Entering Owner Information

	Action	Explanation
1.	(SYS) 	In SYS mode, turn the Control knob to display the Owner Name page.

SYS

```
Owner Name:
 'SEL' to edit
```

2. (SEL) Pressing SEL activates the editing function. The display below appears for 3 seconds.

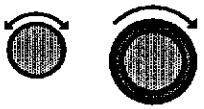
SYS

```
Please record &
verify Password
```

After 3 seconds the display below appears.

SYS

```
Enter owner
password _-----
```

3. 

Turn the Data knob to select the first character in the password, turn the Control knob to move the cursor to the next character space. Characters are not displayed after the cursor is moved. To review the characters, turn the Control knob.

SYS

```
Enter owner
password ----D-
```

4. (ENT)

Press ENT. The screen below is displayed for 3 seconds.

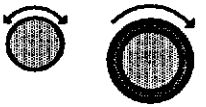
SYS

```
Caution Password
must be verified
```

After 3 seconds the display below appears.

SYS

```
Verify owner
password _-----
```

5. 

Use the Data and Control knobs to confirm your password.

```
Verify owner
password  ----D-
```

6. (ENT)

Pressing ENT saves the password. (If a mistake is made, Flybuddy will ask you to try again.) If the passwords match, the editing function is enabled. The display below appears for 3 seconds.

```
                              SYS
Password matched
editing enabled
```

After 3 seconds, the display below appears.

```
                              SYS
Owner Name:
 'SEL' to edit
```

7. (SEL)

Pressing SEL activates editing.

```
                              SYS
Owner Name:
_
```

8. 


Turn the Data and Control knobs to select characters. Press ENT to save the information.

SYS

```
Owner Name:
JOE JONES
```

9. 

Turn the Data knob to display other owner information pages.

SYS

```
Owner Address:
 'SEL' to edit
```

10. Repeat steps 7 through 9.

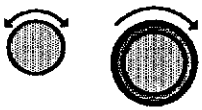
Enter the Owner Address, Owner Phone Number, and Owner Aircraft Number displays.

SYS

```
Owner Name:
JOE JONES
```

Editing Owner Information

Owner information is protected by a password that you choose. To activate the owner information editing function, the password must be entered exactly. Once the password is entered, editing is possible at any time until Flybuddy is turned off.

Action	Explanation
1. SYS 	In SYS mode, turn the Control knob to display the Owner Name page.
	SYS Owner Name: JOE JONES
2. SEL	The password must be entered to enable editing. After pressing SEL, The display below appears for 3 seconds.
	SYS User must first enter Password..
	After 3 seconds the display below appears.
	SYS Enter owner password _-----
3. 	Turn the Data knob to select the first character in the password, turn the Control knob to move the cursor to the next character space.

Characters selected are not displayed after the cursor is moved. To review the characters, turn the Control knob.

SYS

```
Enter owner
password  - - - -D-
```

4. (ENT) Pressing ENT enters the password. (If an incorrect password is entered, Flybuddy will ask you to try again.) If the correct password is entered, the display below appears for 3 seconds.

SYS

```
Password matched
editing enabled
```

After 3 seconds the Owner Name page is displayed.

SYS

```
Owner name:
JOE JONES
```

5.  Turn Data knob to display the Owner information page to be edited.

SYS

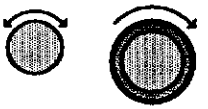
```
WORK PHONE
503 123 4567
```

6. SEL

Pressing SEL activates editing.

SYS

WORK PHONE
503 123 4567

7. 

ENT

Use the Data and Control knobs to edit the display. Press ENT to save the changes.

SYS

HOME PHONE
503 765 4321

Notes

Setting the Auto Nav Scroll Time

Each NAV page may be displayed from 1 to 9 seconds during Auto Nav Scroll.

Action	Explanation
1. SYS 	In SYS mode, turn the Control knob to display the Autonav time page.
2. SEL	Pressing SEL activates the editing function.
3.  ENT	Turn the Data knob to display the desired value. Press ENT to enter the value.

