FlightMax™

Flight Situation Display

General Operating Procedures

Revision History

Date	Revision	Description
Sep. 7, 2000	00	Production Release

General Operating Procedures
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General Operating Procedures

Introduction

This part of the Pilot's Guide will explain general operating procedures for the FlightMax FSD. Topics include:

- *Overview* - provides a brief overview of the main operating features.

- *Controls and Display* - describes all the front panel controls and the display screen. There is also an explanation of the system startup sequence

- *Menus* - describes the various menu types and hierarchical structure of the menus.

- *Pages* - describes the various page types and their functions.

- *Messages* - explains the message bar, the message center, and messages issued by the system.

- *The System Menu* - explains how the system menu is used to configure the system.

- *CD-ROM Drive* - explains the CD -ROM and how to use it.

- *FSD Failsafe Features* - describes the methods used to prevent the display of false or misleading information.

All FlightMax functions are factory installed. Proper installation of each function is verified by the presence of its icon and text legend in the Main menu. If the icon and legend for any function is not present in the Main menu, contact Avidyne for assistance.

Overview

Figure 1: FSD Control Panel

Operating the Avidyne FlightMax FSD requires a basic understanding of the various controls and displays. This part of the User manual will explain the conventions used for general operation. The remaining parts of the User manual explain in detail the operation and use of the specific functions available with the FlightMax FSD.

The front panel of the FlightMax unit (Figure 1) contains several knobs and keys used for controlling the various functions. The Off/Brightness knob is used to turn the unit on and off as well as adjust the screen brightness. There are six line keys, three set function keys and a dual concentric knob used for controlling various screen functions.

Menus are used to navigate through various functions and they follow a consistent style. Each menu contains written text with an icon (if configured for display) to guide the user through the various pages. The Main menu is the starting point for all user operations. All functions are accessed from the Main menu.There is also a System menu for configuring the system.

The various screens for the different functions are referred to as pages. Menus are used to navigate through the

different pages. The main page for each function is called the Data page. The number of pages for each function varies depending upon the amount and type of information the function needs to convey.

The system uses a color coded message bar to convey information to the pilot. This includes everything from general to critical information. Error message information is stored in the Message Center, providing the pilot with a history of messages.

Controls and Display

The Avidyne FlightMax controls consist of an Off/Brt knob, three set function keys, a variable function dual concentric knob and six line select keys (refer to Figure 2).

Off/Brt Knob

This knob is located in the upper right hand corner of the FlightMax unit and serves two purposes. It turns the FlightMax FSD on or off and controls the brightness of the display screen. Turning the knob clockwise turns on the unit and increases the brightness of the display. In typical daylight conditions it is advisable to run at the full brightness (fully clockwise) setting. Screen brightness is controlled only by this knob.

Figure 2: FSD Controls

If your aircraft is equipped with an avionics master switch or an avionics circuit breaker, the FSD can be turned on or off via the aircraft's power switching system. Avidyne recommends that the FSD be powered off during engine start and shutdown and whenever the alternator is brought on or off line.

Menu Key

When this key is depressed it will bring up any menu that is currently not displayed. It is also used to remove menus from the display. This key is also used to display menu items that don't fit within the screen. Using this key with the menus is explained in Menus.

Enter Key

The **Enter** key is similar to the enter key on a computer keyboard. When entering data into the system the Enter key is generally used to execute the change. Specific instances of when to use the **Enter** key are indicated throughout the manual.

Escape Key

The Escape key (labeled **Esc**, for lack of space, but referred to in the documentation as **Escape**, for clarity) is primarily used to navigate to higher level menus.

Line Select Keys

The Line Select keys are used to select menu items. The keys line up with the various menu functions and pressing a key will normally activate that function.

Control Knobs

The Control Knobs are a set of variable-function dual concentric knobs. These knobs are used for setting parameters and controlling the display. The function currently in use determines what tasks, if any, the knobs perform.

System Startup

System startup is automatic once power is applied. The system performs a brief hardware self-test, then systematically initializes its functions.