SYS
Autonav time
2 seconds/page

SYS
Autonav time
2 seconds/page

SYS
Autonav time
4 seconds/page

Notes

NAV Mode Display Customizing

Navigation displays may be customized by the pilot. Flybuddy displays are divided into four different fields, and each Nav item requires either one or two fields. For more information, refer to Basic Concepts, *Display Fields* (page B - 27).

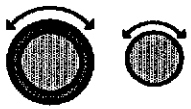
Customizing NAV Displays

Action	Explanation
1. (SYS) 	In SYS Mode, turn the Control knob to display the Nav mode programming page.
2. 	Turn the Data knob to display the Nav page to edit.
3. (SEL)	Pressing SEL activates the editing function.

SYS
Nav mode display
programming pgs

SYS
Brg 085 105nm
Trk 115 145kts

SYS
Brg 085 105nm
Trk 115 145kts

4. 

Turn Control knob to move the cursor under the field to be changed. Turn the Data knob to display the desired Nav information.

SYS

```
Brg 085    105nm
ete SNA    00:44
```

5. Repeat step 4.

ENT

Edit other fields as necessary. Press ENT to save the changes.

SYS

```
Trk 115    105nm
ete SNA    00:44
```

Restoring Default Nav Pages

This procedure is used to restore customized Nav displays to their default (factory) configuration. Default pages are listed in Basic Concepts--*Interpreting Nav Displays* (page B - 29).

Action	Explanation

1. SYS 

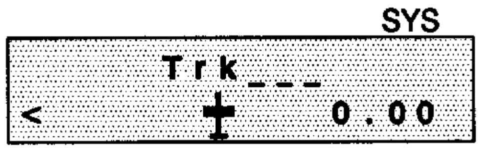
In SYS Mode, turn the Control knob to display the Nav Mode programming page.

SYS

```
Nav mode display
programming pgs
```

2.  Turn Data knob to display the restore page.

3. (ENT) Pressing ENT restores the default Nav Pages.



Notes

Setting the Countdown Timer

The countdown timer can be set in hours, minutes, and seconds. When the timer reaches 00:00:00 the ALERT light flashes. After viewing the alert in SYS mode, the alert clears. A maximum time of 99:59:59 may be entered.

Note
The timer does not display every second as it counts down.

Action	Explanation
1. (SYS) 	In SYS mode, turn the Control knob to display the Countdown Timer page. The setting that was last used appears.
2. (SEL)	Pressing SEL activates the editing function.

SYS
Countdown Timer
00:03:00

SYS
Countdown Timer
00:03:00

3. 

Turn the Control knob to move the cursor under the hours, minutes, or seconds setting.

SYS

```
Countdown Timer
          00:03:00
```

4. 

Display the desired values using the Data and Control knobs. Press ENT to start the timer.

SYS

```
Countdown Timer
          00:03:45
```

Troubleshooting

To Ensure Trouble Free Operation
Avoid high cockpit temperatures when the aircraft is not in use. Extreme heat shortens the life of any electronic equipment. Periodically check all antenna, power, and ground connections.

Caution

DO NOT clean the face plate with chemical cleaning agents, solvents, or harsh detergents. A mild detergent solution and a soft cloth may be used to clean the face plate. DO NOT wax or paint the antenna.

Battery Replacement
The Flybuddy memory is maintained by a lithium battery. The expected service life of this type of battery is from 5 to 10 years. This is not a user replaceable item. The lithium battery must be replaced by the factory, an authorized dealer, or service center.

Indication Of A Low Battery
"Low Battery Alert" appears as an Alert message in SYS mode. If the battery is not replaced, the unit will lose its memory.

If You Have A Problem
Please read the instructions again for the desired function.

If You Are Unable To Correct The Problem
Record the LORAN data (displayed in SYS mode) for ALL stations in the chain, and call your II Morrow dealer or the factory. The technician MUST have this information before the problem can be analyzed.

Difficulty Report

If your unit is malfunctioning, try to record the information below before contacting the factory or dealer. The best information you can provide is better than nothing.

The Latitude & Longitude where the problem occurred?

Serial Number (on back of unit)?