When the basic operating software has been loaded (less than a minute after power-on), the Avidyne logo appears on the system page (Figure 1*). The system then checks the CD-ROM drive for the presence of a data update CD. If one is found, a data load can be initiated.

The system then initializes the functions. Each function checks its own data and external equipment to make sure it can operate properly, then signals the system that it is fully initialized. The system then starts the next function. When all of the functions have been loaded, the system requests that the user press **Enter**. After pressing Enter FlightMax Map is displayed.

System Startup Sequence

1. Supply power to the FSD.

2. Using the **Off/Brt** knob, turn on the FSD. Make sure the display screen is at full brightness.

3. The system will display several pages showing self test and startup information. This information is unimportant in normal use (however it may be useful if

there is a problem with your unit).

4. The Avidyne logo appears on the system page. The screen displays "Press **Enter** To Continue" (see Figure 1).

5. After pressing **Enter** the Map display will come up. The system is now ready for use. Press **Escape** or **Menu**, to display the Main menu (see Figure 3).
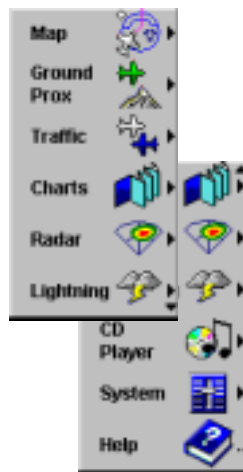

Figure 3: Main Menu

Menus

The FSD user interface is based on a hierarchical menu system. The top level is the Main menu (Figure 3). Each of the major functions in the system is represented by a menu that branches out from the Main menu.

In each menu, functions are assigned to the line select keys to the right of the display screen (Figure 4). Each function in the current menu is displayed on the screen so as to align with the line select key

Figure 4: Main menu and line select keys

that activates it. If there is no legend adjacent to a particular line select key in a particular menu, that key has no function in that menu.

Under certain circumstances, the function normally associated with a line select key may be temporarily unavailable. This is represented in the menus by reducing the displayed intensity of the function's menu legend and removing its color ("graying out" the function). An example is shown in Figure 5.

Figure 5: Disabled menu function

The menu path is indicated by the small menu legends located in the top center of the screen. These legends are presented in stair-step fashion to the left of the menu itself. An example of a menu path is shown in Figure 6. The current menu being used is the bottom legend.
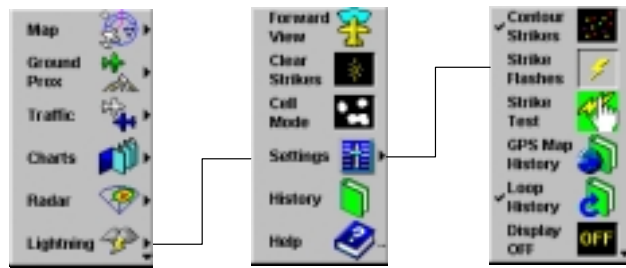
In addition to the functions listed on the menu, each menu contains a help function. The help function gives a short explanation of the functions listed in the menu.

Figure 6: Menu Path

Menu Organization

The menus are organized in a hierarchical structure that provides easy access to the most important functions.

MAIN →   LIGHTNING MAIN MENU →   SETTINGS MENU

Figure 7: Menu Structure

The Main menu is the first menu to appear at startup and contains a list of all functions available on your system as well as accesses to the MAIN menu and the message center (a status page).

The top-most menu for a given function is referred to as the function's main menu. Figure 7 shows the Main menu to the left and the function main menu (in this case LIGHTNING) to the right of it. Settings is a sub-menu of the Lightning Main menu. When an action has been completed within one of the sub-menus the system returns to the functions main menu.

Every menu contains a HELP feature. The HELP page contains a brief explanation of each item in that menu.

Navigating through the Menus

The following table explains how to navigate through the menus:

Table 1: Menu Navigation

TO:	DO This :
move down (to lower levels)	press the line select key associated with the menu item
move up (towards Main menu)	press the fixed-function **Escape** key. Pressing the **Escape** key while in the Main menu, will remove the Main menu from display.
recall a menu	press the set function **Menu** key
remove a menu from the display	press the set function **Menu** key or wait a few seconds for it to automatically disappear*.
shift menu to the next menu page	press the set function **Menu** key to reveal additional menu items that don't fit within the display screen. A downward facing arrowhead symbol at the bottom of the menu or an upward facing arrowhead at the top, indicates the presence of additional menu items (Figure 3).

*NOTE: Menus are set to disappear after a specified time interval to free up space on the screen (unless configured otherwise. See "The System Settings Page" on page 21.) When no menus are visible on the screen, pressing the **Menu** key will redisplay whichever menu was last active.

Menu Functions

There are several different types of functions that can be activated within a menu. Refer to Figure 8, the Lightning Menu, for examples of the different functions.

Lower level menus (sub-menus) are identified by a small triangle to the right of the menu item. Selecting the item will bring up the sub-menu. In the Lightning menu, selecting SETTINGS will bring up the SETTINGS sub-menu.

Actions are functions that are immediately executed as a result of selecting that menu item. In the LIGHTNING menu, selecting CLEAR STRIKES will immediately clear the display of all lightning strikes.

Toggles are functions that perform as on/off switches. They are used to select and deselect different viewing options. A toggle function is indicated by a check mark to the left of the menu item when it is enabled. The check is absent when the function is deselected. To toggle a function, select it by pushing the **Menu** button, then press the adjacent line-select button to toggle it.
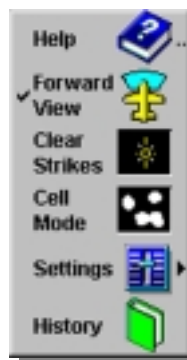
Figure 8: Menu Functions

In the LIGHTNING menu, selecting FORWARD VIEW displays lightning strikes in front of the aircraft. Deselecting it presents a 360° view.

Selections are similar to toggles, but consist of a group of related toggle items on one menu. Only one item in the group may be selected at any time. Selecting a new menu item will deselect the previously selected item.

A *Double Dot* to the right of a menu item means selecting that item will bring up a status or configuration page.

Examples of Menu Functions

Depending on your system configuration, the following are examples of the different menu functions.

Actions

LIGHTNING→CLEAR STRIKES

Toggles

LIGHTNING→FORWARD VIEW
LIGHTNING→SETTINGS→STRIKE TEST

Selections

CHARTS→TYPE

Pages

All of the information presented by the FlightMax is organized into *pages*. Each page is organized and formatted to make it easy to understand the information it presents. Every page covers the entire display screen. Information from two (or more) pages cannot be displayed simultaneously, nor will the system do so. The menu system controls movement through pages. Map pages are selected by the knobs.

The following sections explain the various pages used on the FlightMax FSD.

Data Pages
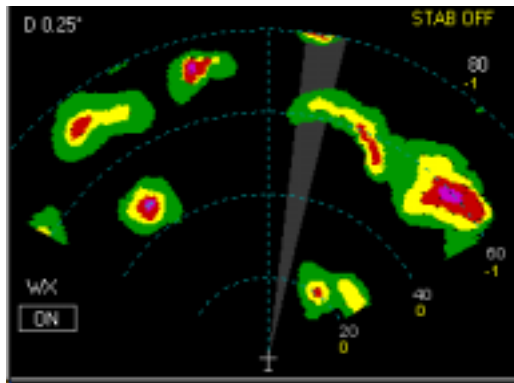

Figure 9: Radar Data Page

Data pages are used by the function to display the main data of that function. It is the first page to appear when the function is selected. Figure 9 shows the Flightmax Radar data page. This page displays weather data and your aircraft's relationship to it.

Data pages vary greatly in format due to the varying types of information presented by the functions.

Status Pages

Status pages provide information about the operational state of various system components. For example, the GPS status page (Figure 10) indicates how many satellites are currently in view and what signal strength the receiver is reporting for each.

The status page contains several common features in addition to the status information for that function.