Software Version? (See SYS Mode, *Displaying Software and Database Version*, page S - 23.)

Database Date? (See SYS Mode, *Displaying Software and Database Version*, page S - 23.)

The GRI? (See SYS Mode, *GRI, Triad, and LORAN Data*, page S - 5.)

WARN Messages? (See SYS Mode, *Displaying WARN Messages*, page S - 1.)

For the information below, see SYS Mode, *Displaying LORAN Data*, page, S - 8.

Triad in use?

SNR?

M_____ X_____ Z_____

W_____ Y_____

Cycle Data 1?

M_____ X_____ Z_____

W_____ Y_____

Cycle Data 2?

M_____ X_____ Z_____

W_____ Y_____

IN-FLIGHT

Indication	Problem
WARN light is on. Displayed Warn message is "Low SNR."	If flying through clouds, rain, snow, etc., the likely problem is precipitation static (P-STAT).
	Action
	After landing inspect (or install) static wicks per aircraft manufacturers specifications. Also, check the static bonding straps on all control surfaces. If the problem continues, skin mapping may be necessary.
(Same as above).	**Problem**
	The aircraft is flying out of the coverage area for the selected chain.
	Action
	Select a new GRI.
(Same as above).	**Problem**
	If the WARN light comes on and stays on after takeoff, or run-up, noise from the aircraft alternator or magneto may be responsible.
	Action
	Contact the dealer or factory.

IN-FLIGHT (CONT.)

Indication	Problem
WARN light is on. Displayed Warn message is " Degraded Accuracy."	Flying over a LORAN transmitter may cause the WARN light to come on temporarily.
	Action
	Fly away from transmitter.

	Problem
WARN light is on. Displayed Warn message is "Station not found."	A station the unit is tracking has gone off the air temporarily .
	Action
	Wait a few minutes; the station will normally come back on.

	Problem
WARN light is on. Displayed message is "Station has blink."	Blink condition is occurring. This is a signal generated by the operator of the transmitter indicating a temporary technical problem with the transmitted signal.
	Action
	Signal information appears normal. The WARN light goes out when the problem clears.

Indication	Problem
The WARN light is on and the Warn message is "TD Sensor Failure."	The unit is malfunctioning.
	Action
	Return to dealer for service.

	Problem
Bearing and distance displays appear to be wrong.	A mistake was made in entering the Latitude/Longitude coordinates of a User waypoint, or the wrong waypoint is selected.
	Action
	Verify that coordinates of the User waypoint are accurate. Check the hemispheric identifier. Check the "From" and "To" waypoints.

	Problem
(Same as above).	WARN light is still on.
	Action
	Do not rely on the LORAN for navigation while the WARN light is on.

Indication	Problem
Triad does not select automatically.	Poor LOP crossing angles, or weak signals.
	Action
	Select best triad manually, then reset to automatic selection.

	Problem
Present Position display appears to be wrong.	The Alternate Solution is displayed.
	Action
	Select the other solution. See Normal Procedures, *Displaying the Alternate Solution* (page N - 37).

Hint

Verify your position by activating the Nearest Waypoint Listing. The correct bearing/distance to the nearest airports should be displayed.

ON THE GROUND

Indication	Problem
WARN light stays on after power-up.	Wrong GRI is selected.
	Action
	Change to appropriate GRI in SYS mode.
	Problem
(Same as above).	Required secondary is shut down.
	Action
	Check LORAN signals in SYS mode to see if unit is receiving signals from each station. Verify the unit is using the appropriate triad. Select another GRI or triad (if available).
	Problem
(Same as above).	Signal is weak due to distance from transmitters.
	Action
	Check signal levels. If very low, you may not obtain lock-on until after takeoff.

ON THE GROUND (CONT.)

Indication	Problem
WARN light stays on after power-up (continued).	Aircraft may be parked near something interfering with the signal (APU, hanger, high-voltage lines). **Action** Move the aircraft. The unit usually does not work inside a hanger.
WARN light is on after run-up.	Noise generated from the aircraft alternator or magneto. **Action** Contact II Morrow dealer or factory.