Title Bar indicates what functions status is being viewed.
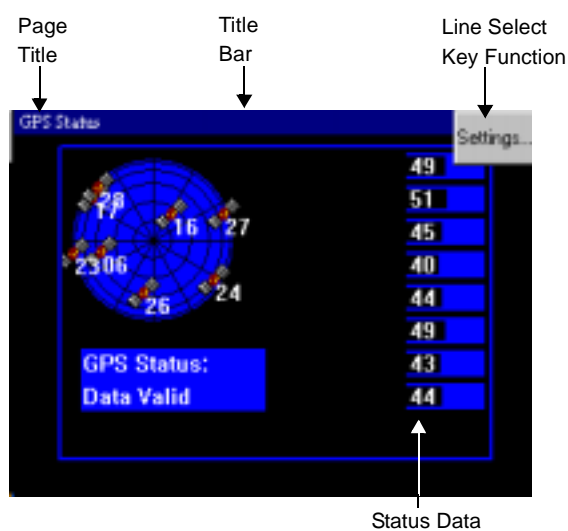
Figure 10: GPS Status Page

Enter and **Escape** keys are used to exit the page. Press the set function **Enter** or **Escape** keys to exit the page. Either one will work.

The **Line Select Key** function is normally used to enter an additional status page for that function or to enter a Configuration page. Press the line select key next to the screen button to initiate.

Confirmation Pages

Confirmation pages are used to confirm any changes that were requested from within that function.

Confirmation pages may also display error information and possible solutions when parameter values are incorrect.

Normally to accept any changes made within the function press the **Enter** key. To decline the changes press the **Escape** key. The changes will revert to the previous values.

Configuration Pages

> **NOTE:** Do not change any settings within any Setup Configuration Page without first consulting your installer.

Configuration pages are used to set system configuration parameters or operation parameters. For example, the *NavMap Settings page* (Figure 11) is used to set navaid displays for FlightMax Map during operation.

Setup configuration pages are used to set system parameters. Normally, after the FlightMax FSD has been installed and set up, these configuration pages should not be accessed.

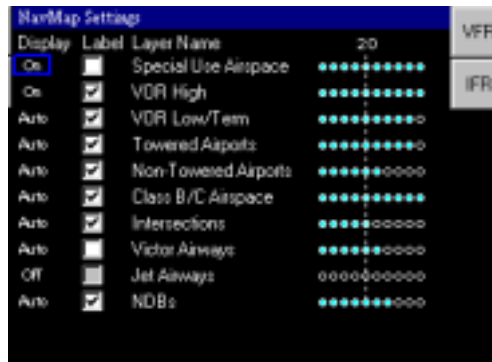Use the **Enter** key to accept changes to the parameter and the **Escape** key to leave that page.

Figure 11: NavMap, a Configuration Page

How to Change Page Parameters

The following table lists the different methods used by the FSD to change page parameters.

The knob controls are used for parameter selection and modification in most pages. Normally, the outer knob is used for parameter selection and the inner knob for parameter change.

Table 2: Changing Parameters

Parameter Type	How to Change
Check Box 	To place or remove a check in a check box, turn the inner knob. The outer knob will move from the check box to another parameter.
Numeric or Text Boxes 	These boxes are similar to lists but only one item (text or numeric) is displayed at time. Use the inner knob to change the value. The outer knob is used to move to another parameter.
Lists 	There are several different types of lists but changing the selections in a list are similar. The list is selected when the top line of the list is highlighted by a blue line. Use the inner knob to scroll up and down the list. For drop down lists, initially turning the inner knob will call up the entire list. Changes to the list do not become effective until **Enter** is pressed. If the list is to long to display, a scroll bar on the hand side indicates that there are more items on that list. Use the outer knob to move to another parameter.

NOTE: Individual parameters do not become effective immediately; they become effective only when **Enter** is selected.

Messages

The Message Bar

The message bar is an annunciation system that is used to keep the pilot informed about critical as well as routine information from the FSD.

When information needs to be conveyed the message bar appears at the bottom of the screen. It contains the following information (Figure 12):

- The message itself.

- A symbol representing the system component that issued the message.

- A symbol representing the priority of the message.

- The elapsed time since the message was issued.

- The total number of messages awaiting confirmation.

Figure 12: The Message Bar

Each issuer is identified by its icon, a smaller version of the ones used in the main main.

The message bar can display only one message at a time. If more than one message is available, the message bar will display the messages with the most criticality first (refer to Table 3 and Table 4 for message type and meanings). Warning, Global messages will be displayed over other types of messages.

Informational messages (and *only* informational messages) may be configured for automatic confirmation after a specified time. This can be done at the MAIN MENU→SYSTEM→SETTINGS menu.

Message Type

There are two types of messages, global and local.

Table 3: Message Type

Type	Meaning
Local	Local messages are displayed only when the issuer's data is being displayed (such as the name of the current chart being displayed while in charts).
Global	Global messages are displayed no matter which screen is currently being viewed. Usually global messages are of a critical nature (such as the loss of a GPS receiver).

Message Priority

Each message is assigned one of the following three priority levels:

Table 4: Message Symbols

Symbol	Meaning
	Informational messages provide low priority information that is useful to know and require no response.
	Cautionary messages provide medium priority information, indicating that a non-critical change has taken place that may require the pilot's knowledge or some response on a non-emergency basis.
	Warning messages are high priority messages that require definite action by the pilot or that indicate a loss of essential functionality.

Background Color

<div align="center">

Table 5: Message Background Color

</div>

Color	Meaning
Blue	The message can be confirmed immediately. Press **ENTER** to confirm (the message bar will disappear).
Gray	The message can be confirmed at a later time. Normally a gray background indicates the user is in a status, confirmation or configuration page and the message can be acknowledged only after leaving the page. Press **ESCAPE** to ignore the message.
Yellow	The message can be confirmed immediately, which causes the display to switch to the issuing function. Press **ENTER** to confirm. For example: while viewing Charts, a yellow message for Traffic appears. Confirming the message will switch the display to Traffic.
Red	The message should be confirmed immediately, which causes the display to switch to the issuing function. Press **ENTER** to confirm. For example: while viewing Charts, a red message for GroundProx appears. Confirming the message will switch the display to GroundProx.

The Message Center

The Message Center maintains a history of some messages. Messages that indicate the state of the system (i.e. communication loss of the GPS receiver, or failure to start an application) are maintained in the message center.

The message center occupies the lower portion of the System menus page. This page (Figure 13) appears by selecting System from the System Main menu .

When a system component issues a message, it is sent both to the message bar and to the message center.

Use the inner knob to scroll up and down and the outer knob to scroll side to side.

Figure 13: The Message Center

Messages Issued by the System

System messages are messages not associated with a specific function (i.e. Charts, Traffic etc.). Messages issued by the system are listed in Table 6. Those issued by the GPS interface are listed in Table 7.

> **NOTE:** Communication with the GPS receiver may be lost and than restored. If the message indicating that communication was lost is not confirmed and communication is subsequently restored, the message will be be removed from the message bar.
>
> Occasional GPS signal dropouts are normal and may be ignored. Persistent messages at close intervals should be investigated. Contact your avionics installer or Avidyne for advice.

Table 6: System Messages

Message	Meaning
Failure Starting <function> Failure to Start <function>	Abnormal system condition has caused startup of the named function to fail. You may wish to power you FSD down, then up, to see whether the function can be restored. If the condition persists record the exact wording of the message and contact Avidyne.
Already starting <function>, please wait	Abnormal system condition has caused attempted restart of the named function. Ignore the message and allow the system to complete its startup sequence. If all functions are available when startup is complete, they can be used with confidence. If the condition persists on restart, record the exact wording of the message and contact Avidyne.

Table 7: GPS Interface Messages

Message	Meaning
Nav Source Position Data is Valid	Normal condition – useful Nav Source data is being received.
Nav Source Position Data is NOT Valid	Your GPS is sending valid data, but not a valid position. Generally means that the GPS has lost satellite lock. If the condition persists, it may help to restart the GPS. If this condition is corrected and you have not confirmed the message, it will simply be removed.
Heading Data is Valid	Normal condition – useful heading data is being received.