Glossary

ACCURACY, ABSOLUTE: A measure of the ability to determine true geographic position (Latitude and Longitude).

ACCURACY, REPEATABLE: A measure of the ability to RETURN to a specific position or location.

ACQUISITION: The process of "locating" the LORAN signal among background noise, and then tracking the signal.

ALTERNATE SOLUTION: There are two solutions to the LORAN's calculations. Normally the unit automatically displays the correct solution. The solution the unit does NOT display is the Alternate Solution.

BASELINE: The line connecting the master transmitting station and a secondary transmitting station.

BASELINE EXTENSION: The extension of the baseline beyond the master and secondary transmitting stations.

BLINK: A transmitted signal indicating signal information from that station may be inaccurate or missing.

CHAIN: A LORAN network consisting of a master station and from two to five secondary stations. A LORAN chain is also referred to as a GRI.

CODING DELAY: The time difference between the pulse groups transmitted by a master station and a secondary station.

CONTROL/MONITOR STATION: A station within a LORAN chain that insures proper signal transmission. It is normally an unmanned receiver site located within the prime

LORAN coverage area, separate from all of the transmitter stations.

CROSSING ANGLE: The angle formed by two intersecting LOPs (Lines of Position).

CROSS-RATE INTERFERENCE: Signal interference caused by over-lapping coverage areas from two or more LORAN chains.

CROSS TRACK DISTANCE: The distance, left or right, away from the desired course.

CYCLE SELECTION: The process of determining the correct cycle of the 100 kHz carrier to track for Time Difference measurement.

CYCLE SLIP: Failure of the receiver to maintain synchronization of the Zero Crossing Tracking Points and phase coding of the LORAN pulses. This results in time measurement errors in multiples of 10 usec (microseconds). A cycle slip normally results in a displayed position error of more than one mile. The magnitude of the error depends on the receiver's position in the LORAN coverage area.

DEFAULT PAGES/SETTINGS: Settings programmed into the unit as it leaves the factory. These settings can later be changed by the user.

DUAL RATED STATION: A LORAN transmitting station that operates in two LORAN chains.

ENVELOPE-TO-CYCLE DIFFERENCE (ECD): A measure of signal distortion determined by the phase shift between the pulse envelope and the 100 kHz carrier.

FIX: A position (latitude/longitude) defined by two intersecting LOPs (Lines of Position).

GEOMETRIC DILUTION OF PRECISION (GDOP): A factor used to express all geometric causes of error in a fix.

GREAT CIRCLE ROUTE: The shortest distance between points along the curved surface of the earth.

GROUND WAVE: A radio wave that travels near or along the Earth's surface.

GROUP REPETITION INTERVAL (GRI): The number used to identify a particular LORAN chain. The four digit number indicates the time coded delay. For instance, the West Coast chain GRI is 9940, which refers to a time interval of 99,400 usec (approximately 1/10 of 1 second).

LINE OF POSITION (LOP): A line representing the series of locations of constant Time Difference (TD) between the master and a secondary station.

LORAN: LOng RAnge Navigation.

LORAN-C: A long range navigation system using ground-based transmitters operating in the Low Frequency (100 KHZ) radio band. The "C" refers to the version of LORAN.

MASTER STATION: The controlling station of a particular LORAN chain which transmits the reference timing signals based on the GRI of that chain.

PRECIPITATION STATIC (P-STAT): Electromagnetic noise created by the rapid discharge of static electricity. An aircraft builds up a static electric charge when passing through charged particles (such as rain, ice, snow, or dust).

REPEATABLE ACCURACY: See ACCURACY, REPEATABLE.

SEARCH: The process of finding and sorting the 100 kHz carrier wave signals.

SECONDARY STATIONS: The two to five secondary transmitting stations in a LORAN chain which transmit in sequence at fixed, predetermined, intervals. Secondary Stations transmit groups of pulses that are used to determine the position of the receiver.

SIGNAL-TO-NOISE RATIO (SNR): The ratio of the LORAN signal level to the level of background noise.

SKYWAVE: An indirect radio wave that reflects off of the ionosphere, rather than following a direct path from the transmitter to the receiver.