Table 7: GPS Interface Messages

Message	Meaning
Heading Data is NOT Valid	Your GPS or FMS is sending valid data, but not a valid heading, even though it is capable of doing so. May indicate a problem with the remote compass system If this condition is corrected and you have not confirmed the message, it will simply be removed.
Nav Source NOT Connected	No data whatsoever is coming from your GPS. It may be turned off, the connection may be broken, or there may be a configuration error (if it has *never* worked or you have made configuration parameter changes). Check the GPS and try restarting it. You probably shouldn't attempt configuration parameter changes without advice from your installer.
Nav Source Data Format Error	Invalid data is coming from your GPS. If persistent, generally indicates a configuration error. Contact your installer.
GPS Settings Invalid (Can't Connect) GPS Settings Invalid (Failed to Connect)	The GPS interface cannot open the assigned port. Generally indicates a configuration error. Contact your installer.

The System Menu

The MAIN MENU→SYSTEM menu (Figure 14) is used to configure the system. It is primarily used by the installer to integrate the FSD with the other avionic systems and to set up the FSD to the pilots personnel preferences.

Figure 14: System Menu

The System Settings Page

The SYSTEM→SETTINGS page (Figure 15) provides options for menu display and message management. The setting options include the following:
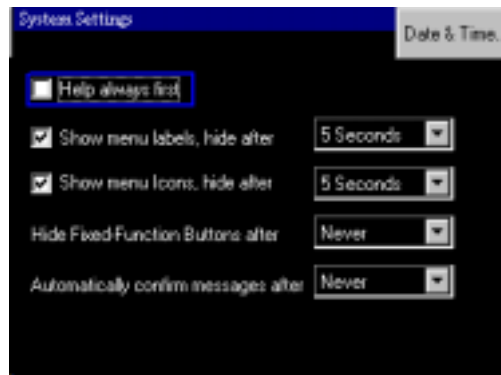

Figure 15: System Settings

Help always first: Whether THE HELP item in each menu is displayed first (the default) or last on all menus.

Show menu labels: Whether menu labels are displayed at all and, if so, whether they are automatically removed from the screen after a period of time.

Show menu icons: Whether menu icons are displayed at all and, if so, whether they are automatically removed from the screen after a period of time.

Hide Fixed-Function Buttons after: Define when the Fixed Function buttons in FlightMax Map are removed from the display, if ever.

Automatically confirm message after: Define when low priority messages are automatically confirmed after a period of time. Automatic message confirmation is only for low priority messages. Critical messages (see page page 16) must be confirmed by the pilot.

> **NOTE:** Removing icons and labels provides more display space so less of the currently viewed function is covered by menus and button labels.

Date & Time: Select this button to access the Date & Time page, Figure 16.

Figure 16: Date & Time Page

Time Zone: Select your primary time zone, based on Greenwich Mean Time (also referred to as "Zulu" time).

Date: Select today's date

Local Time: Select your present local time, based on a 24 hour clock.

Devices

The SYSTEM→DEVICES menu contains functions that allow the installer to set up the interfaces between the FSD and other aircraft systems. The number of functions on the Devices menu is dependent on the number of functions installed on your system.

Detailed information and procedures for using this menu and it's submenus appear in the FSD Installation manual.

In addition to aircraft systems interfaces, the DEVICES menu also provides access to a CD-ROM status page.

Shutdown

Previous versions of the FlightMax FSD required a Shutdown procedure prior to shutting off the FSD. The current version of the FlightMax FSD does not require special shut down procedures. Simply turn off the unit.

Help

The HELP menus provide brief descriptions of the functions on each menu. Each menu on the FSD has a help item. Help for the Charts main menu is shown in Figure 17. They are not designed as a substitute for this manual. Help does not provide access to an on-line manual.

Figure 17: Help Page

CD-ROM Drive

A separate CD-ROM drive is available as an FSD option. The CD-ROM drive is used to load new charts and to load Map database updates. Data update CD-ROMs are available from Avidyne on a subscription basis or individually. Call 1-800-AVIDYNE for more information.

The CD-ROM drive obtains its power from the FSD. It is always on when the FSD is on. There is no power indicator on the CD-ROM drive enclosure, but there is an orange indicator light that shows when the CD-ROM is in active use.

⚠ **CAUTION**

You must plug in or unplug the CD-ROM drive only when the FSD is powered down. If it is plugged in "hot", the drive will not be recognized, and may be damaged.

CD-ROM Drive Operation

To load a CD-ROM into the drive, open the loading tray by pressing the CD-ROM eject button in the center of the unit. Place the CD, label side up, into the tray, popping its center hole onto the spindle, then push the tray in to shut it.
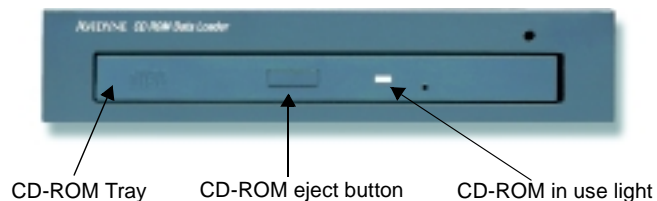

CD-ROM Tray   CD-ROM eject button   CD-ROM in use light

Figure 18: CD-ROM drive

To unload a CD press the CD-ROM eject button. The tray will move out and you can remove the disk, popping it off of the spindle.

Do not attempt to remove a CD while the orange light on the drive is on, indicating that the disk is in active use. Do not turn off the FSD in the middle of a data update operation; wait for it to complete or abort it, then turn off the unit. Failure to follow this precaution could damage the system and necessitate factory service.

Avidyne Fast Data Loader Function

The FlightMax FSD provides a capability for highly efficient updates to Charts and Map data that may be present on the FSD. It has minimal operator interface and is executed automatically at system power up.

At system power up, the FSD checks whether the optional Avidyne CD-ROM disk drive is present and whether a valid data update CD is loaded. The update CD must be installed immediately after power is applied to the FSD (within approximately 30 seconds). If one is present the system displays a confirmation page allowing the user to initiate the update or skip it.

If a confirmation page does not appear, the CD was not inserted in time. Shut down the system and restart again. The CD can be left in the loader. If the CD is read, the Fast Data Loader function is initiated.

The Fast Data Loader function determines which Charts and Map files need to be replaced by newer versions from the update CD and performs the replacement. Steps are taken to ensure that file replacement is accomplished without error, and that, whenever errors do occur, the system is left in a usable state.

During a data load the Data Loader page is displayed. The progress bar indicates how much data has been put on the hard drive. The Fast Data Loader function informs the pilot of any exceptional conditions that arose during its operation.

When the data loader completes, the system resumes its normal startup sequence. When the functions become available upon its completion, the new data will be available for use.

To abort any load, press the **Escape** key. The file being

processed and files that have not been loaded will not be updated.

> **NOTE:** The Data Loader progress bar is inaccurate when loading a large amount of VFR Charts. The progress bar reaches 100% while the system has more charts to load. All other loading displays are accurate.
>
> If you are loading a large amount of VFR charts, ignore the progress bar. When the charts are finished loading, the system will continue with the normal start up sequence.

FSD Failsafe Features

Because of the potential safety issues that arise in any avionics system, the FSD has been designed with a number of failsafe features. These features are designed to eliminate any possibility that the FSD will display information that might be misleading and lead to an unsafe condition.

The following are some of the more important failsafe features:

1. The FSD checks all incoming GPS data for errors. If errors are detected, the GPS data is rejected. If this occurs, there will be a message in the message bar and each function that uses GPS data will invalidate displayed values based on GPS data.

2. Charts and Map depend on loadable data for their functionality. They check the data for validity before using it. If the data is found to be invalid, they will operate, but at reduced capability. Charts may be unable to display data in certain geographical areas. Reloading the data may correct the situation. If not, factory service will be required.

3. Each function is checked for proper operation as it runs. A function that exhibits signs of failure is automatically terminated. If this occurs, a Termination message is displayed in the message bar and the functions icon is grayed (Figure 19). The function can not be restarted except by restarting the FSD. If it occurs repeatedly, service may be required.

Figure 19: Failsafe Message - function Terminated