TIME DIFFERENCE (TD): The difference in time of the arrival of two LORAN signals, one from the master station and the other from one of the secondary stations. TDs are measured in microseconds (usec).

TRACKING: The process of maintaining synchronization of the receiver with the selected signals.

TRIAD: The master and two secondary transmitting stations used by a LORAN receiver to determine position.

WAYPOINT: A specific named location on the earth.

Index

A

Alert Messages .....B - 25
Displaying .....S - 3

Alternate Solution ..B - 47
Displaying .....N - 37

Arrival Alert Radius
Setting .....S - 15

Auto Nav Scroll ....B - 43
Starting .....N - 35
Time Setting .....S - 35

C

CDI Sensitivity
Adjusting .....S - 13

Controls .....B - 9
Buttons .....B - 10
Control Knob .....B - 10
Data Knob .....B - 10
Multi-Purpose
Controls .....B - 11
Power Switch .....B - 9

Countdown Timer ..S - 41
Starting .....S - 42

D

Databases .....B - 1
Airport Database ...B - 1
Heliport Database ..B - 3
NDB Database .....B - 3
Seabase Database ..B - 3
User Database .....B - 2
VOR Database .....B - 2

Datacard
See Optional Datacard

Display Fields .....B - 27

Display Test
Activating .....S - 25

Displays .....B - 9
LCD Display .....B - 9

F

First Flight .....F - 1
Direct Navigation ..F - 3
Start-Up .....F - 1

Flight Plans . N - 11, B - 39
Changing Status ...N - 25
Creating .....N - 11
Deleting .....N - 23
Deleting/Inserting
a Waypoint .....N - 20
Editing .....N - 18
Entering INFO ....N - 16
Two-Leg Flight ....N - 3

G

Glossary .....A - 1

GRI .....S - 5
Entering .....S - 5

GRI Chains .... F - 7, S - 9
Coverage
Areas .....F - 8, S - 10

Ground Speed Unit
Selection .....S - 19

I

Interpreting Database Information
- Airport Database . . B - 35
- Duplicate NDB Identifiers . . . . . B - 38
- Heliport Database . B - 35
- NDB Database . . . . B - 37
- Seabase Database . B - 38
- VOR Database . . . B - 37

L

Latitude/Longitude . S - 21
- Calibration . . . . . S - 21

Lights . . . . . B - 9
- Alert Light . . . . . B - 13
- Mode Lights . . . . . B - 14
- Warn Light . . . . . B - 13

LORAN Data . S - 5, B - 45
- Displaying . . . . . S - 8

M

Magnetic Variation . S - 17
- Manual Adjustment S - 17

Modes . . . . . B - 15

N

Nav Displays
- See also Navigation Displays
- Customizing . . . . . S - 37
- Restoring Default Pages . . . . . S - 38

Navigating to Nearest Waypoint (Emergency Search) N - 1

Navigation Displays . B - 29
- Interpreting . . . . . B - 31

Nearest Waypoint . . B - 33

O

Operating Logic . . . . B - 17
- Displaying Pages . . B - 17
- Editing . . . . . B - 18
- Pages . . . . . B - 17
- Searching Databases . . . . . B - 19

Optional Datacard . . . B - 5
- Airport Database . . B - 6
- Heliport Database . B - 7
- NDB Database . . . . B - 6
- Seabase Database . . B - 7
- VOR Database . . . . B - 6

Owner Information . S - 27
- Editing . . . . . S - 30
- Entering Owner Information . . . . . S - 27

S

Software/Database Version
- Displaying . . . . . S - 23

T

Triads . . . . . S - 5
- Manual Selection . . S - 6

Troubleshooting . . . . T - 1

U

User Waypoints ....N - 27
Creating .....N - 27
Deleting .....N - 31
Editing .....N - 29
Entering/Editing
INFO .....N - 32

W

Warn Messages .....B - 21
Displaying .....S - 1
Reciever Warn
Messages .....B - 21

Waypoint Search ....N - 7
City Name .....N - 9
Identifier .....N - 7

Displaying Waypoint
Info .....N - 10